PTO/AIA/15 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	UPN-R3895D2US
First Named Inventor	Luk VANDENBERGHE
Title	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [✔] **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. [ ] **Applicant asserts small entity status.** See 37 CFR 1.27
3. [ ] **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. [✔] **Specification** [*Total Pages* 53] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. [✔] **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 21]
6. **Inventor's Oath or Declaration** [*Total Pages*] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. [ ] Newly executed (original or copy)
   b. [ ] A copy from a prior application (37 CFR 1.63(d))
7. [✔] **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   [ ] Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
   a. [✔] Computer Readable Form (CRF)
   b. [ ] Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ADDRESS TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

ACCOMPANYING APPLICATION PAPERS

10. [✔] **Assignment Papers** (cover sheet & document(s)) Name of Assignee The Trustees of the University of Pennsylvania
11. [✔] **37 CFR 3.73(c) Statement** (*when there is an assignee*) [✔] **Power of Attorney**
12. [ ] **English Translation Document** (*if applicable*)
13. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [ ] Copies of citations attached
14. [ ] **Preliminary Amendment**
15. [ ] **Return Receipt Postcard** (*MPEP § 503*) (*Should be specifically itemized*)
16. [ ] **Certified Copy of Priority Document(s)** (*if foreign priority is claimed*)
17. [ ] **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. [ ] **Other:** _____

***Note**: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

[✔] The address associated with Customer Number: 00270 **OR** [ ] Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	/Colleen M. Schaller/	Date	2019-03-27
Name (Print/Type)	Colleen M. Schaller	Registration No. (Attorney/Agent)	67751

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk Vandenberghe
Filer:	Colleen M. Schaller
Attorney Docket Number:	UPN-R3895D2US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1720**

Electronic Acknowledgement Receipt

EFS ID:	35559044
Application Number:	16368758
International Application Number:	
Confirmation Number:	7840
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk Vandenberghe
Customer Number:	270
Filer:	Colleen M. Schaller
Filer Authorized By:	
Attorney Docket Number:	UPN-R3895D2US
Receipt Date:	28-MAR-2019
Filing Date:	
Time Stamp:	20:40:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1720
RAM confirmation Number	032919INTEFSW00006598083040
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	UPNR3895D2US_20190328_ADS.pdf	1566229 980634a4520814d98d6d17fe3a0135ee3fccc8e6	no	8
Warnings:					
Information:					
2		R3895D2US_Appln.pdf	432181 a574be51c4046c9c53ffa22993607270f31e6c19	yes	53

Multipart Description/PDF files in .zip description

Document Description	Start	End
Abstract	53	53
Claims	52	52
Specification	1	51

Warnings:					
Information:					
3	Sequence Listing (Text File)	R3895D2_Seq-Listing_ST25.txt	259545	no	-
Warnings:					
Information:					
4	Power of Attorney	UPNR3895D1US_POA.pdf	87643 44f702e9ca117913856ad5cb738251ef605be47b	no	1
Warnings:					
Information:					
5	Assignee showing of ownership per 37 CFR 3.73	UPNR3895D2US_Statement-3_73c.pdf	117917 88efa29def1f724b7a0db76be6800607a4d4ded8	no	3

Warnings:					
Information:					
6	Assignee showing of ownership per 37 CFR 3.73	R3895_Assignment_signed.pdf	220050 64db71ba22ce2de9b74fcef0eaabc9da8665fd2a	no	4
Warnings:					
Information:					
7	Oath or Declaration filed	R3895C2_Declarations-EXECUTED_All-pto.pdf	2112763 97080758dd6ebc50ba30f4bac8e9a8a1482c115e	no	4
Warnings:					
Information:					
8	Drawings-only black and white line drawings	UPNR3895D1US_Figs.pdf	143363 68b09b877e42102135198f44983375ee277d16ef	no	21
Warnings:					
Information:					
9	Transmittal of New Application	UPNR3895D2US_Transmittal.pdf	277097 6bfb7e70ca656f14b23993ce9bb956293dab3257	no	2
Warnings:					
Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	35021 afdaf2e12c062776a81b2d701929054e5d145c2d	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	5251809	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Luk		VANDENBERGHE	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Weston	MA	US

Mailing Address of Inventor:

Address 1	14 Indian Hill Road
Address 2	
City	Weston
State/Province	MA
Postal Code	02493
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Guangping		GAO	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Westborough	MA	US

Mailing Address of Inventor:

Address 1	4 Edward Dunn Way
Address 2	
City	Westborough
State/Province	MA
Postal Code	01581
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James	M.	WILSON	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

City	Philadelphia	State/Province	PA	Country of Residence	US

Mailing Address of Inventor:

Address 1	1831 Delancey Street		
Address 2			
City	Philadelphia	**State/Province**	PA
Postal Code	19103	**Country**	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	00270		
Email Address	docketing@howsoniplaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR		
Attorney Docket Number	UPN-R3895D2US	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	21	**Suggested Figure for Publication (if any)**	

Filing By Reference :

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	00270		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the application number blank.

Prior Application Status	Pending				Remove
Application Number	Continuity Type		Prior Application Number		Filing Date (YYYY-MM-DD)
	Division of		14624671		2015-02-18
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14624671	Division of	11887679	2007-10-02	8999678	2015-04-07
Prior Application Status	Expired				Remove
Application Number	Continuity Type		Prior Application Number		Filing Date (YYYY-MM-DD)
PCTUS2006013375	Claims benefit of provisional		60733497		2005-11-04
Prior Application Status	Expired				Remove
Application Number	Continuity Type		Prior Application Number		Filing Date (YYYY-MM-DD)
PCTUS2006013375	Claims benefit of provisional		60669083		2005-04-07

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

Organization Name	THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA		
Mailing Address Information For Applicant:			
Address 1	3160 Chestnut Street, Suite 200		
Address 2			
City	Philadelphia	**State/Province**	PA
Country	US	Postal Code	19104
Phone Number		Fax Number	

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

Email Address	

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/Colleen M. Schaller/			Date (YYYY-MM-DD)	2019-03-28
First Name	Colleen M.	Last Name	Schaller	Registration Number	67751

Additional Signature may be generated within this form by selecting the Add button. Add

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent C o o p eration Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ABSTRACT OF THE DISCLOSURE

A method of correcting singletons in a selected AAV sequence in order to increasing the packaging yield, transduction efficiency, and/or gene transfer efficiency of the selected AAV is provided. This method involves altering one or more singletons in the parental AAV capsid to conform the singleton to the amino acid in the corresponding position(s) of the aligned functional AAV capsid sequences.

Sarepta Exhibit 1002, page 17

CLAIMS:

1. A vector comprising an AAV capsid selected from the group consisting of:

rh20, which has an amino acid sequence of SEQ ID NO:1 or a sequence having at least 97% identity thereto;

rh32/33, which has an amino acid sequence of SEQ ID NO:2 or a sequence having at least 97% identity thereto;

rh39, which has an amino acid sequence of SEQ ID NO:3 or a sequence having at least 97% identity thereto;

rh46, which has an amino acid sequence of SEQ ID NO:4 or a sequence having at least 97% identity thereto;

rh73, which has an amino acid sequence of SEQ ID NO:5 or a sequence having at least 97% identity thereto;

rh74 which has an amino acid sequence of SEQ ID NO:6 or a sequence having at least 97% identity thereto.

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a divisional of US Patent Application No. 14/624,671, filed February 18, 2015, which is a division of US Patent Application No. 11/887,679, filed October 2, 2007, now US Patent no. 8,999,678, issued April 7, 2015, which is a national stage of PCT/US2006/013375, filed April 7, 2006, which claims the benefit of US Patent Application No. 60/669,083, filed April 7, 2005, now expired, and US Patent Application No. 60/733,497, filed November 4, 2005, now expired, which are hereby incorporated by reference.

GOVERNMENT SUPPORT

This invention was made with government support under grant number P01 HL059407 awarded by the National Institutes of Health. The government has certain rights in the invention.

INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED IN ELECTRONIC FORM

Applicant hereby incorporates by reference the Sequence Listing material filed in electronic form herewith. This file is labeled "R3895D2US_Seq-Listing_ST25.txt".

BACKGROUND OF THE INVENTION

Adeno-associated virus (AAV), a member of the Parvovirus family, is a small nonenveloped, icosahedral virus with single-stranded linear DNA genomes of 4.7 kilobases (kb) to 6 kb. AAV is assigned to the genus, *Dependovirus*, because the virus was discovered as a contaminant in purified adenovirus stocks. AAV's life cycle includes a latent phase at which AAV genomes, after infection, are site specifically integrated into host chromosomes and an infectious phase in which, following either adenovirus or herpes simplex virus infection, the integrated genomes are subsequently rescued,

replicated, and packaged into infectious viruses. The properties of non-pathogenicity, broad host range of infectivity, including non-dividing cells, and potential site-specific chromosomal integration make AAV an attractive tool for gene transfer.

AAV vectors have been described for use as delivery vehicles for both therapeutic and immunogenic molecules. To date, there have been several different well-characterized AAVs isolated from human or non-human primates (NHP).

Recently, investigators have described a large number of AAVs of different sequences [G. Gao, *et al.*, *Proc Natl Acad Sci USA*, **100**(10):6081-6086 (May 13, 2003); US-2003-0138772-A1 (July 24, 2003)] and characterized these AAVs into different serotypes and clades [G. Gao, *et al.*, *J. Virol.*, **78**(12):6381-6388 (June 2004); International Patent Publication No. WO 2005/033321]. It has been reported that different AAVs exhibit different transfection efficiencies, and also exhibit tropism for different cells or tissues.

What is desirable are AAV-based constructs for delivery of heterologous molecules to different cell types.

SUMMARY OF THE INVENTION

The present invention provides a method of improving vectors derived from AAV which are non-functional and/or which perform weakly.

In one aspect, the method provides a method for correcting singletons in a selected AAV sequence in order to increase the packaging yield, transduction efficiency, and/or gene transfer efficiency of the selected AAV. This method involves altering one or more singletons in the parental AAV capsid to conform the singleton to the amino acid in the corresponding position(s) of the aligned functional AAV capsid sequences.

In another aspect, the invention provides modified AAV sequences, *i.e.*, sequences with one or more singletons eliminated.

In yet another aspect, the invention provides AAV vectors having modified AAV capsids according to the present invention.

Other aspects and advantages of the invention will be readily apparent from the following detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Sarepta Exhibit 1002, page 20

Fig. 1 is a graph illustrating *in vitro* 293 transduction of singleton corrected AAV vectors. Singleton corrections are indicated after the vector name with – if present – a number to indicate the number of mutations performed.

Figs. 2A-2C are line graphs illustrating the titration of AAV vectors on 293 cells at multiplicities of infection ranging from 10^1 to 10^4, with a comparison between parent rh.8 and singleton-corrected rh.8 (rh.8R) in Fig. 2A, parent rh.37 and modified rh.37 (Fig. 2B), and AAV2 and AAV8 in Fig. 2C. As a control, a similar titration of AAV2 and AAV2/8 eGFP expressing vector is presented. Percent (%) of eGFP positive cells is presented on the Y-axis and was assayed by flow cytometry.

Fig. 3 is a phylogenetic tree of AAV sequences, which indicates their phylogenetic relationship and clades.

Figs. 4A-4L are an alignment of the nucleic acid sequences of the capsid protein (vp1) of AAV2 [SEQ ID NO:7], cy.5 [SEQ ID NO:8], rh.10 [SEQ ID NO: 9], rh.13 [SEQ ID NO: 10], AAV1 [SEQ ID NO: 11], AAV3 [SEQ ID NO: 12] , AAV6 [SEQ ID NO: 13], AAV7 [SEQ ID NO: 14], AAV8 [SEQ ID NO: 15], hu.13 [SEQ ID NO:16], hu.26 [SEQ ID NO: 17], hu.37 [SEQ ID NO: 18], hu.53 [SEQ ID NO: 19], rh.39 [SEQ ID NO: 20], rh.43 [SEQ ID NO: 21]and rh.46 [SEQ ID NO: 22].

Figs. 5A-5D are an alignment of the amino acid sequences of the capsid protein (vp1) of AAV2 [SEQ ID NO: 23], cy.5 [SEQ ID NO: 24], rh.10 [SEQ ID NO: 25], rh.13 [SEQ ID NO: 26], AAV1 [SEQ ID NO: 27], AAV3 [SEQ ID NO: 28] , AAV6 [SEQ ID NO: 29], AAV7 [SEQ ID NO: 30], AAV8 [SEQ ID NO: 31], hu.13 [SEQ ID NO: 32], hu.26 [SEQ ID NO: 33], hu.37 [SEQ ID NO: 34], hu.53 [SEQ ID NO: 35], rh.39 [SEQ ID NO: 36], rh.43 [SEQ ID NO: 37]and rh.46 [SEQ ID NO: 38].

Figs. 6A-6B are an alignment of the amino acid sequences of the capsid protein (vp1) of rh.13 [SEQ ID NO: 26], rh2 [SEQ ID NO: 39], rh.8 [SEQ ID NO: 41], hu.29 [SEQ ID NO: 42], and rh.64 [SEQ ID NO: 43].

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a method for improving the function of an AAV vector. The present invention is particularly well suited to improve the packaging yield, transduction efficiency, and/or gene transfer efficiency of an AAV vector having a capsid

Sarepta Exhibit 1002, page 21

of an AAV which contains one or more singletons. The invention further provides novel AAV capsid sequences identified and prepared according to the method of the invention.

As used throughout this specification and the claims, the terms "comprising" and "including" are inclusive of other components, elements, integers, steps and the like. Conversely, the term "consisting" and its variants are exclusive of other components, elements, integers, steps and the like.

SINGLETON METHOD OF INVENTION

As used herein, the term "singleton" refers to a variable amino acid in a given position in a selected (*i.e.*, parental) AAV capsid sequence. The presence of a variable amino acid is determined by aligning the sequence of the parental AAV capsid with a library of functional AAV capsid sequences. The sequences are then analyzed to determine the presence of any variable amino acid sequences in the parental AAV capsid where the sequences of the AAV in the library of functional AAVs have complete conservation. The parental AAV sequence is then altered to change the singleton to the conserved amino acid identified in that position in the functional AAV capsid sequences. According to the present invention, a parental AAV sequence may have 1 to 6, 1 to 5, 1 to 4, 1 to 3, or 2 singletons. A parental AAV sequence may have more than 6 singletons.

Once modified, the modified AAV capsid can be used to construct an AAV vector having the modified capsid. This vector can be constructed using techniques known to those of skill in the art.

The AAV selected for modification according to the invention method is one for which it is desirable to increase any one or more of the following three functional properties of AAV, *i.e.*, packaging into the viral particle having the capsid of the selected AAV sequence, increasing transduction efficiency, or increasing gene transfer efficiency as compared to the parental AAV. For example, the parental AAV may be characterized by having a lower packaging efficiency than other, closely related AAV. In another example, the parental AAV may have a lower transduction efficiency as compared to closely related AAVs. In another example, the parental AAV may have a lower gene transfer efficiency (*i.e.*, a lower ability to deliver a target molecule *in vivo*) as compared to closely related AAVs. In other examples, the parental AAV is characterized by

Sarepta Exhibit 1002, page 22

adequate function in each of these categories, but increased function one or more of these areas is desired.

Thus, the invention provides a library of functional AAVs, the sequences of which are to be compared to the selected (parental) AAV. Suitably, the library contains AAVs which have a desired function which is targeted for improvement in the selected parental AAV. In other words, each of the sequences in the library of functional AAVs is characterized by a desired level of packaging ability, a desired level of *in vitro* transduction efficiency, or a desired level of *in vivo* gene transfer efficiency (*i.e.*, the ability to deliver to a target selected target tissue or cell in a subject). The functional AAVs which compose the library may individually have one, two or all of these functional characteristics. Other desired functions for the library may be readily determined by one of skill in the art.

In one embodiment, a functional AAV is an AAV characterized by the ability to produce viral particles with equivalent or greater packaging and transduction efficiency as any one of AAV1, AAV2, AAV7, AAV8 or AAV9. Function may be assessed in a pseudotyping setting with AAV2 rep and AAV2 ITRs. Thus, an altered parental AAV can be constructed using conventional techniques and the AAV vector is considered functional if virus is produced from the parental AAV at titers of at least 50% when compared to production of AAV2. Further, the ability of AAV to transduce cells can be readily determined by one of skill in the art. For example, a parental AAV can be constructed such that it contains a marker gene which allows ready detection of virus. For example, the AAV contains eGFP or another gene which allows fluorescent detection. Where the AAV contains CMV-eGFP, when the virus produced from the altered parental AAV capsid is transduced into 293 cells at a multiplicity of infection of 10^4, function is demonstrated where transduction efficiency is greater than 5% GFP fluorescence of total cells in a context where the cells were pretreated with wild-type human adenovirus type 5 at a multiplicity of infection of 20 for 2 hours.

Suitably, a library is composed of at least three or at least four functional AAV capsid sequences which represent at least two different clades. Preferably, at least two sequences from each of the represented clades is included in the library. In certain embodiments, three, four, five, six, or more clades are represented.

Sarepta Exhibit 1002, page 23

A "clade" is a group of AAV which are phylogenetically related to one another as determined using a Neighbor-Joining algorithm by a bootstrap value of at least 75% (of at least 1000 replicates) and a Poisson correction distance measurement of no more than 0.05, based on alignment of the AAV vp1 amino acid sequence.

The Neighbor-Joining algorithm has been described extensively in the literature. See, *e.g.*, M. Nei and S. Kumar, *Molecular Evolution and Phylogenetics* (Oxford University Press, New York (2000). Computer programs are available that can be used to implement this algorithm. For example, the MEGA v2.1 program implements the modified Nei-Gojobori method. Using these techniques and computer programs, and the sequence of an AAV vp1 capsid protein, one of skill in the art can readily determine whether a selected AAV is contained in one of the clades identified herein, in another clade, or is outside these clades.

While the AAV clades are based primarily upon naturally occurring AAV vp1 capsids, the clades are not limited to naturally occurring AAV. The clades can encompass non-naturally occurring AAV, including, without limitation, recombinant, modified or altered, chimeric, hybrid, synthetic, artificial, etc., AAV which are phylogenetically related as determined using a Neighbor-Joining algorithm at least 75% (of at least 1000 replicates) and a Poisson correction distance measurement of no more than 0.05, based on alignment of the AAV vp1 amino acid sequence.

The AAV clades which have been described include Clade A (represented by AAV1 and AAV6), Clade B (represented by AAV2) and Clade C (represented by the AAV2-AAV3 hybrid), Clade D (represented by AAV7), Clade E (represented by AAV8), and Clade F (represented by human AAV9). These clades are represented by a member of the clade that is a previously described AAV serotype. Previously described AAV1 and AAV6 are members of a single clade (Clade A) in which 4 isolates were recovered from 3 humans. Previously described AAV3 and AAV5 serotypes are clearly distinct from one another, but were not detected in the screen described herein, and have not been included in any of these clades.

Further discussion of AAV clades is provided in G. Gao, *et al.*, J. Virol., 78(12):6381-6388 (June 2004) and International Patent Publication Nos. WO 2004/028817 and WO2005/033321. The latter document also provides novel human AAV sequences, which are incorporated by reference herein.

In one embodiment, the libraries used in the method of the invention exclude AAV5. In another embodiment, the libraries used in the method of the invention exclude AAV4. However, in certain embodiments, *e.g.*, where the parental AAV is similar to AAV5, it may be desirable to include this sequence in the alignment.

Although a library can be constructed that contains the minimal number of sequences, efficiency in identifying singletons may be optimized by utilizing a library containing a larger number of sequences. Suitably, the library contains a minimum of four sequences, with at least two clades being represented. Preferably, the library contains at least two sequences from each of the represented clades. In one embodiment, the library contains more than 100 AAV sequences. In another embodiment, the library contains at least three to 100 AAV sequences. In still another embodiment, the library contains at least six to 50 AAV sequences.

Suitable AAVs for use in the functional libraries of the invention include, *e.g.*, AAV1, AAV2, AAV6, AAV7, AAV8, AAV9, and other sequences which have been described [G. Gao, *et al*, *Proc Natl. Acad Sci.*, **100**(10):6081-6086 (May 13, 2003); International Patent Publication Nos. WO 2004/042397 and WO 2005/033321]. One of skill in the art can readily select other AAVs, *e.g.*, those isolated using the methods described in International Patent Publication No. WO 03/093460 A1 (Nov 13, 2003) and US Patent Application Publication No. 2003-0138772 A1 (July 24, 2003).

According to the present invention, the at least three sequences within the library are least 85% identical over the full-length of their aligned capsid sequences.

The term "percent (%) identity" may be readily determined for amino acid sequences, over the full-length of a protein, or a fragment thereof. Suitably, a fragment is at least about 8 amino acids in length, and may be up to about 700 amino acids. Generally, when referring to "identity", "homology", or "similarity" between two different adeno-associated viruses, "identity", "homology" or "similarity" is determined in reference to "aligned" sequences. "Aligned" sequences or "alignments" refer to multiple nucleic acid sequences or protein (amino acids) sequences, often containing corrections for missing or additional bases or amino acids as compared to a reference sequence.

Alignments are performed using any of a variety of publicly or commercially available Multiple Sequence Alignment Programs. Sequence alignment programs are

Sarepta Exhibit 1002, page 25

available for amino acid sequences, *e.g.*, the "Clustal X", "MAP", "PIMA", "MSA", "BLOCKMAKER", "MEME", and "Match-Box" programs. Generally, any of these programs are used at default settings, although one of skill in the art can alter these settings as needed. Alternatively, one of skill in the art can utilize another algorithm or computer program which provides at least the level of identity or alignment as that provided by the referenced algorithms and programs. *See, e.g.*, J. D. Thomson *et al*, *Nucl. Acids. Res.*, "A comprehensive comparison of multiple sequence alignments", 27(13):2682-2690 (1999).

Multiple sequence alignment programs are also available for nucleic acid sequences. Examples of such programs include, "Clustal W", "CAP Sequence Assembly", "MAP", and "MEME", which are accessible through Web Servers on the internet. Other sources for such programs are known to those of skill in the art. Alternatively, Vector NTI utilities are also used. There are also a number of algorithms known in the art that can be used to measure nucleotide sequence identity, including those contained in the programs described above. As another example, polynucleotide sequences can be compared using Fasta™, a program in GCG Version 6.1. Fasta™ provides alignments and percent sequence identity of the regions of the best overlap between the query and search sequences. For instance, percent sequence identity between nucleic acid sequences can be determined using Fasta™ with its default parameters (a word size of 6 and the NOPAM factor for the scoring matrix) as provided in GCG Version 6.1, herein incorporated by reference.

According to the invention, the sequences of the target or parental AAV capsid suspected of containing a singleton are compared to the sequences of the AAV capsids within the library. This comparison is performed using an alignment of the full-length vp1 protein of the AAV capsid.

A singleton is identified where, for a selected amino acid position when the AAV sequences are aligned, all of the AAVs in the library have the same amino acid residue (*i.e.*, are completely conserved), but the parental AAV has a different amino acid residue.

Typically, when an alignment is prepared based upon the AAV capsid vp1 protein, the alignment contains insertions and deletions which are so identified with respect to a reference AAV sequence (*e.g.*, AAV2) and the numbering of the amino acid residues is based upon a reference scale provided for the alignment. However, any given

AAV sequence may have fewer amino acid residues than the reference scale. In the present invention, when discussing the parental AAV and the sequences of the reference library, the term "the same position" or the "corresponding position" refers to the amino acid located at the same residue number in each of the sequences, with respect to the reference scale for the aligned sequences. However, when taken out of the alignment, each of the AAV vp1 proteins may have these amino acids located at different residue numbers.

Optionally, the method of the invention can be performed using a nucleic acid alignment and identifying as a singleton a codon which encodes a different amino acid (*i.e.*, a non-synonymous codon). Where the nucleic acid sequences of a given codon are not identical in the parental AAV as compared to the sequences of that codon in the library, but encode the same amino acid, they are considered synonymous and are not a singleton.

According to the present invention, a parental AAV containing a singleton is altered such that the singleton residue is replaced with the conserved amino acid residue of the AAVs in the library.

Conveniently, this replacement can be performed by using conventional site-directed mutagenesis techniques on the codon for the variable amino acid. Typically, the site-directed mutagenesis is performed using as few steps as required to obtain the desired codon for the conserved amino acid residue. Such methods are well known to those of skill in the art and can be performed using published methods and/or commercially available kits [*e.g.*, available from Stratagene and Promega]. The site-directed mutagenesis may be performed on the AAV genomic sequence. The AAV sequence may be carried by a vector (*e.g.*, a plasmid backbone) for convenience.
Alternatively, one of skill in the art can alter the parental AAV using other techniques know to those of skill in the art.

A parental AAV may have more than one singleton, *e.g.*, two, three, four, five, six or more. However, improvement in function may be observed after correction of one singleton. In the embodiment where a parental AAV carries multiple singletons, each singleton may be altered at a time, followed by assessment of the modified AAV for enhancement of the desired function. Alternatively, multiple singletons may be altered prior to assessment for enhancement of the desired function.

Sarepta Exhibit 1002, page 27

Even where a parental AAV contains multiple singletons and functional improvement is observed altered of a first singleton, it may be desirable to optimize function by altering the remaining singleton(s).

Typically, a parental AAV which has had one or more singleton(s) altered according to the method of the invention, is assessed for function by packaging the AAV into an AAV particle. These methods are well known to those of skill in the art. See, *e.g.*, G. Gao *et al*, Proc Natl Acad Sci., cited above; Sambrook *et al*, Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Press, Cold Spring Harbor NY.

These altered AAVs have novel capsids produced according to the method of the invention and are assessed for function. Suitable methods for assessing AAV function have been described herein and include, *e.g.*, the ability to produce DNAse protected particles, *in vitro* cell transduction efficiency, and/or *in vivo* gene transfer. Suitably, the altered AAVs of the invention have a sufficient number of singletons altered to increase function in one or all of these characteristics, as compared to the function of the parent AAV.

II. Novel AAV of the Invention

The invention further provides a method of predicting whether a novel AAV will be functional. The method involves using the singleton method of the invention and identifying the absence of a singleton in the sequence of the selected AAV, *i.e.*, an AAV which lacks a singleton.

Thus, in one embodiment, the invention provides a method of selecting an AAV for use in producing a vector. This method involves selecting a parental AAV capsid sequence for analysis and identifying the absence of any singletons in the parental AAV capsid in an alignment comprising the parental AAV capsid sequence and a library of functional AAV capsid sequences. Once the absence of a singleton in a selected AAV capsid is determined, the AAV can be used to generate a vector according to known techniques.

The term "substantial homology" or "substantial similarity," when referring to a nucleic acid, or fragment thereof, indicates that, when optimally aligned with appropriate nucleotide insertions or deletions with another nucleic acid (or its complementary strand), there is nucleotide sequence identity in at least about 95 to 99% of the aligned sequences.

Sarepta Exhibit 1002, page 28

Preferably, the homology is over full-length sequence, or an open reading frame thereof, or another suitable fragment which is at least 15 nucleotides in length. Examples of suitable fragments are described herein.

The terms "sequence identity", "percent sequence identity", or "percent identical" in the context of nucleic acid sequences refers to the residues in the two sequences which are the same when aligned for maximum correspondence. The length of sequence identity comparison may be over the full-length of the genome, the full-length of a gene coding sequence, or a fragment of at least about 500 to 5000 nucleotides, is desired. However, identity among smaller fragments, *e.g.* of at least about nine nucleotides, usually at least about 20 to 24 nucleotides, at least about 28 to 32 nucleotides, at least about 36 or more nucleotides, may also be desired.

The term "substantial homology" or "substantial similarity," when referring to amino acids or fragments thereof, indicates that, when optimally aligned with appropriate amino acid insertions or deletions with another amino acid (or its complementary strand), there is amino acid sequence identity in at least about 95 to about 99% of the aligned sequences and in certain embodiments, about 97% of the aligned sequences. Preferably, the homology is over full-length sequence, or a protein thereof, *e.g.*, a cap protein, a rep protein, or a fragment thereof which is at least 8 amino acids, or more desirably, at least 15 amino acids in length. Examples of suitable fragments are described herein.

By the term "highly conserved" is meant at least 80% identity, preferably at least 90% identity, and more preferably, over 97% identity. Identity is readily determined by one of skill in the art by resort to algorithms and computer programs known by those of skill in the art.

The term "serotype" is a distinction with respect to an AAV having a capsid which is serologically distinct from other AAV serotypes. Serologic distinctiveness is determined on the basis of the lack of cross-reactivity between antibodies to the AAV as compared to other AAV. Cross-reactivity is typically measured in a neutralizing antibody assay. For this assay polyclonal serum is generated against a specific AAV in a rabbit or other suitable animal model using the adeno-associated viruses. In this assay, the serum generated against a specific AAV is then tested in its ability to neutralize either the same (homologous) or a heterologous AAV. The dilution that achieves 50% neutralization is considered the neutralizing antibody titer. If for two AAVs the quotient

Sarepta Exhibit 1002, page 29

of the heterologous titer divided by the homologous titer is lower than 16 in a reciprocal manner, those two vectors are considered as the same serotype. Conversely, if the ratio of the heterologous titer over the homologous titer is 16 or more in a reciprocal manner the two AAVs are considered distinct serotypes.

In a further embodiment, the invention provides AAV having novel capsids, including rh. 20, rh.32/33, rh.39, rh.46, rh.73, and rh.74. The sequences of rh.20 have the amino acid sequence of SEQ ID NO:1, or a sequence 95 to 99% identical over the full-length of SEQ ID NO:1. The capsid of rh.32/33 has an amino acid sequence of SEQ ID NO:2, or sequences 95% to 99% identical thereto over the full-length of SEQ ID NO:2. The capsid of rh.39 has an amino acid sequence of SEQ ID NO:3, or sequences 95% to 99% identical thereto over the full-length of SEQ ID NO:3. The capsid of rh.46 has an amino acid sequence of SEQ ID NO:4, or sequences 95% to 99% identical thereto over the full-length of SEQ ID NO:4. The capsid of rh.73 has an amino acid sequence of SEQ ID NO:5, or sequences 95% to 99% identical thereto over the full-length of SEQ ID NO:5. The capsid of rh.74 has an amino acid sequence of SEQ ID NO:6, or sequences 95% to 99% identical thereto over the full-length of SEQ ID NO:6. Preferably, the sequence identity of these novel AAV capsids is such that it lacks any singletons. The sequences of the novel AAV are provided in the Sequence Listing.

In still another embodiment, the novel AAV sequences of the invention include the singleton-corrected AAV capsid proteins and the sequences encoding these capsid proteins. Examples of suitable singleton-correct AAV sequences include, AAV6.1, AAV6.2, AAV6.1.2, rh.8R, rh.48.1, rh.48.2, rh.48.1.2, hu.44R1, hu.44R2 hu.44R3, hu.29R, ch.5R1, rh.67, rh.54, hu.48R1, hu.48R2, and hu.48R3. For example, the singleton-corrected AAV6, including AAV6.1, AAV6.2 and AAV6.12 have shown significant functional improvement over the parental AAV6 sequence.

Particularly desirable proteins include the AAV capsid proteins, which are encoded by the nucleotide sequences identified above. The AAV capsid is composed of three proteins, vp1, vp2 and vp3, which are alternative splice variants. Other desirable fragments of the capsid protein include the constant and variable regions, located between hypervariable regions (HVR). Other desirable fragments of the capsid protein include the HVR themselves.

Sarepta Exhibit 1002, page 30

An algorithm developed to determine areas of sequence divergence in AAV2 has yielded 12 hypervariable regions (HVR) of which 5 overlap or are part of the four previously described variable regions. [Chiorini *et al*, *J. Virol*, **73**:1309-19 (1999); Rutledge *et al*, *J. Virol.*, **72**:309-319] Using this algorithm and/or the alignment techniques described herein, the HVR of the novel AAV serotypes are determined. For example, the HVR are located as follows: HVR1, aa 146-152; HVR2, aa 182-186; HVR3, aa 262-264; HVR4, aa 381-383; HVR5, aa 450-474; HVR6, aa 490-495; HVR7, aa 500-504; HVR8, aa 514-522; HVR9, aa 534-555; HVR10, aa 581-594; HVR11, aa 658-667; and HVR12, aa 705-719 [the numbering system is based on an alignment which uses the AAV2 vp1 as a point of reference]. Using the alignment provided herein performed using the Clustal X program at default settings, or using other commercially or publicly available alignment programs at default settings such as are described herein, one of skill in the art can readily determine corresponding fragments of the novel AAV capsids of the invention.

Suitably, fragments are at least 8 amino acids in length. However, fragments of other desired lengths may be readily utilized. Such fragments may be produced recombinantly or by other suitable means, *e.g.*, by chemical synthesis.

The invention further provides other AAV sequences which are identified using the sequence information provided herein. For example, given the sequences provided herein, infectious may be isolated using genome walking technology (Siebert *et al.*, 1995, Nucleic Acid Research, 23:1087-1088, Friezner-Degen *et al.*, 1986, J. Biol. Chem. **261**:6972-6985, BD Biosciences Clontech, Palo Alto, CA). Genome walking is particularly well suited for identifying and isolating the sequences adjacent to the novel sequences identified according to the method of the invention. This technique is also useful for isolating inverted terminal repeat (ITRs) of the novel AAV, based upon the novel AAV capsid and rep sequences provided herein.

The novel AAV amino acid sequences, peptides and proteins may be expressed from AAV nucleic acid sequences of the invention. Additionally, these amino acid sequences, peptides and proteins can be generated by other methods known in the art, including, *e.g.*, by chemical synthesis, by other synthetic techniques, or by other methods. The sequences of any of the AAV capsids provided herein can be readily generated using a variety of techniques.

Sarepta Exhibit 1002, page 31

Suitable production techniques are well known to those of skill in the art. See, *e.g.*, Sambrook et al, Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Press (Cold Spring Harbor, NY). Alternatively, peptides can also be synthesized by the well-known solid phase peptide synthesis methods (Merrifield, *J. Am. Chem. Soc.*, **85**:2149 (1962); Stewart and Young, Solid Phase Peptide Synthesis (Freeman, San Francisco, 1969) pp. 27-62). These and other suitable production methods are within the knowledge of those of skill in the art and are not a limitation of the present invention.

The sequences, proteins, and fragments of the invention may be produced by any suitable means, including recombinant production, chemical synthesis, or other synthetic means. Such production methods are within the knowledge of those of skill in the art and are not a limitation of the present invention.

III. Production of rAAV with Novel AAV Capsids

The invention encompasses novel AAV capsid sequences generated by mutation following use of the method of the invention for identifying singletons. The invention further encompasses the novel AAV rh.20, rh.32/33, rh.39, rh.46, rh.73, and rh.74 capsid sequences [SEQ ID Nos: 1- 6].

In another aspect, the present invention provides molecules that utilize the novel AAV sequences of the invention, including fragments thereof, for production of viral vectors useful in delivery of a heterologous gene or other nucleic acid sequences to a target cell.

The molecules of the invention which contain AAV sequences include any genetic element (vector) which may be delivered to a host cell, *e.g.*, naked DNA, a plasmid, phage, transposon, cosmid, episome, a protein in a non-viral delivery vehicle (*e.g.*, a lipid-based carrier), virus, etc., which transfers the sequences carried thereon.

The selected vector may be delivered by any suitable method, including transfection, electroporation, liposome delivery, membrane fusion techniques, high velocity DNA-coated pellets, viral infection and protoplast fusion. The methods used to construct any embodiment of this invention are known to those with skill in nucleic acid manipulation and include genetic engineering, recombinant engineering, and synthetic techniques. See, *e.g.,* Sambrook *et al*, Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Press, Cold Spring Harbor, NY.

Sarepta Exhibit 1002, page 32

In one embodiment, the vectors of the invention contain, *inter alia*, sequences encoding an AAV capsid of the invention or a fragment thereof. In another embodiment, the vectors of the invention contain, at a minimum, sequences encoding an AAV rep protein or a fragment thereof. Optionally, vectors of the invention may contain both AAV cap and rep proteins. In vectors in which both AAV *rep* and *cap* are provided, the AAV *rep* and AAV *cap* sequences can originate from an AAV of the same clade. Alternatively, the present invention provides vectors in which the *rep* sequences are from an AAV source which differs from that which is providing the *cap* sequences. In one embodiment, the *rep* and *cap* sequences are expressed from separate sources (*e.g.*, separate vectors, or a host cell and a vector). In another embodiment, these *rep* sequences are fused in frame to *cap* sequences of a different AAV source to form a chimeric AAV vector. Optionally, the vectors of the invention are vectors packaged in an AAV capsid of the invention. These vectors and other vectors described herein can further contain a minigene comprising a selected transgene which is flanked by AAV 5' ITR and AAV 3' ITR.

Thus, in one embodiment, the vectors described herein contain nucleic acid sequences encoding an intact AAV capsid which may be from a single AAV sequence . Alternatively, these vectors contain sequences encoding artificial capsids which contain one or more fragments of the singleton-corrected AAV capsid fused to heterologous AAV or non-AAV capsid proteins (or fragments thereof). These artificial capsid proteins are selected from non-contiguous portions of the singleton-corrected capsid or from capsids of other AAVs. These modifications may be to increase expression, yield, and/or to improve purification in the selected expression systems, or for another desired purpose (*e.g.*, to change tropism or alter neutralizing antibody epitopes).

The vectors described herein, *e.g.*, a plasmid, are useful for a variety of purposes, but are particularly well suited for use in production of a rAAV containing a capsid comprising AAV sequences or a fragment thereof. These vectors, including rAAV, their elements, construction, and uses are described in detail herein.

In one aspect, the invention provides a method of generating a recombinant adeno-associated virus (AAV) having a novel AAV capsid of the invention. Such a method involves culturing a host cell which contains a nucleic acid sequence encoding a novel AAV capsid protein of the invention, or fragment thereof, as defined herein; a

Sarepta Exhibit 1002, page 33

functional rep gene; a minigene composed of, at a minimum, AAV inverted terminal repeats (ITRs) and a transgene; and sufficient helper functions to permit packaging of the minigene into the AAV capsid protein.

The components required to be cultured in the host cell to package an AAV minigene in an AAV capsid may be provided to the host cell in *trans*. Alternatively, one or more of the required components (*e.g.*, minigene, *rep* sequences, *cap* sequences, and/or helper functions) may be provided by a stable host cell which has been engineered to contain one or more of the required components using methods known to those of skill in the art. Most suitably, such a stable host cell will contain the required component(s) under the control of an inducible promoter. However, the required component(s) may be under the control of a constitutive promoter. Examples of suitable inducible and constitutive promoters are provided herein, in the discussion of regulatory elements suitable for use with the transgene. In still another alternative, a selected stable host cell may contain selected component(s) under the control of a constitutive promoter and other selected component(s) under the control of one or more inducible promoters. For example, a stable host cell may be generated which is derived from 293 cells (which contain E1 helper functions under the control of a constitutive promoter), but which contains the rep and/or cap proteins under the control of inducible promoters. Still other stable host cells may be generated by one of skill in the art.

The minigene, *rep* sequences, *cap* sequences, and helper functions required for producing the rAAV of the invention may be delivered to the packaging host cell in the form of any genetic element which transfer the sequences carried thereon. The selected genetic element may be delivered by any suitable method, including those described herein. The methods used to construct any embodiment of this invention are known to those with skill in nucleic acid manipulation and include genetic engineering, recombinant engineering, and synthetic techniques. See, *e.g.*, Sambrook et al, Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Press, Cold Spring Harbor, NY. Similarly, methods of generating rAAV virions are well known and the selection of a suitable method is not a limitation on the present invention. See, *e.g.*, K. Fisher et al, *J. Virol.*, **70**:520-532 (1993) and US Patent No. 5,478,745.

Unless otherwise specified, the AAV ITRs, and other selected AAV components described herein, may be readily selected from among any AAV, including, without

limitation, AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV7, AAV9 and one of the other novel AAV sequences of the invention. These ITRs or other AAV components may be readily isolated using techniques available to those of skill in the art from an AAV sequence. Such AAV may be isolated or obtained from academic, commercial, or public sources (*e.g.*, the American Type Culture Collection, Manassas, VA). Alternatively, the AAV sequences may be obtained through synthetic or other suitable means by reference to published sequences such as are available in the literature or in databases such as, *e.g.*, GenBank®, PubMed®, or the like.

A. The Minigene

The minigene is composed of, at a minimum, a transgene and its regulatory sequences, and 5' and 3' AAV inverted terminal repeats (ITRs). In one desirable embodiment, the ITRs of AAV serotype 2 are used. However, ITRs from other suitable sources may be selected. It is this minigene that is packaged into a capsid protein and delivered to a selected host cell.

1. The transgene

The transgene is a nucleic acid sequence, heterologous to the vector sequences flanking the transgene, which encodes a polypeptide, protein, or other product, of interest. The nucleic acid coding sequence is operatively linked to regulatory components in a manner which permits transgene transcription, translation, and/or expression in a host cell.

The composition of the transgene sequence will depend upon the use to which the resulting vector will be put. For example, one type of transgene sequence includes a reporter sequence, which upon expression produces a detectable signal. Such reporter sequences include, without limitation, DNA sequences encoding β-lactamase, β-galactosidase (LacZ), alkaline phosphatase, thymidine kinase, green fluorescent protein (GFP), enhanced GFP (EGFP), chloramphenicol acetyltransferase (CAT), luciferase, membrane bound proteins including, for example, CD2, CD4, CD8, the influenza hemagglutinin protein, and others well known in the art, to which high affinity antibodies directed thereto exist or can be produced by conventional means, and fusion proteins comprising a membrane bound protein appropriately fused to an antigen tag domain from, among others, hemagglutinin or Myc.

Sarepta Exhibit 1002, page 35

These coding sequences, when associated with regulatory elements which drive their expression, provide signals detectable by conventional means, including enzymatic, radiographic, colorimetric, fluorescence or other spectrographic assays, fluorescent activating cell sorting assays and immunological assays, including enzyme linked immunosorbent assay (ELISA), radioimmunoassay (RIA) and immunohistochemistry. For example, where the marker sequence is the LacZ gene, the presence of the vector carrying the signal is detected by assays for beta-galactosidase activity. Where the transgene is green fluorescent protein or luciferase, the vector carrying the signal may be measured visually by color or light production in a luminometer.

However, desirably, the transgene is a non-marker sequence encoding a product which is useful in biology and medicine, such as proteins, peptides, RNA, enzymes, dominant negative mutants, or catalytic RNAs. Desirable RNA molecules include tRNA, dsRNA, ribosomal RNA, catalytic RNAs, siRNA, small hairpin RNA, trans-splicing RNA, and antisense RNAs. One example of a useful RNA sequence is a sequence which inhibits or extinguishes expression of a targeted nucleic acid sequence in the treated animal. Typically, suitable target sequences include oncologic targets and viral diseases. See, for examples of such targets the oncologic targets and viruses identified below in the section relating to immunogens.

The transgene may be used to correct or ameliorate gene deficiencies, which may include deficiencies in which normal genes are expressed at less than normal levels or deficiencies in which the functional gene product is not expressed. Alternatively, the transgene may provide a product to a cell which is not natively expressed in the cell type or in the host. A preferred type of transgene sequence encodes a therapeutic protein or polypeptide which is expressed in a host cell. The invention further includes using multiple transgenes. In certain situations, a different transgene may be used to encode each subunit of a protein, or to encode different peptides or proteins. This is desirable when the size of the DNA encoding the protein subunit is large, *e.g.*, for an immunoglobulin, the platelet-derived growth factor, or a dystrophin protein. In order for the cell to produce the multi-subunit protein, a cell is infected with the recombinant virus containing each of the different subunits. Alternatively, different subunits of a protein may be encoded by the same transgene. In this case, a single transgene includes

Sarepta Exhibit 1002, page 36

the DNA encoding each of the subunits, with the DNA for each subunit separated by an internal ribozyme entry site (IRES). This is desirable when the size of the DNA encoding each of the subunits is small, *e.g.*, the total size of the DNA encoding the subunits and the IRES is less than five kilobases. As an alternative to an IRES, the DNA may be separated by sequences encoding a 2A peptide, which self-cleaves in a post-translational event. See, *e.g.*, M.L. Donnelly, *et al*, *J. Gen. Virol.*, **78**(Pt 1):13-21 (Jan 1997); Furler, S., *et al*, *Gene Ther.*, **8**(11):864-873 (June 2001); Klump H., *et al.*, *Gene Ther.*, **8**(10):811-817 (May 2001). This 2A peptide is significantly smaller than an IRES, making it well suited for use when space is a limiting factor. More often, when the transgene is large, consists of multi-subunits, or two transgenes are co-delivered, rAAV carrying the desired transgene(s) or subunits are co-administered to allow them to concatamerize *in vivo* to form a single vector genome. In such an embodiment, a first AAV may carry an expression cassette which expresses a single transgene and a second AAV may carry an expression cassette which expresses a different transgene for co-expression in the host cell. However, the selected transgene may encode any biologically active product or other product, *e.g.*, a product desirable for study.

Suitable transgenes may be readily selected by one of skill in the art. The selection of the transgene is not considered to be a limitation of this invention.

Sarepta Exhibit 1002, page 37

2. Regulatory Elements

In addition to the major elements identified above for the minigene, the vector also includes conventional control elements which are operably linked to the transgene in a manner which permits its transcription, translation and/or expression in a cell transfected with the plasmid vector or infected with the virus produced by the invention. As used herein, "operably linked" sequences include both expression control sequences that are contiguous with the gene of interest and expression control sequences that act in *trans* or at a distance to control the gene of interest.

Expression control sequences include appropriate transcription initiation, termination, promoter and enhancer sequences; efficient RNA processing signals such as splicing and polyadenylation (polyA) signals; sequences that stabilize cytoplasmic mRNA; sequences that enhance translation efficiency (*i.e.*, Kozak consensus sequence); sequences that enhance protein stability; and when desired, sequences that enhance secretion of the encoded product. A great number of expression control sequences, including promoters which are native, constitutive, inducible and/or tissue-specific, are known in the art and may be utilized.

Examples of constitutive promoters include, without limitation, the retroviral Rous sarcoma virus (RSV) LTR promoter (optionally with the RSV enhancer), the cytomegalovirus (CMV) promoter (optionally with the CMV enhancer) [see, *e.g.*, Boshart *et al*, *Cell*, **41**:521-530 (1985)], the SV40 promoter, the dihydrofolate reductase promoter, the β-actin promoter, the phosphoglycerol kinase (PGK) promoter, and the EF1 promoter [Invitrogen]. Inducible promoters allow regulation of gene expression and can be regulated by exogenously supplied compounds, environmental factors such as temperature, or the presence of a specific physiological state, *e.g.*, acute phase, a particular differentiation state of the cell, or in replicating cells only. Inducible promoters and inducible systems are available from a variety of commercial sources, including, without limitation, Invitrogen, Clontech and Ariad. Many other systems have been described and can be readily selected by one of skill in the art. Examples of inducible promoters regulated by exogenously supplied compounds, include, the zinc-inducible sheep metallothionine (MT) promoter, the dexamethasone (Dex)-inducible mouse mammary tumor virus (MMTV) promoter, the T7 polymerase promoter system [International Patent Publication No. WO 98/10088]; the ecdysone insect promoter [No *et*

al, *Proc. Natl. Acad. Sci. USA*, **93**:3346-3351 (1996)], the tetracycline-repressible system [Gossen *et al*, *Proc. Natl. Acad. Sci. USA*, **89**:5547-5551 (1992)], the tetracycline-inducible system [Gossen *et al*, *Science*, **268**:1766-1769 (1995), see also Harvey *et al*, *Curr. Opin. Chem. Biol.*, **2**:512-518 (1998)], the RU486-inducible system [Wang *et al*, *Nat. Biotech.*, **15**:239-243 (1997) and Wang *et al*, *Gene Ther.*, **4**:432-441 (1997)] and the rapamycin-inducible system [Magari *et al*, *J. Clin. Invest.*, **100**:2865-2872 (1997)]. Other types of inducible promoters which may be useful in this context are those which are regulated by a specific physiological state, *e.g.*, temperature, acute phase, a particular differentiation state of the cell, or in replicating cells only.

In another embodiment, the native promoter for the transgene will be used. The native promoter may be preferred when it is desired that expression of the transgene should mimic the native expression. The native promoter may be used when expression of the transgene must be regulated temporally or developmentally, or in a tissue-specific manner, or in response to specific transcriptional stimuli. In a further embodiment, other native expression control elements, such as enhancer elements, polyadenylation sites or Kozak consensus sequences may also be used to mimic the native expression.

Another embodiment of the transgene includes a gene operably linked to a tissue-specific promoter. For instance, if expression in skeletal muscle is desired, a promoter active in muscle should be used. These include the promoters from genes encoding skeletal β-actin, myosin light chain 2A, dystrophin, muscle creatine kinase, as well as synthetic muscle promoters with activities higher than naturally-occurring promoters (see Li *et al.*, *Nat. Biotech.*, **17**:241-245 (1999)). Examples of promoters that are tissue-specific are known for liver (albumin, Miyatake *et al.*, *J. Virol.*, **71**:5124-32 (1997); hepatitis B virus core promoter, Sandig *et al.*, *Gene Ther.*, **3**:1002-9 (1996); alpha-fetoprotein (AFP), Arbuthnot *et al.*, *Hum. Gene Ther.*, **7**:1503-14 (1996)), bone osteocalcin (Stein *et al.*, *Mol. Biol. Rep.*, **24**:185-96 (1997)); bone sialoprotein (Chen *et al.*, *J. Bone Miner. Res.*, **11**:654-64 (1996)), lymphocytes (CD2, Hansal *et al.*, *J. Immunol.*, **161**:1063-8 (1998); immunoglobulin heavy chain; T cell receptor chain), neuronal such as neuron-specific enolase (NSE) promoter (Andersen *et al.*, *Cell. Mol. Neurobiol.*, **13**:503-15 (1993)), neurofilament light-chain gene (Piccioli *et al.*, *Proc. Natl.*

Sarepta Exhibit 1002, page 39

Acad. Sci. USA, **88**:5611-5 (1991)), and the neuron-specific vgf gene (Piccioli *et al.*, *Neuron,* **15**:373-84 (1995)), among others.

Optionally, plasmids carrying therapeutically useful transgenes may also include selectable markers or reporter genes may include sequences encoding geneticin, hygromicin or purimycin resistance, among others. Such selectable reporters or marker genes (preferably located outside the viral genome to be rescued by the method of the invention) can be used to signal the presence of the plasmids in bacterial cells, such as ampicillin resistance. Other components of the plasmid may include an origin of replication. Selection of these and other promoters and vector elements are conventional and many such sequences are available [see, *e.g.*, Sambrook et al, and references cited therein].

The combination of the transgene, promoter/enhancer, and 5' and 3' AAV ITRs is referred to as a "minigene" for ease of reference herein. Provided with the teachings of this invention, the design of such a minigene can be made by resort to conventional techniques.

3. Delivery of the Minigene to a Packaging Host Cell

The minigene can be carried on any suitable vector, *e.g.*, a plasmid, which is delivered to a host cell. The plasmids useful in this invention may be engineered such that they are suitable for replication and, optionally, integration in prokaryotic cells, mammalian cells, or both. These plasmids (or other vectors carrying the 5' AAV ITR-heterologous molecule-3' AAV ITR) contain sequences permitting replication of the minigene in eukaryotes and/or prokaryotes and selection markers for these systems. Selectable markers or reporter genes may include sequences encoding geneticin, hygromicin or purimycin resistance, among others. The plasmids may also contain certain selectable reporters or marker genes that can be used to signal the presence of the vector in bacterial cells, such as ampicillin resistance. Other components of the plasmid may include an origin of replication and an amplicon, such as the amplicon system employing the Epstein Barr virus nuclear antigen. This amplicon system, or other similar amplicon components permit high copy episomal replication in the cells. Preferably, the molecule carrying the minigene is transfected into the cell, where it may exist transiently. Alternatively, the minigene (carrying the 5' AAV ITR-heterologous molecule-3' ITR) may be stably integrated into the genome of the host cell, either

chromosomally or as an episome. In certain embodiments, the minigene may be present in multiple copies, optionally in head-to-head, head-to-tail, or tail-to-tail concatamers. Suitable transfection techniques are known and may readily be utilized to deliver the minigene to the host cell.

Generally, when delivering the vector comprising the minigene by transfection, the vector is delivered in an amount from about 5 μg to about 100 μg DNA, about 10 μg to about 50 μg DNA to about 1×10^4 cells to about 1×10^{13} cells, or about 1×10^5 cells. However, the relative amounts of vector DNA to host cells may be adjusted by one of ordinary skill in the art, who may take into consideration such factors as the selected vector, the delivery method and the host cells selected.

B. *Rep* and *Cap* Sequences

In addition to the minigene, the host cell contains the sequences which drive expression of a novel AAV capsid protein of the invention (or a capsid protein comprising a fragment thereof) in the host cell and rep sequences of the same source as the source of the AAV ITRs found in the minigene, or a cross-complementing source. The AAV *cap* and *rep* sequences may be independently obtained from an AAV source as described above and may be introduced into the host cell in any manner known to one in the art as described above. Additionally, when pseudotyping an AAV vector, the sequences encoding each of the essential rep proteins may be supplied by different AAV sources (*e.g.,* AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV7, AAV8, AAV9). For example, the *rep*78/68 sequences may be from AAV2, whereas the *rep*52/40 sequences may be from AAV8.

In one embodiment, the host cell stably contains the capsid protein under the control of a suitable promoter, such as those described above. Most desirably, in this embodiment, the capsid protein is expressed under the control of an inducible promoter. In another embodiment, the capsid protein is supplied to the host cell in *trans*. When delivered to the host cell in *trans*, the capsid protein may be delivered via a plasmid which contains the sequences necessary to direct expression of the selected capsid protein in the host cell. Most desirably, when delivered to the host cell in *trans*, the plasmid carrying the capsid protein also carries other sequences required for packaging the rAAV, *e.g.*, the *rep* sequences.

Sarepta Exhibit 1002, page 41

In another embodiment, the host cell stably contains the *rep* sequences under the control of a suitable promoter, such as those described above. Most desirably, in this embodiment, the essential rep proteins are expressed under the control of an inducible promoter. In another embodiment, the rep proteins are supplied to the host cell in *trans*. When delivered to the host cell in *trans*, the rep proteins may be delivered via a plasmid which contains the sequences necessary to direct expression of the selected rep proteins in the host cell. Most desirably, when delivered to the host cell in *trans*, the plasmid carrying the capsid protein also carries other sequences required for packaging the rAAV, *e.g.*, the *rep* and *cap* sequences.

Thus, in one embodiment, the *rep* and *cap* sequences may be transfected into the host cell on a single nucleic acid molecule and exist stably in the cell as an episome. In another embodiment, the *rep* and *cap* sequences are stably integrated into the chromosome of the cell. Another embodiment has the *rep* and *cap* sequences transiently expressed in the host cell. For example, a useful nucleic acid molecule for such transfection comprises, from 5' to 3', a promoter, an optional spacer interposed between the promoter and the start site of the *rep* gene sequence, an AAV *rep* gene sequence, and an AAV *cap* gene sequence.

Optionally, the *rep* and/or *cap* sequences may be supplied on a vector that contains other DNA sequences that are to be introduced into the host cells. For instance, the vector may contain the rAAV construct comprising the minigene. The vector may comprise one or more of the genes encoding the helper functions, *e.g.,* the adenoviral proteins E1, E2a, and E4 ORF6, and the gene for VAI RNA.

Preferably, the promoter used in this construct may be any of the constitutive, inducible or native promoters known to one of skill in the art or as discussed above. In one embodiment, an AAV P5 promoter sequence is employed. The selection of the AAV to provide any of these sequences does not limit the invention.

In another preferred embodiment, the promoter for *rep* is an inducible promoter, such as are discussed above in connection with the transgene regulatory elements. One preferred promoter for *rep* expression is the T7 promoter. The vector comprising the *rep* gene regulated by the T7 promoter and the *cap* gene, is transfected or transformed into a cell which either constitutively or inducibly expresses the T7

Sarepta Exhibit 1002, page 42

polymerase. See International Patent Publication No. WO 98/10088, published March 12, 1998.

The spacer is an optional element in the design of the vector. The spacer is a DNA sequence interposed between the promoter and the *rep* gene ATG start site. The spacer may have any desired design; that is, it may be a random sequence of nucleotides, or alternatively, it may encode a gene product, such as a marker gene. The spacer may contain genes which typically incorporate start/stop and polyA sites. The spacer may be a non-coding DNA sequence from a prokaryote or eukaryote, a repetitive non-coding sequence, a coding sequence without transcriptional controls or a coding sequence with transcriptional controls. Two exemplary sources of spacer sequences are the phage ladder sequences or yeast ladder sequences, which are available commercially, *e.g.*, from Gibco or Invitrogen, among others. The spacer may be of any size sufficient to reduce expression of the *rep*78 and *rep*68 gene products, leaving the *rep*52, *rep*40 and *cap* gene products expressed at normal levels. The length of the spacer may therefore range from about 10 bp to about 10.0 kbp, preferably in the range of about 100 bp to about 8.0 kbp. To reduce the possibility of recombination, the spacer is preferably less than 2 kbp in length; however, the invention is not so limited.

Although the molecule(s) providing *rep* and *cap* may exist in the host cell transiently (*i.e.*, through transfection), it is preferred that one or both of the *rep* and *cap* proteins and the promoter(s) controlling their expression be stably expressed in the host cell, *e.g.*, as an episome or by integration into the chromosome of the host cell. The methods employed for constructing embodiments of this invention are conventional genetic engineering or recombinant engineering techniques such as those described in the references above. While this specification provides illustrative examples of specific constructs, using the information provided herein, one of skill in the art may select and design other suitable constructs, using a choice of spacers, P5 promoters, and other elements, including at least one translational start and stop signal, and the optional addition of polyadenylation sites.

In another embodiment of this invention, the rep or cap protein may be provided stably by a host cell.

Sarepta Exhibit 1002, page 43

C. The Helper Functions

The packaging host cell also requires helper functions in order to package the rAAV of the invention. Optionally, these functions may be supplied by a herpesvirus. Most desirably, the necessary helper functions are each provided from a human or non-human primate adenovirus source, such as those described above and/or are available from a variety of sources, including the American Type Culture Collection (ATCC), Manassas, VA (US). In one currently preferred embodiment, the host cell is provided with and/or contains an E1a gene product, an E1b gene product, an E2a gene product, and/or an E4 ORF6 gene product. The host cell may contain other adenoviral genes such as VAI RNA, but these genes are not required. In a preferred embodiment, no other adenovirus genes or gene functions are present in the host cell.

By "adenoviral DNA which expresses the E1a gene product", it is meant any adenovirus sequence encoding E1a or any functional E1a portion. Adenoviral DNA which expresses the E2a gene product and adenoviral DNA which expresses the E4 ORF6 gene products are defined similarly. Also included are any alleles or other modifications of the adenoviral gene or functional portion thereof. Such modifications may be deliberately introduced by resort to conventional genetic engineering or mutagenic techniques to enhance the adenoviral function in some manner, as well as naturally occurring allelic variants thereof. Such modifications and methods for manipulating DNA to achieve these adenovirus gene functions are known to those of skill in the art.

The adenovirus E1a, E1b, E2a, and/or E4ORF6 gene products, as well as any other desired helper functions, can be provided using any means that allows their expression in a cell. Each of the sequences encoding these products may be on a separate vector, or one or more genes may be on the same vector. The vector may be any vector known in the art or disclosed above, including plasmids, cosmids and viruses. Introduction into the host cell of the vector may be achieved by any means known in the art or as disclosed above, including transfection, infection, electroporation, liposome delivery, membrane fusion techniques, high velocity DNA-coated pellets, viral infection and protoplast fusion, among others. One or more of the adenoviral genes may be stably integrated into the genome of the host cell, stably expressed as episomes, or expressed

transiently. The gene products may all be expressed transiently, on an episome or stably integrated, or some of the gene products may be expressed stably while others are expressed transiently. Furthermore, the promoters for each of the adenoviral genes may be selected independently from a constitutive promoter, an inducible promoter or a native adenoviral promoter. The promoters may be regulated by a specific physiological state of the organism or cell (*i.e.*, by the differentiation state or in replicating or quiescent cells) or by other means, *e.g.*, by exogenously added factors.

D. Host Cells And Packaging Cell Lines

The host cell itself may be selected from any biological organism, including prokaryotic (*e.g.*, bacterial) cells, and eukaryotic cells, including, insect cells, yeast cells and mammalian cells. Particularly desirable host cells are selected from among any mammalian species, including, without limitation, cells such as A549, WEHI, 3T3, 10T1/2, BHK, MDCK, COS 1, COS 7, BSC 1, BSC 40, BMT 10, VERO, WI38, HeLa, 293 cells (which express functional adenoviral E1), Saos, C2C12, L cells, HT1080, HepG2 and primary fibroblast, hepatocyte and myoblast cells derived from mammals including human, monkey, mouse, rat, rabbit, and hamster. The selection of the mammalian species providing the cells is not a limitation of this invention; nor is the type of mammalian cell, *i.e.*, fibroblast, hepatocyte, tumor cell, etc. The requirements for the cell used is that it not carry any adenovirus gene other than E1, E2a and/or E4 ORF6; it not contain any other virus gene which could result in homologous recombination of a contaminating virus during the production of rAAV; and it is capable of infection or transfection of DNA and expression of the transfected DNA. In a preferred embodiment, the host cell is one that has *rep* and *cap* stably transfected in the cell.

One host cell useful in the present invention is a host cell stably transformed with the sequences encoding rep and cap, and which is transfected with the adenovirus E1, E2a, and E4ORF6 DNA and a construct carrying the minigene as described above. Stable *rep* and/or *cap* expressing cell lines, such as B-50 (International Patent Application Publication No. WO 99/15685), or those described in US Patent No. 5,658,785, may also be similarly employed. Another desirable host cell contains the minimum adenoviral DNA which is sufficient to express E4 ORF6. Yet other cell lines can be constructed using the novel singleton-corrected AAV *cap* sequences of the invention.

Sarepta Exhibit 1002, page 45

The preparation of a host cell according to this invention involves techniques such as assembly of selected DNA sequences. This assembly may be accomplished utilizing conventional techniques. Such techniques include cDNA and genomic cloning, which are well known and are described in Sambrook *et al.*, cited above, use of overlapping oligonucleotide sequences of the adenovirus and AAV genomes, combined with polymerase chain reaction, synthetic methods, and any other suitable methods which provide the desired nucleotide sequence.

Introduction of the molecules (as plasmids or viruses) into the host cell may also be accomplished using techniques known to the skilled artisan and as discussed throughout the specification. In preferred embodiment, standard transfection techniques are used, *e.g.*, $CaPO_4$ transfection or electroporation, and/or infection by hybrid adenovirus/AAV vectors into cell lines such as the human embryonic kidney cell line HEK 293 (a human kidney cell line containing functional adenovirus E1 genes which provides *trans*-acting E1 proteins).

One of skill in the art will readily understand that the novel AAV sequences of the invention can be readily adapted for use in these and other viral vector systems for *in vitro, ex vivo or in vivo* gene delivery. Similarly, one of skill in the art can readily select other fragments of the AAV genome of the invention for use in a variety of rAAV and non-rAAV vector systems. Such vectors systems may include, *e.g.*, lentiviruses, retroviruses, poxviruses, vaccinia viruses, and adenoviral systems, among others. Selection of these vector systems is not a limitation of the present invention.

Thus, the invention further provides vectors generated using the nucleic acid and amino acid sequences of the novel AAV of the invention. Such vectors are useful for a variety of purposes, including for delivery of therapeutic molecules and for use in vaccine regimens. Particularly desirable for delivery of therapeutic molecules are recombinant AAV containing capsids of the novel AAV of the invention. These, or other vector constructs containing novel AAV sequences of the invention may be used in vaccine regimens, *e.g.*, for co-delivery of a cytokine, or for delivery of the immunogen itself.

Sarepta Exhibit 1002, page 46

IV. Recombinant Viruses And Uses Therefor

Using the techniques described herein, one of skill in the art can generate a rAAV having a capsid of an AAV of the invention or having a capsid containing one or more fragments of an AAV of the invention. In one embodiment, a full-length capsid from a singleton-corrected AAV can be utilized.

A. Delivery of Viruses

In another aspect, the present invention provides a method for delivery of a transgene to a host which involves transfecting or infecting a selected host cell with a recombinant viral vector generated with the singleton-corrected AAV (or functional fragments thereof) of the invention. Methods for delivery are well known to those of skill in the art and are not a limitation of the present invention.

In one desirable embodiment, the invention provides a method for AAV-mediated delivery of a transgene to a host. This method involves transfecting or infecting a selected host cell with a recombinant viral vector containing a selected transgene under the control of sequences that direct expression thereof and the modified capsid proteins of the capsids.

Optionally, a sample from the host may be first assayed for the presence of antibodies to a selected AAV source (*e.g.*, a serotype). A variety of assay formats for detecting neutralizing antibodies are well known to those of skill in the art. The selection of such an assay is not a limitation of the present invention. See, *e.g.*, Fisher et al, *Nature Med.*, **3**(3):306-312 (March 1997) and W. C. Manning et al, *Human Gene Therapy*, **9**:477-485 (March 1, 1998). The results of this assay may be used to determine which AAV vector containing capsid proteins of a particular source are preferred for delivery, *e.g.*, by the absence of neutralizing antibodies specific for that capsid source.

In one aspect of this method, the delivery of vector with AAV capsid proteins of the invention may precede or follow delivery of a gene via a vector with a different AAV capsid protein. Thus, gene delivery via rAAV vectors may be used for repeat gene delivery to a selected host cell. Desirably, subsequently administered rAAV vectors carry the same transgene as the first rAAV vector, but the subsequently administered vectors contain capsid proteins of sources (and preferably, different serotypes) which differ from the first vector. For example, if a first vector has a singleton-corrected capsid proteins, subsequently administered vectors may have capsid

Sarepta Exhibit 1002, page 47

proteins selected from among the other AAV, optionally, from another serotype or from another clade.

Optionally, multiple rAAV vectors can be used to deliver large transgenes or multiple transgenes by co-administration of rAAV vectors concatamerize *in vivo* to form a single vector genome. In such an embodiment, a first AAV may carry an expression cassette which expresses a single transgene (or a subunit thereof) and a second AAV may carry an expression cassette which expresses a second transgene (or a different subunit) for co-expression in the host cell. A first AAV may carry an expression cassette which is a first piece of a polycistronic construct (*e.g.*, a promoter and transgene, or subunit) and a second AAV may carry an expression cassette which is a second piece of a polycistronic construct (*e.g.*, transgene or subunit and a polyA sequence). These two pieces of a polycistronic construct concatamerize *in vivo* to form a single vector genome that co-expresses the transgenes delivered by the first and second AAV. In such embodiments, the rAAV vector carrying the first expression cassette and the rAAV vector carrying the second expression cassette can be delivered in a single pharmaceutical composition. In other embodiments, the two or more rAAV vectors are delivered as separate pharmaceutical compositions which can be administered substantially simultaneously, or shortly before or after one another.

The above-described recombinant vectors may be delivered to host cells according to published methods. The rAAV, preferably suspended in a physiologically compatible carrier, may be administered to a human or non-human mammalian patient. Suitable carriers may be readily selected by one of skill in the art in view of the indication for which the transfer virus is directed. For example, one suitable carrier includes saline, which may be formulated with a variety of buffering solutions (*e.g.*, phosphate buffered saline). Other exemplary carriers include sterile saline, lactose, sucrose, calcium phosphate, gelatin, dextran, agar, pectin, peanut oil, sesame oil, and water. The selection of the carrier is not a limitation of the present invention.

Optionally, the compositions of the invention may contain, in addition to the rAAV and carrier(s), other conventional pharmaceutical ingredients, such as preservatives, or chemical stabilizers. Suitable exemplary preservatives include chlorobutanol, potassium sorbate, sorbic acid, sulfur dioxide, propyl gallate, the parabens,

Sarepta Exhibit 1002, page 48

ethyl vanillin, glycerin, phenol, and parachlorophenol. Suitable chemical stabilizers include gelatin and albumin.

The vectors are administered in sufficient amounts to transfect the cells and to provide sufficient levels of gene transfer and expression to provide a therapeutic benefit without undue adverse effects, or with medically acceptable physiological effects, which can be determined by those skilled in the medical arts. Conventional and pharmaceutically acceptable routes of administration include, but are not limited to, direct delivery to a desired organ (*e.g.*, the liver (optionally via the hepatic artery) or lung), oral, inhalation, intranasal, intratracheal, intraarterial, intraocular, intravenous, intramuscular, subcutaneous, intradermal, and other parental routes of administration. Routes of administration may be combined, if desired.

Dosages of the viral vector will depend primarily on factors such as the condition being treated, the age, weight and health of the patient, and may thus vary among patients. For example, a therapeutically effective human dosage of the viral vector is generally in the range of from about 0.1 mL to about 100 mL of solution containing concentrations of from about 1×10^9 to 1×10^{16} genomes virus vector. A preferred human dosage for delivery to large organs (*e.g.*, liver, muscle, heart and lung) may be about 5×10^{10} to 5×10^{13} AAV genomes per 1 kg, at a volume of about 1 to 100 mL. A preferred dosage for delivery to eye is about 5×10^9 to 5×10^{12} genome copies, at a volume of about 0.1 mL to 1 mL. The dosage will be adjusted to balance the therapeutic benefit against any side effects and such dosages may vary depending upon the therapeutic application for which the recombinant vector is employed. The levels of expression of the transgene can be monitored to determine the frequency of dosage resulting in viral vectors, preferably AAV vectors containing the minigene. Optionally, dosage regimens similar to those described for therapeutic purposes may be utilized for immunization using the compositions of the invention.

Examples of therapeutic products and immunogenic products for delivery by the AAV-containing vectors of the invention are provided below. These vectors may be used for a variety of therapeutic or vaccinal regimens, as described herein. Additionally, these vectors may be delivered in combination with one or more other vectors or active ingredients in a desired therapeutic and/or vaccinal regimen.

Sarepta Exhibit 1002, page 49

B. Therapeutic Transgenes

Useful therapeutic products encoded by the transgene include hormones and growth and differentiation factors including, without limitation, insulin, glucagon, growth hormone (GH), parathyroid hormone (PTH), growth hormone releasing factor (GRF), follicle stimulating hormone (FSH), luteinizing hormone (LH), human chorionic gonadotropin (hCG), vascular endothelial growth factor (VEGF), angiopoietins, angiostatin, granulocyte colony stimulating factor (GCSF), erythropoietin (EPO), connective tissue growth factor (CTGF), basic fibroblast growth factor (bFGF), acidic fibroblast growth factor (aFGF), epidermal growth factor (EGF), platelet-derived growth factor (PDGF), insulin growth factors I and II (IGF-I and IGF-II), any one of the transforming growth factor α superfamily, including TGFα, activins, inhibins, or any of the bone morphogenic proteins (BMP) BMPs 1-15, any one of the heregluin/neuregulin/ARIA/neu differentiation factor (NDF) family of growth factors, nerve growth factor (NGF), brain-derived neurotrophic factor (BDNF), neurotrophins NT-3 and NT-4/5, ciliary neurotrophic factor (CNTF), glial cell line derived neurotrophic factor (GDNF), neurturin, agrin, any one of the family of semaphorins/collapsins, netrin-1 and netrin-2, hepatocyte growth factor (HGF), ephrins, noggin, sonic hedgehog and tyrosine hydroxylase.

Other useful transgene products include proteins that regulate the immune system including, without limitation, cytokines and lymphokines such as thrombopoietin (TPO), interleukins (IL) IL-1 through IL-25 (including, *e.g.*, IL-2, IL-4, IL-12 and IL-18), monocyte chemoattractant protein, leukemia inhibitory factor, granulocyte-macrophage colony stimulating factor, Fas ligand, tumor necrosis factors α and β, interferons α, β, and γ, stem cell factor, flk-2/flt3 ligand. Gene products produced by the immune system are also useful in the invention. These include, without limitations, immunoglobulins IgG, IgM, IgA, IgD and IgE, chimeric immunoglobulins, humanized antibodies, single chain antibodies, T cell receptors, chimeric T cell receptors, single chain T cell receptors, class I and class II MHC molecules, as well as engineered immunoglobulins and MHC molecules. Useful gene products also include complement regulatory proteins such as complement regulatory proteins, membrane cofactor protein (MCP), decay accelerating factor (DAF), CR1, CF2 and CD59.

Sarepta Exhibit 1002, page 50

Still other useful gene products include any one of the receptors for the hormones, growth factors, cytokines, lymphokines, regulatory proteins and immune system proteins. The invention encompasses receptors for cholesterol regulation and/or lipid modulation, including the low density lipoprotein (LDL) receptor, high density lipoprotein (HDL) receptor, the very low density lipoprotein (VLDL) receptor, and scavenger receptors. The invention also encompasses gene products such as members of the steroid hormone receptor superfamily including glucocorticoid receptors and estrogen receptors, Vitamin D receptors and other nuclear receptors. In addition, useful gene products include transcription factors such as *jun*, *fos*, max, mad, serum response factor (SRF), AP-1, AP2, *myb*, MyoD and myogenin, ETS-box containing proteins, TFE3, E2F, ATF1, ATF2, ATF3, ATF4, ZF5, NFAT, CREB, HNF-4, C/EBP, SP1, CCAAT-box binding proteins, interferon regulation factor (IRF-1), Wilms tumor protein, ETS-binding protein, STAT, GATA-box binding proteins, *e.g.*, GATA-3, and the forkhead family of winged helix proteins.

Other useful gene products include, carbamoyl synthetase I, ornithine transcarbamylase, arginosuccinate synthetase, arginosuccinate lyase, arginase, fumarylacetacetate hydrolase, phenylalanine hydroxylase, alpha-1 antitrypsin, glucose-6-phosphatase, porphobilinogen deaminase, cystathione beta-synthase, branched chain ketoacid decarboxylase, albumin, isovaleryl-coA dehydrogenase, propionyl CoA carboxylase, methyl malonyl CoA mutase, glutaryl CoA dehydrogenase, insulin, beta-glucosidase, pyruvate carboxylate, hepatic phosphorylase, phosphorylase kinase, glycine decarboxylase, H-protein, T-protein, a cystic fibrosis transmembrane regulator (CFTR) sequence, and a dystrophin gene product [*e.g.*, a mini- or micro-dystrophin]. Still other useful gene products include enzymes such as may be useful in enzyme replacement therapy, which is useful in a variety of conditions resulting from deficient activity of enzyme. For example, enzymes that contain mannose-6-phosphate may be utilized in therapies for lysosomal storage diseases (*e.g.*, a suitable gene includes that encoding β-glucuronidase (GUSB)).

Still other useful gene products include those used for treatment of hemophilia, including hemophilia B (including Factor IX) and hemophilia A (including Factor VIII and its variants, such as the light chain and heavy chain of the heterodimer and the B-deleted domain; US Patent No. 6,200,560 and US Patent No. 6,221,349). The

Sarepta Exhibit 1002, page 51

Factor VIII gene codes for 2351 amino acids and the protein has six domains, designated from the amino to the terminal carboxy terminus as A1-A2-B-A3-C1-C2 [Wood *et al*, *Nature*, **312**:330 (1984); Vehar *et al.*, *Nature* **312**:337 (1984); and Toole *et al*, *Nature*, **342**:337 (1984)]. Human Factor VIII is processed within the cell to yield a heterodimer primarily comprising a heavy chain containing the A1, A2 and B domains and a light chain containing the A3, C1 and C2 domains. Both the single chain polypeptide and the heterodimer circulate in the plasma as inactive precursors, until activated by thrombin cleavage between the A2 and B domains, which releases the B domain and results in a heavy chain consisting of the A1 and A2 domains. The B domain is deleted in the activated procoagulant form of the protein. Additionally, in the native protein, two polypeptide chains ("a" and "b"), flanking the B domain, are bound to a divalent calcium cation.

In some embodiments, the minigene comprises first 57 base pairs of the Factor VIII heavy chain which encodes the 10 amino acid signal sequence, as well as the human growth hormone (hGH) polyadenylation sequence. In alternative embodiments, the minigene further comprises the A1 and A2 domains, as well as 5 amino acids from the N-terminus of the B domain, and/or 85 amino acids of the C-terminus of the B domain, as well as the A3, C1 and C2 domains. In yet other embodiments, the nucleic acids encoding Factor VIII heavy chain and light chain are provided in a single minigene separated by 42 nucleic acids coding for 14 amino acids of the B domain [US Patent No. 6,200,560].

As used herein, a therapeutically effective amount is an amount of AAV vector that produces sufficient amounts of Factor VIII to decrease the time it takes for a subject's blood to clot. Generally, severe hemophiliacs having less than 1% of normal levels of Factor VIII have a whole blood clotting time of greater than 60 minutes as compared to approximately 10 minutes for non-hemophiliacs.

The present invention is not limited to any specific Factor VIII sequence. Many natural and recombinant forms of Factor VIII have been isolated and generated. Examples of naturally occurring and recombinant forms of Factor VII can be found in the patent and scientific literature including, US Patent Nos. 5,563,045; 5,451,521, 5,422,260; 5,004,803; 4,757,006; 5,661,008; 5,789,203; 5,681,746; 5,595,886; 5,045,455; 5,668,108; 5,633,150; 5,693,499; 5,587,310; 5,171,844; 5,149,637; 5,112,950;

4,886,876; International Patent Publication Nos. WO 94/11503, WO 87/07144, WO 92/16557, WO 91/09122, WO 97/03195, WO 96/21035, and WO 91/07490; European Patent Application Nos. EP 0 672 138, EP 0 270 618, EP 0 182 448, EP 0 162 067, EP 0 786 474, EP 0 533 862, EP 0 506 757, EP 0 874 057,EP 0 795 021, EP 0 670 332, EP 0 500 734, EP 0 232 112, and EP 0 160 457; Sanberg *et al.*, XXth Int. Congress of the World Fed. Of Hemophilia (1992), and Lind *et al.*, *Eur. J. Biochem.*, **232**:19 (1995).

Nucleic acids sequences coding for the above-described Factor VIII can be obtained using recombinant methods or by deriving the sequence from a vector known to include the same. Furthermore, the desired sequence can be isolated directly from cells and tissues containing the same, using standard techniques, such as phenol extraction and PCR of cDNA or genomic DNA [See, *e.g.*, Sambrook et al]. Nucleotide sequences can also be produced synthetically, rather than cloned. The complete sequence can be assembled from overlapping oligonucleotides prepared by standard methods and assembled into a complete coding sequence [See, *e.g.*, Edge, *Nature* **292**:757 (1981); Nambari *et al*, *Science*, **223**:1299 (1984); and Jay *et al*, *J. Biol. Chem.* **259**:6311 (1984).

Furthermore, the invention is not limited to human Factor VIII. Indeed, it is intended that the present invention encompass Factor VIII from animals other than humans, including but not limited to companion animals (*e.g.*, canine, felines, and equines), livestock (*e.g.*, bovines, caprines and ovines), laboratory animals, marine mammals, large cats, etc.

The AAV vectors may contain a nucleic acid coding for fragments of Factor VIII which is itself not biologically active, yet when administered into the subject improves or restores the blood clotting time. For example, as discussed above, the Factor VIII protein comprises two polypeptide chains: a heavy chain and a light chain separated by a B-domain which is cleaved during processing. As demonstrated by the present invention, co-tranducing recipient cells with the Factor VIII heavy and light chains leads to the expression of biologically active Factor VIII. Because most hemophiliacs contain a mutation or deletion in only one of the chains (*e.g.*, heavy or light chain), it may be possible to administer only the chain defective in the patient to supply the other chain.

Other useful gene products include non-naturally occurring polypeptides, such as chimeric or hybrid polypeptides having a non-naturally occurring amino acid sequence containing insertions, deletions or amino acid substitutions. For example,

Sarepta Exhibit 1002, page 53

single-chain engineered immunoglobulins could be useful in certain immunocompromised patients. Other types of non-naturally occurring gene sequences include antisense molecules and catalytic nucleic acids, such as ribozymes, which could be used to reduce overexpression of a target.

Reduction and/or modulation of expression of a gene is particularly desirable for treatment of hyperproliferative conditions characterized by hyperproliferating cells, as are cancers and psoriasis. Target polypeptides include those polypeptides which are produced exclusively or at higher levels in hyperproliferative cells as compared to normal cells. Target antigens include polypeptides encoded by oncogenes such as myb, myc, fyn, and the translocation gene bcr/abl, ras, src, P53, neu, trk and EGRF. In addition to oncogene products as target antigens, target polypeptides for anti-cancer treatments and protective regimens include variable regions of antibodies made by B cell lymphomas and variable regions of T cell receptors of T cell lymphomas which, in some embodiments, are also used as target antigens for autoimmune disease. Other tumor-associated polypeptides can be used as target polypeptides such as polypeptides which are found at higher levels in tumor cells including the polypeptide recognized by monoclonal antibody 17-1A and folate binding polypeptides.

Other suitable therapeutic polypeptides and proteins include those which may be useful for treating individuals suffering from autoimmune diseases and disorders by conferring a broad based protective immune response against targets that are associated with autoimmunity including cell receptors and cells which produce "self"-directed antibodies. T cell mediated autoimmune diseases include Rheumatoid arthritis (RA), multiple sclerosis (MS), Sjögren's syndrome, sarcoidosis, insulin dependent diabetes mellitus (IDDM), autoimmune thyroiditis, reactive arthritis, ankylosing spondylitis, scleroderma, polymyositis, dermatomyositis, psoriasis, vasculitis, Wegener's granulomatosis, Crohn's disease and ulcerative colitis. Each of these diseases is characterized by T cell receptors (TCRs) that bind to endogenous antigens and initiate the inflammatory cascade associated with autoimmune diseases.

Sarepta Exhibit 1002, page 54

C. Immunogenic Transgenes

Suitably, the AAV vectors of the invention avoid the generation of immune responses to the AAV sequences contained within the vector. However, these vectors may nonetheless be formulated in a manner that permits the expression of a transgene carried by the vectors to induce an immune response to a selected antigen. For example, in order to promote an immune response, the transgene may be expressed from a constitutive promoter, the vector can be adjuvanted as described herein, and/or the vector can be put into degenerating tissue.

Examples of suitable immunogenic transgenes include those selected from a variety of viral families. Examples of desirable viral families against which an immune response would be desirable include, the picornavirus family, which includes the genera rhinoviruses, which are responsible for about 50% of cases of the common cold; the genera enteroviruses, which include polioviruses, coxsackieviruses, echoviruses, and human enteroviruses such as hepatitis A virus; and the genera apthoviruses, which are responsible for foot and mouth diseases, primarily in non-human animals. Within the picornavirus family of viruses, target antigens include the VP1, VP2, VP3, VP4, and VPG. Other viral families include the astroviruses and the calcivirus family. The calcivirus family encompasses the Norwalk group of viruses, which are an important causative agent of epidemic gastroenteritis. Still another viral family desirable for use in targeting antigens for inducing immune responses in humans and non-human animals is the togavirus family, which includes the genera alphavirus, which include Sindbis viruses, RossRiver virus, and Venezuelan, Eastern & Western Equine encephalitis, and rubivirus, including Rubella virus. The flaviviridae family includes dengue, yellow fever, Japanese encephalitis, St. Louis encephalitis and tick borne encephalitis viruses. Other target antigens may be generated from the Hepatitis C or the coronavirus family, which includes a number of non-human viruses such as infectious bronchitis virus (poultry), porcine transmissible gastroenteric virus (pig), porcine hemagglutinatin encephalomyelitis virus (pig), feline infectious peritonitis virus (cat), feline enteric coronavirus (cat), canine coronavirus (dog), and human respiratory coronaviruses, which may cause the common cold and/or non-A, B or C hepatitis, and which include the putative cause of sudden acute respiratory syndrome (SARS). Within the coronavirus family, target antigens include the E1 (also called M or matrix protein), E2 (also called S or Spike protein), E3 (also called

HE or hemagglutin-elterose) glycoprotein (not present in all coronaviruses), or N (nucleocapsid). Still other antigens may be targeted against the arterivirus family and the rhabdovirus family. The rhabdovirus family includes the genera vesiculovirus (*e.g.*, Vesicular Stomatitis Virus), and the general lyssavirus (*e.g.*, rabies). Within the rhabdovirus family, suitable antigens may be derived from the G protein or the N protein. The family filoviridae, which includes hemorrhagic fever viruses such as Marburg and Ebola virus may be a suitable source of antigens. The paramyxovirus family includes parainfluenza Virus Type 1, parainfluenza Virus Type 3, bovine parainfluenza Virus Type 3, rubulavirus (mumps virus, parainfluenza Virus Type 2, parainfluenza virus Type 4, Newcastle disease virus (chickens), rinderpest, morbillivirus, which includes measles and canine distemper, and pneumovirus, which includes respiratory syncytial virus. The influenza virus is classified within the family orthomyxovirus and is a suitable source of antigen (*e.g.*, the HA protein, the N1 protein). The bunyavirus family includes the genera bunyavirus (California encephalitis, La Crosse), phlebovirus (Rift Valley Fever), hantavirus (puremala is a hemahagin fever virus), nairovirus (Nairobi sheep disease) and various unassigned bungaviruses. The arenavirus family provides a source of antigens against LCM and Lassa fever virus. Another source of antigens is the bornavirus family. The reovirus family includes the genera reovirus, rotavirus (which causes acute gastroenteritis in children), orbiviruses, and cultivirus (Colorado Tick fever, Lebombo (humans), equine encephalosis, blue tongue). The retrovirus family includes the sub-family oncorivirinal which encompasses such human and veterinary diseases as feline leukemia virus, HTLVI and HTLVII, lentivirinal (which includes HIV, simian immunodeficiency virus, feline immunodeficiency virus, equine infectious anemia virus, and spumavirinal).

With respect to HIV and SIV, many suitable antigens have been described and can readily be selected. Examples of suitable HIV and SIV antigens include, without limitation the gag, pol, Vif, Vpx, VPR, Env, Tat and Rev proteins, as well as various fragments thereof. For example, suitable fragments of the envelope (env) protein include, *e.g.*, gp41, gp140, and gp120. In addition, a variety of modifications to these and other HIV and SIV antigens have been described. Suitable antigens for this purpose are known to those of skill in the art. For example, one may select a sequence encoding the gag, pol, Vif, and Vpr, Env, Tat and Rev, amongst other proteins. See, *e.g.*, the modified gag

Sarepta Exhibit 1002, page 56

protein which is described in US Patent 5,972,596. See, also, the HIV and SIV proteins described in D.H. Barouch et al, J. Virol., 75(5):2462-2467 (March 2001), and R.R. Amara, et al, Science, 292:69-74 (6 April 2001). These proteins or subunits thereof may be delivered alone, or in combination via separate vectors or from a single vector.

The papovavirus family includes the sub-family polyomaviruses (BKU and JCU viruses) and the sub-family papillomavirus (associated with cancers or malignant progression of papilloma). The adenovirus family includes viruses (EX, AD7, ARD, O.B.) which cause respiratory disease and/or enteritis. The parvovirus family includes feline parvovirus (feline enteritis), feline panleucopeniavirus, canine parvovirus, and porcine parvovirus. The herpesvirus family includes the sub-family alphaherpesvirinae, which encompasses the genera simplexvirus (HSVI, HSVII), varicellovirus (pseudorabies, varicella zoster) and the sub-family betaherpesvirinae, which includes the genera cytomegalovirus (HCMV, muromegalovirus) and the sub-family gammaherpesvirinae, which includes the genera lymphocryptovirus, EBV (Burkitts lymphoma), human herpesviruses 6A, 6B and 7, Kaposi's sarcoma-associated herpesvirus and cercopithecine herpesvirus (B virus), infectious rhinotracheitis, Marek's disease virus, and rhadinovirus. The poxvirus family includes the sub-family chordopoxvirinae, which encompasses the genera orthopoxvirus (Variola major (Smallpox) and Vaccinia (Cowpox)), parapoxvirus, avipoxvirus, capripoxvirus, leporipoxvirus, suipoxvirus, and the sub-family entomopoxvirinae. The hepadnavirus family includes the Hepatitis B virus. One unclassified virus which may be suitable source of antigens is the Hepatitis delta virus, Hepatitis E virus, and prions. Another virus which is a source of antigens is Nipan Virus. Still other viral sources may include avian infectious bursal disease virus and porcine respiratory and reproductive syndrome virus. The alphavirus family includes equine arteritis virus and various Encephalitis viruses.

The present invention may also encompass immunogens which are useful to immunize a human or non-human animal against other pathogens including bacteria, fungi, parasitic microorganisms or multicellular parasites which infect human and non-human vertebrates, or from a cancer cell or tumor cell. Examples of bacterial pathogens include pathogenic gram-positive cocci include pneumococci; staphylococci (and the toxins produced thereby, *e.g.*, enterotoxin B); and streptococci. Pathogenic

Sarepta Exhibit 1002, page 57

gram-negative cocci include meningococcus; gonococcus. Pathogenic enteric gram-negative bacilli include enterobacteriaceae; pseudomonas, acinetobacteria and eikenella; melioidosis; salmonella; shigella; haemophilus; moraxella; *H. ducreyi* (which causes chancroid); brucella species (brucellosis); *Francisella tularensis* (which causes tularemia); *Yersinia pestis* (plague) and other yersinia (pasteurella); streptobacillus moniliformis and spirillum; Gram-positive bacilli include listeria monocytogenes; erysipelothrix rhusiopathiae; *Corynebacterium diphtheria* (diphtheria); cholera; *B. anthracis* (anthrax); donovanosis (granuloma inguinale); and bartonellosis. Diseases caused by pathogenic anaerobic bacteria include tetanus; botulism (*Clostridum botulinum* and its toxin); *Clostridium perfringens* and its epsilon toxin; other clostridia; tuberculosis; leprosy; and other mycobacteria. Pathogenic spirochetal diseases include syphilis; treponematoses: yaws, pinta and endemic syphilis; and leptospirosis. Other infections caused by higher pathogen bacteria and pathogenic fungi include glanders (*Burkholderia mallei*); actinomycosis; nocardiosis; cryptococcosis, blastomycosis, histoplasmosis and coccidioidomycosis; candidiasis, aspergillosis, and mucormycosis; sporotrichosis; paracoccidiodomycosis, petriellidiosis, torulopsosis, mycetoma and chromomycosis; and dermatophytosis. Rickettsial infections include Typhus fever, Rocky Mountain spotted fever, Q fever (*Coxiella burnetti*), and Rickettsialpox. Examples of mycoplasma and chlamydial infections include: mycoplasma pneumoniae; lymphogranuloma venereum; psittacosis; and perinatal chlamydial infections. Pathogenic eukaryotes encompass pathogenic protozoans and helminths and infections produced thereby include: amebiasis; malaria; leishmaniasis; trypanosomiasis; toxoplasmosis; *Pneumocystis carinii*; *Trichans*; *Toxoplasma gondii*; babesiosis; giardiasis; trichinosis; filariasis; schistosomiasis; nematodes; trematodes or flukes; and cestode (tapeworm) infections.

Many of these organisms and/or the toxins produced thereby have been identified by the Centers for Disease Control [(CDC), Department of Heath and Human Services, USA], as agents which have potential for use in biological attacks. For example, some of these biological agents, include, *Bacillus anthracis* (anthrax), *Clostridium botulinum* and its toxin (botulism), *Yersinia pestis* (plague), variola major (smallpox), *Francisella tularensis* (tularemia), and viral hemorrhagic fevers [filoviruses (*e.g.*, Ebola, Marburg], and arenaviruses [*e.g.*, Lassa, Machupo]), all of which are currently classified

Sarepta Exhibit 1002, page 58

as Category A agents; *Coxiella burnetti* (Q fever); Brucella species (brucellosis), *Burkholderia mallei* (glanders), *Burkholderia pseudomallei* (meloidosis), *Ricinus communis* and its toxin (ricin toxin), *Clostridium perfringens* and its toxin (epsilon toxin), *Staphylococcus* species and their toxins (enterotoxin B), *Chlamydia psittaci* (psittacosis), water safety threats (*e.g.*, *Vibrio cholerae*, *Crytosporidium parvum*), Typhus fever (*Richettsia powazekii*), and viral encephalitis (alphaviruses, *e.g.*, Venezuelan equine encephalitis; eastern equine encephalitis; western equine encephalitis); all of which are currently classified as Category B agents; and Nipan virus and hantaviruses, which are currently classified as Category C agents. In addition, other organisms, which are so classified or differently classified, may be identified and/or used for such a purpose in the future. It will be readily understood that the viral vectors and other constructs described herein are useful to deliver antigens from these organisms, viruses, their toxins or other by-products, which will prevent and/or treat infection or other adverse reactions with these biological agents.

Administration of the vectors of the invention to deliver immunogens against the variable region of the T cells elicit an immune response including CTLs to eliminate those T cells. In rheumatoid arthritis (RA), several specific variable regions of TCRs which are involved in the disease have been characterized. These TCRs include V-3, V-14, V-17 and V-17. Thus, delivery of a nucleic acid sequence that encodes at least one of these polypeptides will elicit an immune response that will target T cells involved in RA. In multiple sclerosis (MS), several specific variable regions of TCRs which are involved in the disease have been characterized. These TCRs include V-7 and V-10. Thus, delivery of a nucleic acid sequence that encodes at least one of these polypeptides will elicit an immune response that will target T cells involved in MS. In scleroderma, several specific variable regions of TCRs which are involved in the disease have been characterized. These TCRs include V-6, V-8, V-14 and V-16, V-3C, V-7, V-14, V-15, V-16, V-28 and V-12. Thus, delivery of a nucleic acid molecule that encodes at least one of these polypeptides will elicit an immune response that will target T cells involved in scleroderma.

Thus, a rAAV-derived recombinant viral vector of the invention provides an efficient gene transfer vehicle which can deliver a selected transgene to a selected host cell *in vivo or ex vivo* even where the organism has neutralizing antibodies to one or more

Sarepta Exhibit 1002, page 59

AAV sources. In one embodiment, the rAAV and the cells are mixed *ex vivo;* the infected cells are cultured using conventional methodologies; and the transduced cells are re-infused into the patient.

These compositions are particularly well suited to gene delivery for therapeutic purposes and for immunization, including inducing protective immunity. AAV of the invention and compositions containing same can also be used in immunization regimens such as those described in co-owned US Patent Application No. 60/565,936, filed April 28, 2004 for "Sequential Adenovirus and AAV-Mediated Delivery of Immunogenic Molecules".

Further, the compositions of the invention may also be used for production of a desired gene product *in vitro.* For *in vitro* production, a desired product (*e.g.*, a protein) may be obtained from a desired culture following transfection of host cells with a rAAV containing the molecule encoding the desired product and culturing the cell culture under conditions which permit expression. The expressed product may then be purified and isolated, as desired. Suitable techniques for transfection, cell culturing, purification, and isolation are known to those of skill in the art.

The following examples illustrate several aspects and embodiments of the invention.

EXAMPLE 1

According to the method of the invention, AAV sequences have been identified as having singletons, when placed in an alignment with a library of sequences containing representatives of each of clades A, B, C, D, E, and F (represented by AAV9). The following table illustrates the capsid sequences and the singleton to be altered to a conserved sequence. For certain mutations, the singleton is followed by an * and then the amino acid reside which replaces it. For other mutations, the singleton is followed by its amino acid position and the residue which replaced it.

The amino acid numbering is based upon the published sequences for each of these AAV capsids. See, *e.g.*, G. Gao, *et al.*, J. Virol., 78(12):6381-6388 (June 2004) and International Patent Publication No. WO 2004/042397 [all sequences therein deposited

Sarepta Exhibit 1002, page 60

with GenBank], and International Patent Publication No. WO 2005/033321, filed September 30, 2004, which are incorporated by reference.

For example, with reference to the following table, the nomenclature should be read as follow. Cy5R1 refers to the amino acid sequence of SEQ ID NO. 24, which has been modified to contain an aspartic acid (D) in amino acid residue position 13; cy5 has a glycine in its native amino acid sequence at residue number 13. Cy5R2 refers to the amino acid sequence of SEQ ID NO:24, which has been modified to contain an aspartic acid in amino acid position 13 (glycine in the native sequence) and an asparagine in amino acid residue position 403 (aspartic acid in the native sequence). Cy5R3 has the amino acid sequence of SEQ ID NO:24, which has been modified to have the same modifications as the Cy5R2 and, additionally, a lysine at position 158 (natively an asparagine) and a glutamine at position 161 (natively a proline). Given this information, one of skill in the art should be readily able to determine the other singleton modifications recited in the following table.

Name	SEQ ID NO: (Parent AAV)	Sites Mutated				Clade
cy5	24					
Cy5R1		G13D				D
Cy5R2		G13D	D403N			D
Cy5R3		G13D	D403N	R51K		D
Cy5R4		G13D	D403N	R51K	N158K+ P161Q	D
rh.13	26					D
Rh.13R		E538K				D
Rh37	40					D
Rh37R2		E634K	T207M			D
Rh.2	39					E
rh.2R		V651I				E
Rh.8	41					
rh.8R		D531E				
Rh.48	44					
Rh.48.1		K217E				B
Rh.48.2		S304N				B
Rh.48.1.2		K217E	S304N			B

Name	SEQ ID NO: (Parent AAV)	Sites Mutated	Clade			
Hu.44	45					A
Hu.44R1		E137K				A
Hu.44R2		E137K	P446L			A
Hu.44R3		E137K	P446L	G609D		A
Rh32/33	2					
Hu. 29	42					B
Hu.29R		G396E				B
Ch.5	46					
Ch.5R1		T611I				
rh.67	47					D
rh.58	48			S653N		E
Rh.64	43					E
Rh64R1		R697W				E
Rh64R2		R697W	V686E			E
AAV6	29					A
AAV6.2		F129L				A
AAV6.1		K531E				A
AAV6.12		F129L	K531E			A
rh.54	49	V404M				D
hu.48	50					A
hu.48R1		G277S				A
hu.48R2		G277S	E322K			A
hu.48R3		G277S	E322K	S552N		A

EXAMPLE 2

In a preliminary study, five clones were selected to test the singleton method of the invention. The table below provides the phenotype description of the 5 clones. The number of predicted singletons is given with the clade and serotype classification.

Packaging phenotype is considered insufficient when their titer is lower than $1x10^{11}$GC, low when lower than $1x10^{12}$GC, good when lower $1x10^{13}$, excellent when higher.

Sarepta Exhibit 1002, page 62

Gene transfer phenotypes were established by CB.A1AT gene expression and indicated as follows; "+++" better than lead candidate for target tissue, "++", "+" and "-" respectively better than 50%, between 10-50% or lower than 10% of A1AT serum levels of lead candidates (muscle: AAV1, Liver:AAV8, Lung:AAV9). "n/a" indicated that vector could not be produced at sufficient levels for in vivo gene transfer studies.

Cloning of the singleton corrections went as follows. From the original packaging plasmid, site directed mutagenesis was performed. Subsequent to that, vector backbone integrity was assayed by a PstI digest and correction of the singleton was confirmed by sequencing. EGFP-expressing vector was then produced in triplicates on 12-well format side by side with the parental singleton-containing vector, AAV2 and AAV2/8 positive control and a production without presence of packaging plasmid as a negative control. Equal volume of harvested lysate after a 3x freeze was incubated on 293 cells. eGFP expressing was monitored by flow cytometry 72h post transduction.

Site-directed mutagenesis of the singleton residues in clones rh.37, rh.2, ch.5, rh.13, and rh.8 was performed. These particular sequences were selected to represent a variety of phenotypes that were previously documented.

Clone	Packaging	Gene Transfer Phenotype			# Singleton	Clade
	Phenotype	Lung	Liver	Muscle		(serotype)
rh.37	insufficient	n/a	n/a	n/a	2	D (AAV7)
rh.2	Low	++	+	+++	1	E (AAV8)
ch.5	Good	-	-	-	1	Ch.5
rh.13	Excellent	+	+	+	1	D (AAV7)
rh.8	Good	-	+	++	1	Rh.8

An increase in vector expression was noticed for 4 out of 5 clones. The increase was most dramatic for rh.37 and rh.2, vectors that were previously shown to have a low packaging yield. For these vectors productive particles were produced at levels sufficient for detection. Vectors rh.8 and rh.13 showed an increase in transduction.

In order to distinguish the effects of the singleton mutation on transduction versus packaging and assembly, small-scale vector preparations were made and titered for Dnase resistant particles by quantitative PCR. For rh.37, a two-log increase in vector production was observed. rh.8 showed a moderate 5 fold increase in titer whereas rh.13 performed

equally. All titers of singleton corrected clones were within acceptable range in comparison to AAV2 and AAV2/8 production and when extrapolated to large-scale preparations. rh.2 was not assayed for titration.

Subsequently the effect of the singleton change was monitored in vitro in a transduction setting with equal particle number per cell. A titration on 293 cells was performed for rh.8 and rh.13. Moderate increases in transduction efficiency were described at all MOIs.

From this initial subset of 5 clones, 3 productively transduced cells. Two clones were unable to yield any eGFP expression in this setting. This is most likely due to a defect in packaging of the vector that could not be predicted by the singleton approach.

The method of the invention was utilized to correct four predicted singleton locations in AAV clone hu. 46, P156S R362C S393F A676. However, these modifications did not result in an AAV which could be rescued, indicating another type of fatal error in the hu. 46 sequence.

EXAMPLE 3 – In Vitro Analysis of Viral Vectors with Altered Capsids

Using the methods of the invention, the capsid proteins of rh.64 and hu.29 were altered and then used to construct viral vectors with the altered capsids using pseudotyping as described in Example 2 and in G. Gao *et al.*, *Proc Natl Acad Sci U S A* **99**, 11854-9 (Sep 3, 2002).

Briefly, vectors expressing enhanced green fluorescent protein (EGFP) were used to examine *in vitro* transduction efficiency of the vectors in human endothelial kidney cells (293 cells). These 293 cells were incubated in the presence of 10^4 GC/cell pseudotyped AAVCMVeGFP particles after a short pre-incubation with wtAd5. The number of eGFP positive cells per 10,000 total cells was measured by FACS analysis with a limit of detection of 5 cells/10K.

Modification of the Rh.64 capsid according to the invention afforded modified rh.64 particles which were over a 100-fold more efficient after a R697W change. A subsequent V686E mutation yielded a 2-fold increase in packaging capability.

Modification of the Hu.29 capsid according to the invention afforded modified rh.64 virions that were rescued from a deficient packaging capability by changing G396E. A greater than 1000-fold increase in production was observed.

Many of the over 20 modified AAV virions showed improvement in expression include, AAV6.1, hu.48R1, hu.48R2, hu.44R2, hu.44R3, rh.48.2, rh.48.2, rh.48.2.1.

EXAMPLE 4 - Singleton effect in *in vivo* gene transfer applications.

The effects of the singleton mutants were studied in an *in vivo* setting. Gene transfers studies on C57B/6 mice have been initiated on a number of vectors modified according to the method of the invention. Muscle directed and liver directed studies were initiated and benchmarked versus the current lead candidates for the particular application.

Human α-antitrypsin (A1AT) was selected as a sensitive and quantitative reporter gene in the vectors and expressed under the control of CMV-enhanced chicken β-actin promoter. Employment of the CB promoter enables high levels of tissue non-specific and constitutive A1AT gene transfer to be achieved and also permits use of the same vector preparation for gene transfer studies in any tissue of interest.

Muscle was chosen as a first target tissue. 40 different novel vectors (based on 24 different clones each with their respective singleton mutant(s)) were injected intramuscularly in a hind limb of C57B/6 mice. All experiments were performed with 1×10^{11}GC/animal with a CB.A1AT transgene cassette. Vectors were each time aliquoted at equal volume (50µl) per mouse and group per Clade. Every individual study comprised one or two clades with control groups including the representative serotype, AAV2/8 and AAV2/1 that served as benchmarks for muscle targeted gene transfer. Transgene expression is detected at day 7, 14, 28 and 63 post injection and evaluated by a specific hA1AT ELISA.

For several isolates and singleton corrected versions, data on their performance after intraportal liver-directed infusion was generated. Preliminary results show that the majority of the corrected clones perform equal or better than the

Sarepta Exhibit 1002, page 65

original isolated.

For one particular clone namely cy.5, the singleton correction seem to beneficial effect on muscle transduction. The clone cy.5R4 carrying 4 singleton corrections improved gene transfer efficiency on an already decent muscle tropism exhibited by the original isolate. The performance of cy.5R4 is equal or slightly better than the benchmark controls AAV2/1 and AAV2/7.

An isolate that was previously yielded too low titers for further evaluation, rh.64, performed exceptionally well in muscle after correction of one singleton. Rh.64R1 performed better than rh64.2 and gave hA1AT levels higher than those achieved by its closest relative serotype AAV2/8 but also than AAV2/7.

In other studies, mice were injected with vector in groups based on the clades. 1 x 10^{11}GC/mouse was dosed with vector expressing CB.hA1AT. Serum levels of hA1AT were measured by specific hA1AT ELISA.

The effects of singleton on *in vivo* gene transfer seem to be dependent on isolate and target tissue. Several interesting observations were made.

For certain singleton clones, the effects are qualitatively similar in muscle and liver (e.g. rh.2, rh.13 or cy.5). Isolates hu.48 and rh.48 show an increased expression in muscle with increased number of singletons reverted.

Other clones like rh.64 and AAV6 show a particular expression profile. Isolate hu.48R2 for example packages about 10fold less efficient when compared to hu.48R3 but the latter transduces muscle about 5-fold less efficient. AAV6 contains two singletons. Both have moderate effects on packaging and combined they bring AAV6 packaging up to benchmark level. *In vitro*, little difference is noticeable between the parental clone and the different clones. In vivo, in muscle, AAV6.1 and AAV6.1.2 show decreased gene transfer whereas AAV6.2 show a moderate increase.

Example 5 – Evaluation of Singleton-Corrected AAV in Lung and Liver

AAV vectors optimized for packaging and gene transfer efficiency by the reversion of singleton residues were further evaluated in lung and liver. The data is presented for both vectors that were identified as non-singleton containing or for those for which the singleton residue was converted to the conserved amino-acid.

A. Evaluation of CB.A1AT AAV gene transfer to lung after Intratracheal injection mediated by pi2, rh32.33, AAV2/9, AAV2/5, rh.2R, ch5R .

Several AAV capsids are compared in their ability to target lung. hA1AT levels were measured in serum. The AAVs evaluated are either singleton free (pi2, rh32.33, AAV2/9, AAV2/5, rh.2R, ch5R) or contain one singleton residue (rh.2, rh.8). AAV2/5 and AAV2/9 are represented as benchmarks.

The gene transfer studies were performed in C57B/6 mice (male, 5 per group) using the vectors carrying either the CB.A1AT expression cassette (*i.e.*, AAV2 5' ITR, chicken β-actin promoter (CB), human α1-antitrypsin (A1AT), AAV2 3' ITR) or the CB.nLacZ expression cassette (*i.e.*, AAV2, 5'ITR, nuclear-localized β-galactosidase (nLacZ), AAV2 3'ITR) in the capsids described above. Briefly, 50 μL of these singleton-corrected or singleton-free vectors were co-instilled (1×10^{11} genome copies (GC)) intratracheally with vectors carrying the A1AT and the vectors carrying the nLacZ (1×10^{11} GC).

At days 12 and 20, 20 bleeds were taken and serum levels of A1AT were measured (ng AAT/mL serum). The data showed a dramatic increase of human α1-antitrypsin expression in lung for rh.2 to rh.2R after intratracheal (IT) injection of 1×10^{11} GC. In addition a variety AAV vectors that are free of singleton residues were evaluated. All vectors showed acceptable levels of expression in lung.

B. Evaluation of AAV6 singleton vectors in comparison to the AAV2/5 and AAV2/9

AAV6 singleton corrected clones were evaluated. Modified AAV6 (AAV6.2) was prepared using the singleton correction method of the invention, and the pseudotyping techniques described herein. The AAV6.2 particles carrying A1AT and LacZ expression cassettes, prepared as described in Example 5, were coinjected intranasally (1×10^{11} GC) and intratracheally. AAT expression was evaluated by ELISA in serum and in bronchial alveolar liquid (BAL). Expression levels were normalized for total protein. LacZ expression was measured by ELISA for β-galactosidase from lung homogenate. Necropsy was performed at day 21.

Sarepta Exhibit 1002, page 67

These vectors were compared to AAV2/6, a current clinical candidate for lung gene transfer, AAV 2/5 and AAV2/9 in a study involving C57 Bl/6 mice (male, n=8/ group).

AAV6.2 presented statistically significant improvement over AAV6 in serum A1AT excretion. AAV6.2 also showed higher levels of A1AT levels as compared to the other vectors, including AAV2/9 and AAV2/5. Mild improvement in BAL was noted as was for LacZ expression in lung homogenate. However, due to large animal to animal variations, no conclusions could be drawn from LacZ quantitation.

When evaluating the localization of AAV gene expression, superior staining for nuclear localized LacZ in the AAV2/6.2 group was observed, as compared to AAV 2/6. There was marked improvement over AAV2/6 and AAV2/5 in lung airway epithelium, the primary target for diseases like cystic fibrosis.

C. *Intraportal (iv) injection of AAV.CB.A1AT (1 x 10^{11} GC) in C57Bl/6 mice with clade B and clade C AAV members.*

All vectors used are absent of singleton residues either from isolation (AAV2/8, AAV2, hu.13, hu.51, hu.11, hu.53)or by mutation (hu.29R) All vectors are compared to AAV2/8 (clade E) as a benchmark.

D. Intravenous injection of AAV members of Clade E. rh.64R1, rh.64R2, rh.2R are singleton optimized. All other vector are singleton free.

The expression from AAV Clade B and C members was found similar to equivalent for all members including hu.29R, a singleton optimized clone. This particular clone was reconstituted in packaging capability from a hu.29 and now presents similar gene transfer functionality to other members of the virus family.

For Clade E vectors evaluated, all vectors that are either singleton free naturally or corrected for singleton residues perform in the similar range as the current best performer for liver directed gene transfer, AAV2/8. Particularly AAV rh64R1 and rh.64R2 are of interest. rh.64, found to be defective in packaging, now performs equally well in liver directed gene transfer after conversion of one (rh.64R1) or two

Sarepta Exhibit 1002, page 68

(rh.64R2) singletons. For rh.2 the singleton correction corresponds to a dramatic more than 10 fold increase in gene delivery.

All publications, including patents, cited in this specification are incorporated herein by reference. While the invention has been described with reference to particularly preferred embodiments, it will be appreciated that modifications can be made without departing from the spirit of the invention.

Sarepta Exhibit 1002, page 69

PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

■ Practitioners associated with Customer Number: 00270

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

■ The address associated with Customer Number: 00270

OR

☐

Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address: The Trustees of the University of Pennsylvania
3160 Chestnut Street, Suite 200, Philadelphia, PA 19104

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	[signature]	Date	6/25/13
Name	Jennifer Langenberger	Telephone	215-573-4508
Title	Director, Intellectual Property		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: The Trustees of the University of Pennsylvania

Application No./Patent No.: _____ Filed/Issue Date: _____

Titled: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

The Trustees of the University of Pennsylvania, a university

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

   The document was recorded in the United States Patent and Trademark Office at

   Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

   The document was recorded in the United States Patent and Trademark Office at

   Reel _____, Frame _____, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Colleen M. Schaller/	2019-03-28
Signature	Date
Colleen M. Schaller	67751
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Customer No. 00270 **UPN-R3895**

ASSIGNMENT

WHEREAS, Luk Vandenberghe, Guangping Gao, and James M. Wilson hereinafter referred to as ASSIGNORS, have invented and are the owners of an invention entitled **METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR**, said invention being fully set forth and described in the application for Letters Patent of the United States which has been prepared in connection with said invention, and which has been signed by ASSIGNORS;

WHEREAS, The Trustees of the University of Pennsylvania, a corporation organized and existing under and by virtue of the laws of the Commonwealth of Pennsylvania and engaged in business at 3160 Chestnut Street, Suite 200, Philadelphia, PA 19104-6283, United States of America, hereinafter referred to as ASSIGNEE, is desirous of acquiring the said invention and any and all applications for Letters Patent and any and all Letters Patent of the United States and foreign countries which may be issued therefore;

NOW, THEREFORE, THIS IS TO WITNESS that in consideration of the sum of One Dollar ($1.00) paid to ASSIGNORS by ASSIGNEE, the receipt of which is hereby acknowledged, and for other good and valuable consideration, ASSIGNORS have sold, assigned and set over, and hereby do sell, assign and set over, unto ASSIGNEE, its successors and assigns, the entire right, title and interest for, to and within the United States and all foreign countries, in and to the aforesaid invention and in and to any application for Letters Patent which ASSIGNEE at its expense may cause to be filed in the United States, under an international treaty, or in any foreign country, and in any United States or foreign patent which may be granted on said invention, including any extensions, non-provisionals, divisions, reissues, continuations, or continuations-in-part.

And ASSIGNORS hereby authorize and request the Director of the USPTO to issue any and all Letters Patent of the United States to ASSIGNEE, its successors and assigns, as owner of all right, title and interest therein;

And for said consideration, it is hereby covenanted and agreed that at the request and expense of ASSIGNEE, its successors and assigns, ASSIGNORS will execute any further papers and do such other acts and things as may be necessary and proper to procure Letters Patent of said invention in the United States and in such foreign countries as ASSIGNEE, its successors and assigns may elect, and vest the full title thereto in ASSIGNEE, its successors and assigns;

And ASSIGNORS hereby authorize and direct its attorneys to insert, in the space provided below, the serial number of the aforesaid application for Letters Patent of the United States when the same shall have been made known to them by the United States Patent and Trademark Office.

IN WITNESS WHEREOF, this assignment has been executed on the dates indicated below.

Date 9/20/07

LUK VANDENBERGHE

NOTARIAL CERTIFICATE

State of Pennsylvania :

:ss.

County of Philadelphia :

Before me, the undersigned, a notary public, in and for the county aforesaid, on this 20 day of September, 2007, personally appeared **LUK VANDENBERGHE** to me known to be the person described in and who executed the foregoing instrument and who acknowledged the execution of the same as a free act and deed and desired the same to be recorded as such.

Notary Public

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Teresa M. Dunn, Notary Public
City of Philadelphia, Philadelphia County
My commission expires August 12, 2011

IN WITNESS WHEREOF, this assignment has been executed on the dates indicated below.

Date 9/20/2007

GUANGPING GAO

NOTARIAL CERTIFICATE

State of Pennsylvania :

: ss.

County of Philadelphia :

Before me, the undersigned, a notary public, in and for the county aforesaid, on this 20 day of September, 2007, personally appeared **GUANGPING GAO** to me known to be the person described in and who executed the foregoing instrument and who acknowledged the execution of the same as a free act and deed and desired the same to be recorded as such.

Notary Public

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Teresa M. Dunn, Notary Public
City of Philadelphia, Philadelphia County
My commission expires August 12, 2011

IN WITNESS WHEREOF, this assignment has been executed on the dates indicated below.

Date 9-20-07

JAMES M. WILSON

NOTARIAL CERTIFICATE

State of Pennsylvania :

: ss.

County of Philadelphia :

Before me, the undersigned, a notary public, in and for the county aforesaid, on this 20 day of September, 2007, personally appeared **JAMES M. WILSON** to me known to be the person described in and who executed the foregoing instrument and who acknowledged the execution of the same as a free act and deed and desired the same to be recorded as such.

Notary Public

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Teresa M. Dunn, Notary Public
City of Philadelphia, Philadelphia County
My commission expires August 12, 2011

Application for United States Letters Patent Serial Number 11/887,679, filed October 2, 2007.

Howson & Howson LLP

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 14/624,671 filed on February 18, 2015.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Guangping GAO Date (Optional): 2/23/2015

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 14/624,671 filed on February 18, 2015

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Luk VANDENBERGHE Date (Optional): 2/25/2015

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [x] The attached application, or
- [ ] United States application or PCT international application number _____ filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: James M. WILSON Date (Optional): 3/17/15

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

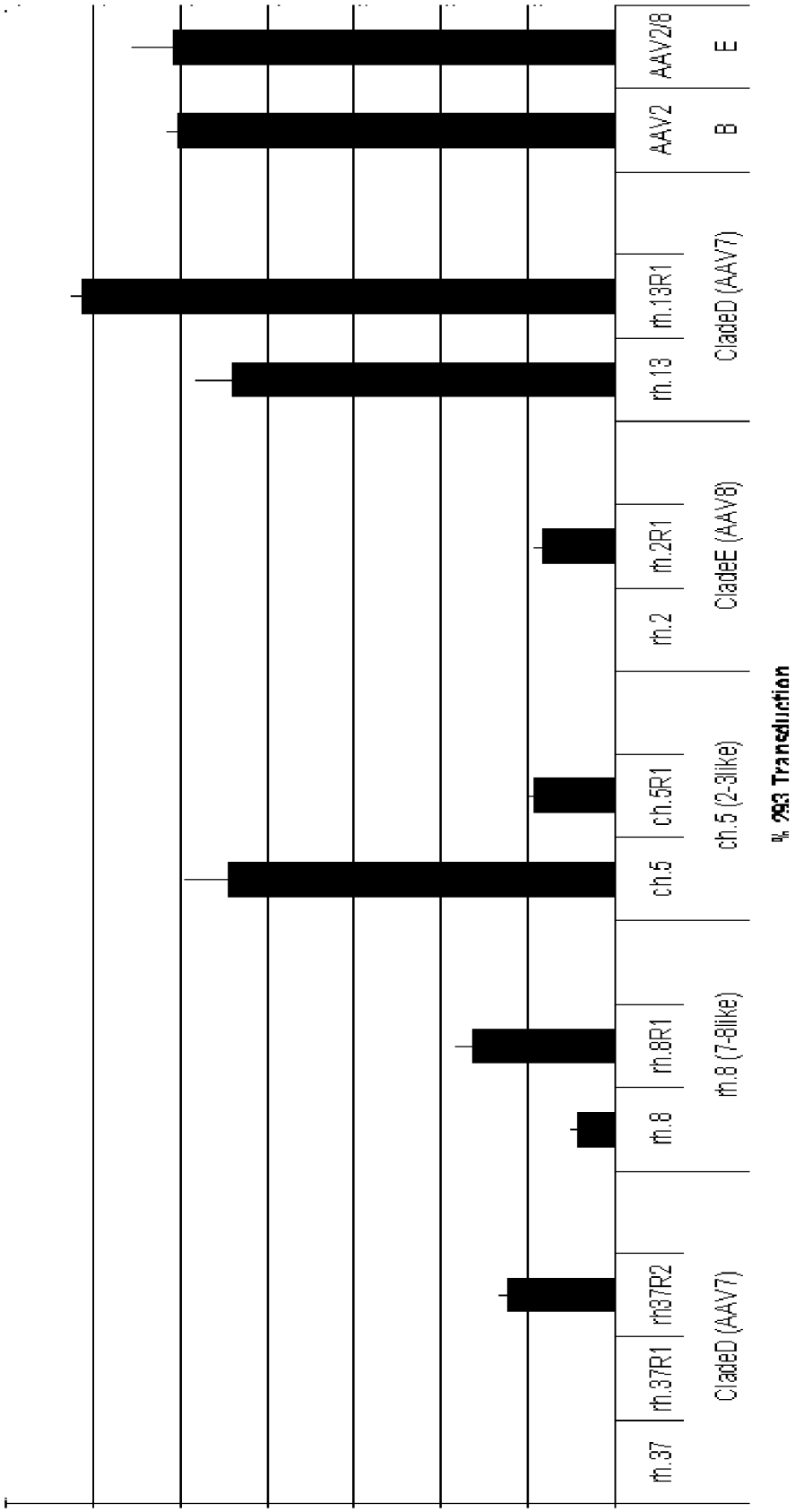
Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

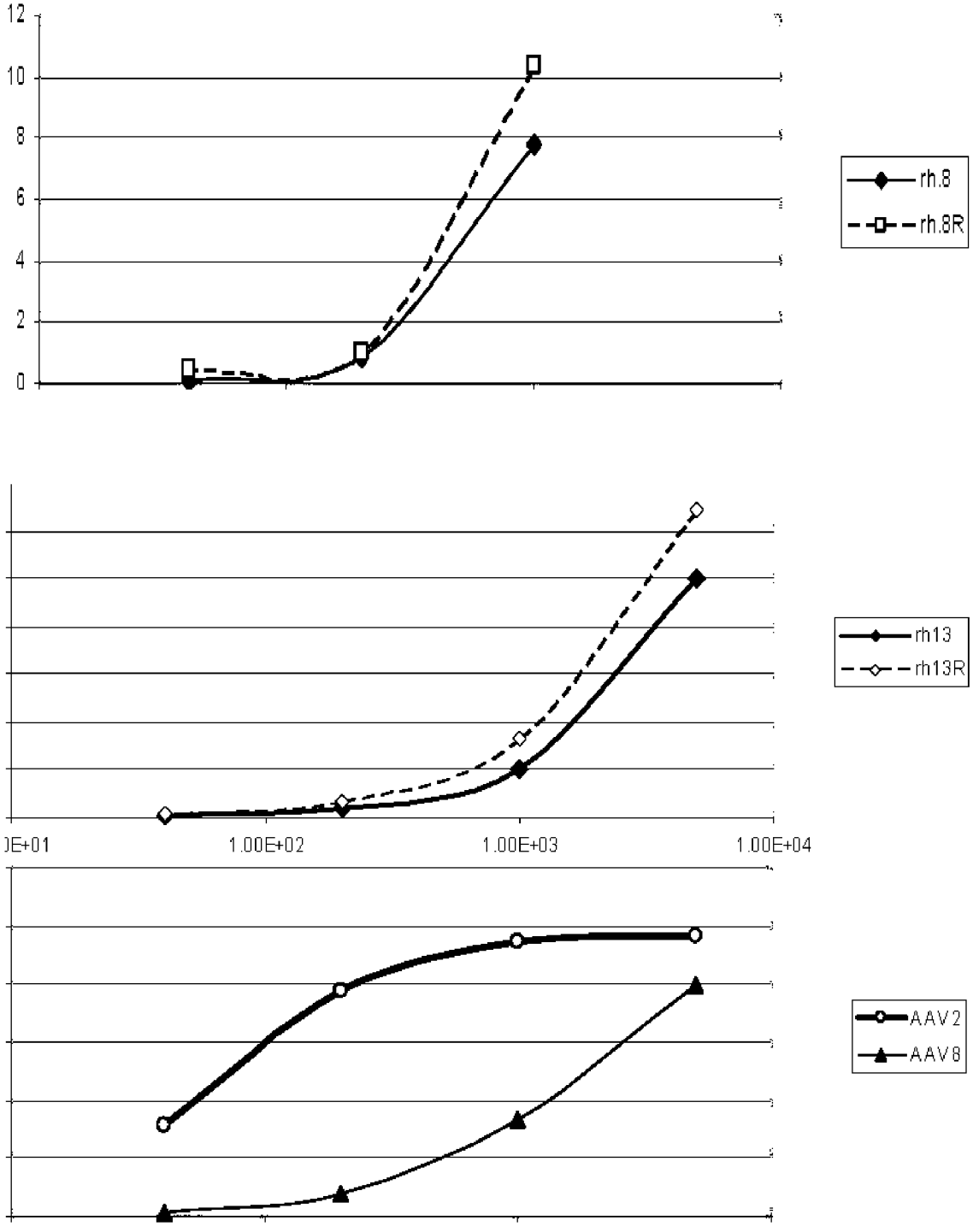
The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Fig. 1 : Singleton *In Vitro* lysate Transduction



FIGs. 2A- 2C


12
10
8
6
4
2
0
rh.8
rh.8R
rh13
rh13R
1.00E+02
1.00E+03
1.00E+04
AAV2
AAV8

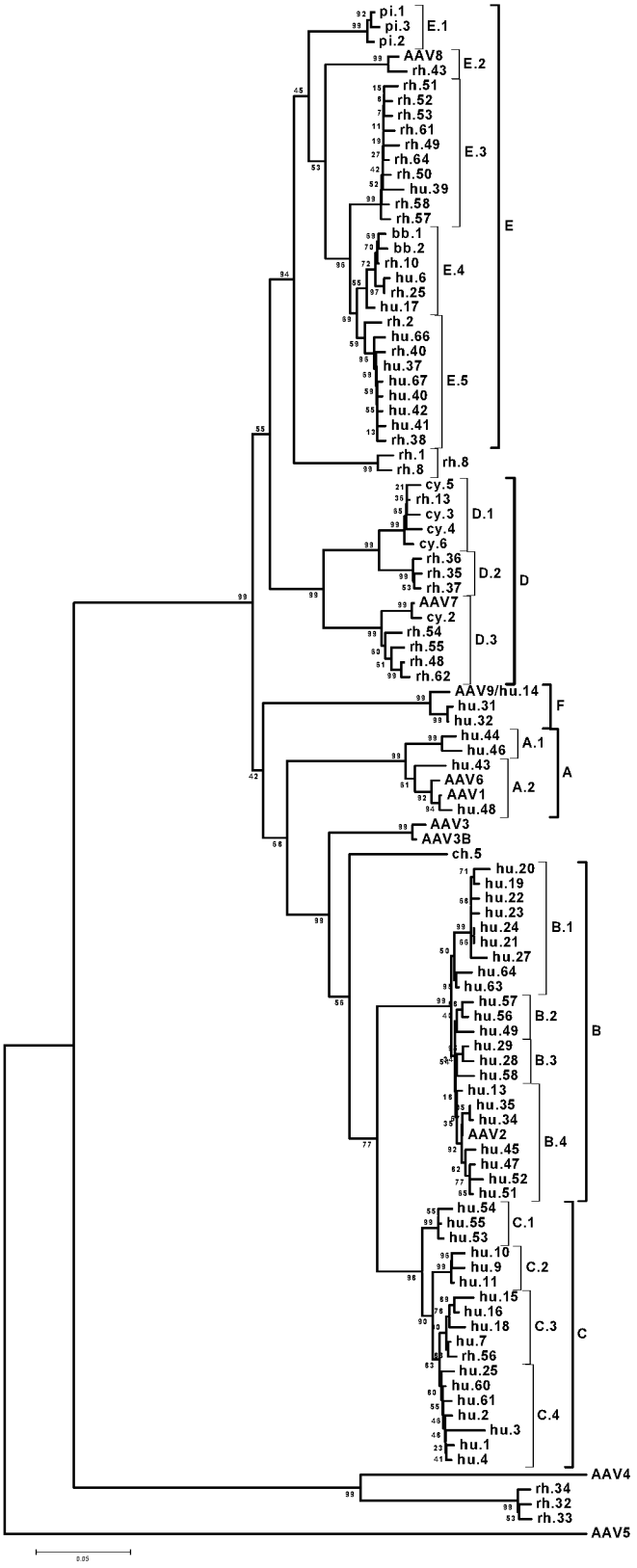

pi.1
pi.3
pi.2
E.1
AAV8
rh.43
E.2
rh.51
rh.52
rh.53
rh.61
rh.49
rh.64
rh.50
hu.39
rh.58
rh.57
E.3
bb.1
bb.2
rh.10
hu.6
rh.25
hu.17
E.4
rh.2
hu.66
rh.40
hu.37
hu.67
hu.40
hu.42
hu.41
rh.38
E.5
E
rh.1
rh.8
rh.8
cy.5
rh.13
cy.3
cy.4
cy.6
D.1
rh.36
rh.35
rh.37
D.2
AAV7
cy.2
rh.54
rh.55
rh.48
rh.62
D.3
D
AAV9/hu.14
hu.31
hu.32
F
hu.44
hu.46
A.1
hu.43
AAV6
AAV1
hu.48
A.2
A
AAV3
AAV3B
ch.5
hu.20
hu.19
hu.22
hu.23
hu.24
hu.21
hu.27
hu.64
hu.63
B.1
hu.57
hu.56
hu.49
B.2
hu.29
hu.28
hu.58
B.3
hu.13
hu.35
hu.34
AAV2
hu.45
hu.47
hu.52
hu.51
B.4
B
hu.54
hu.55
hu.53
C.1
hu.10
hu.9
hu.11
C.2
hu.15
hu.16
hu.18
hu.7
rh.56
C.3
hu.25
hu.60
hu.61
hu.2
hu.3
hu.1
hu.4
C.4
C
AAV4
rh.34
rh.32
rh.33
AAV5
0.05

FIG. 3

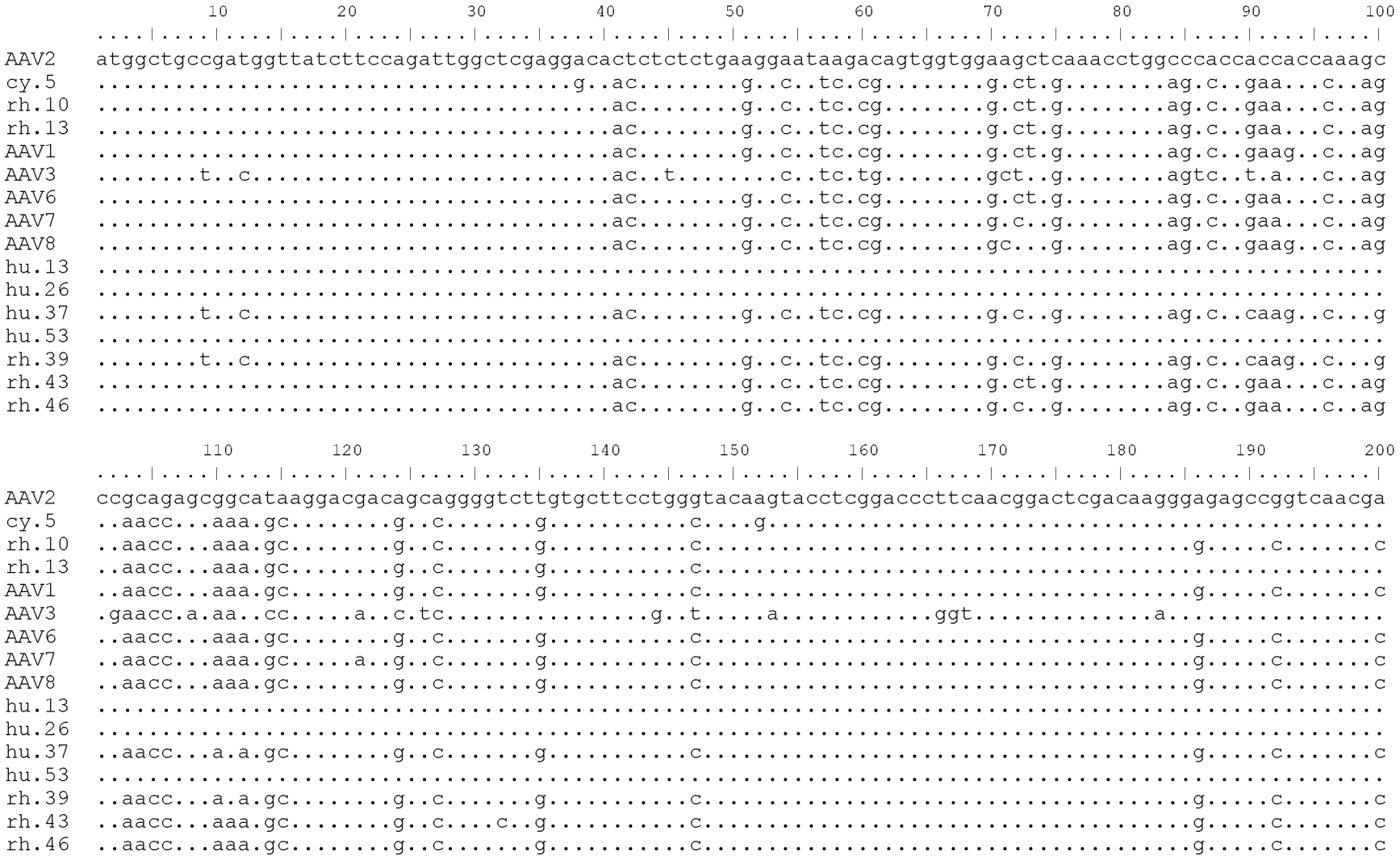


FIG. 4A

Sarepta Exhibit 1002, page 85

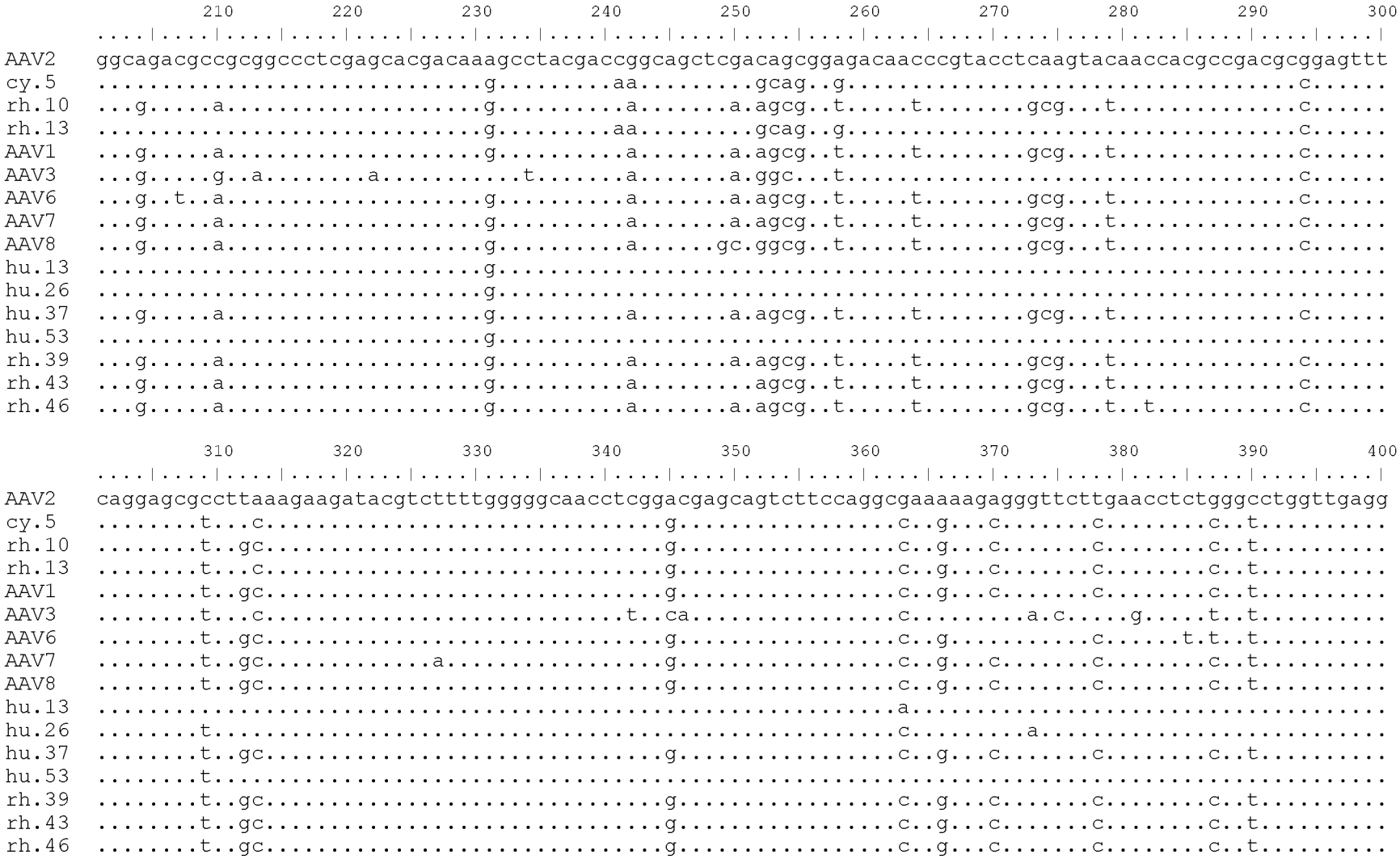


FIG. 4B

Sarepta Exhibit 1002, page 86

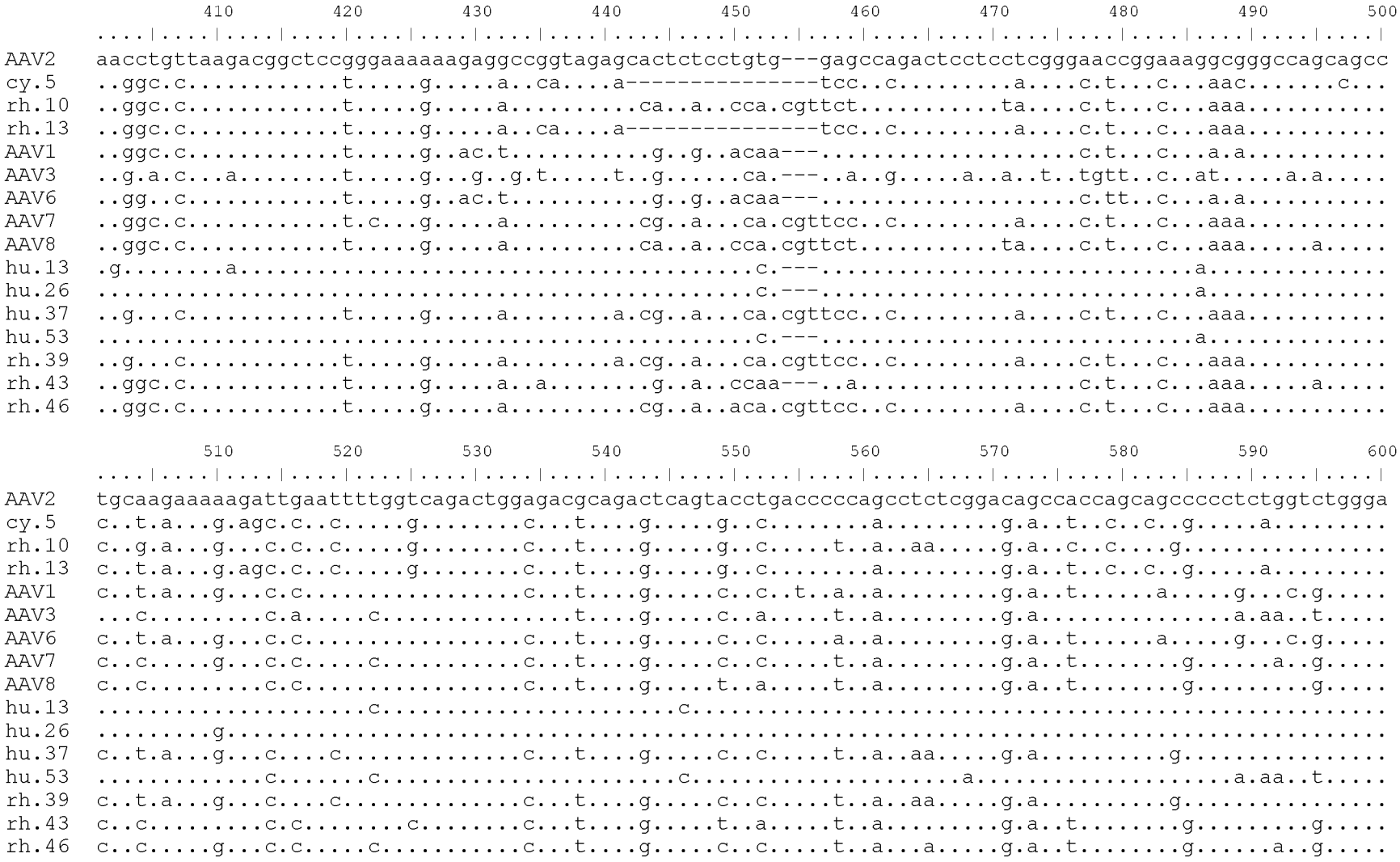


FIG. 4C

Sarepta Exhibit 1002, page 87

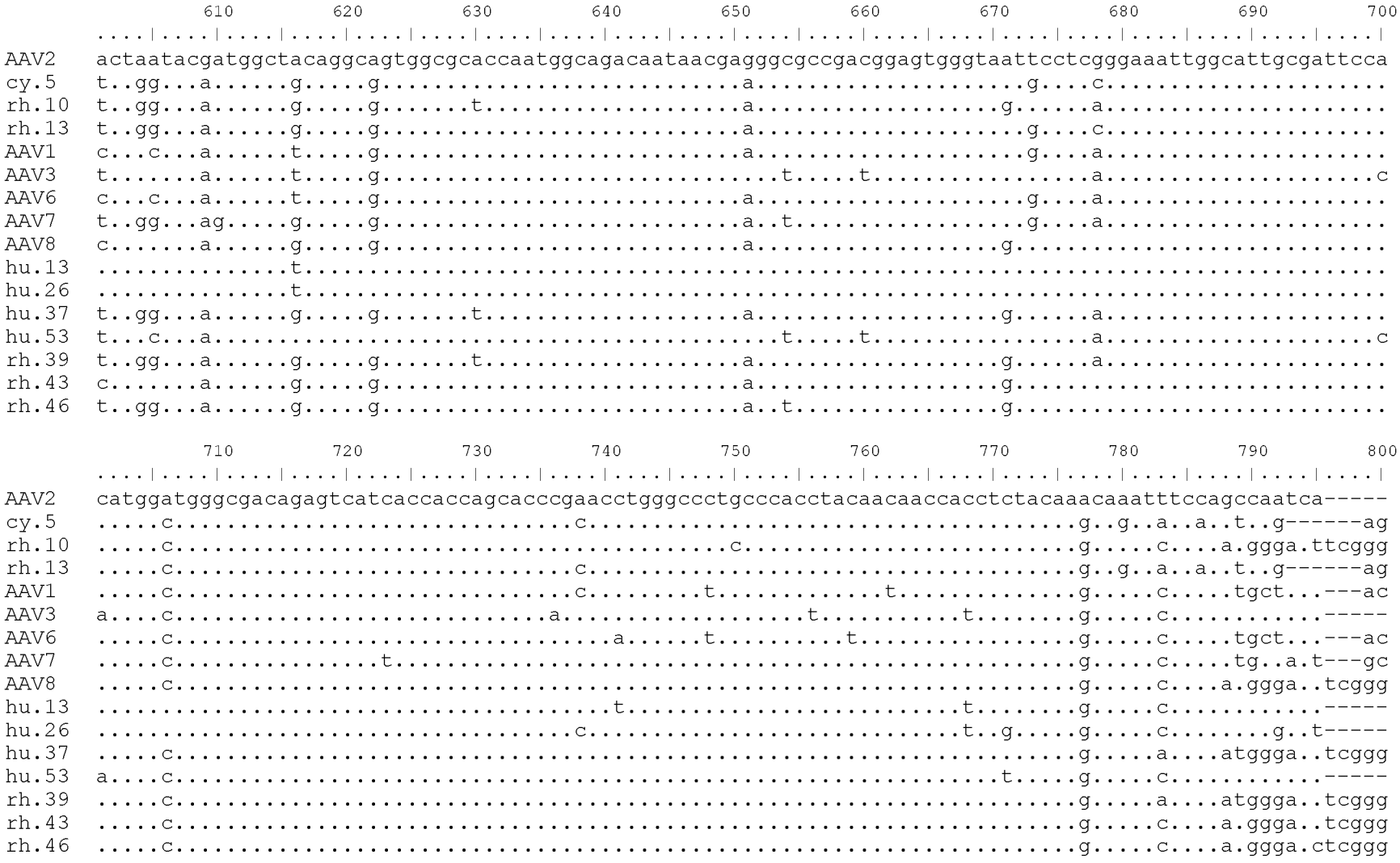

610 620 630 640 650 660 670 680 690 700
AAV2 actaatacgatggctacaggcagtggcgcaccaatggcagacaataacgagggcgccgacggagtgggtaattcctcgggaaattggcattgcgattcca
cy.5 t..gg...a......g.....g.....a.....g....c.....
rh.10 t..gg...a......g.....g.....t.....a.....g.....a.....
rh.13 t..gg...a......g.....g.....a.....g....c.....
AAV1 c...c...a......t.....g.....a.....g....a.....
AAV3 t.......a......t.....g.....t.....t.....a.....c
AAV6 c...c...a......t.....g.....a.....g....a.....
AAV7 t..gg...ag.....g.....g.....a..t.....g....a.....
AAV8 c.......a......g.....g.....a.....g.....
hu.13 .....t.....
hu.26 .....t.....
hu.37 t..gg...a......g.....g.....t.....a.....g.....a.....
hu.53 t...c...a.....t.....t.....a.....c
rh.39 t..gg...a......g.....g.....t.....a.....g.....a.....
rh.43 c.......a......g.....g.....a.....g.....
rh.46 t..gg...a......g.....g.....a..t.....g.....
710 720 730 740 750 760 770 780 790 800
AAV2 catggatgggcgacagagtcatcaccaccagcacccgaacctgggccctgcccacctacaacaaccacctctacaaacaaatttccagccaatca-----
cy.5 .....c.....c.....g..g..a..a..t..g------ag
rh.10 .....c.....c.....g.....c....a.ggga.ttcggg
rh.13 .....c.....c.....g..g..a..a..t..g------ag
AAV1 .....c.....c.....t.....t.....g.....c.....tgct...---ac
AAV3 a....c.....a.....t.....t.....g.....c.....-----
AAV6 .....c.....a.....t.....t.....g.....c.....tgct...---ac
AAV7 .....c.....t.....g.....c.....tg..a.t---gc
AAV8 .....c.....g.....c....a.ggga..tcggg
hu.13 .....t.....t.....g.....c.....-----
hu.26 .....c.....t..g.....g.....c.....g..t-----
hu.37 .....c.....g.....a....atggga..tcggg
hu.53 a....c.....t.....g.....c.....-----
rh.39 .....c.....g.....a....atggga..tcggg
rh.43 .....c.....g.....c....a.ggga..tcggg
rh.46 .....c.....g.....c....a.ggga.ctcggg

FIG. 4D

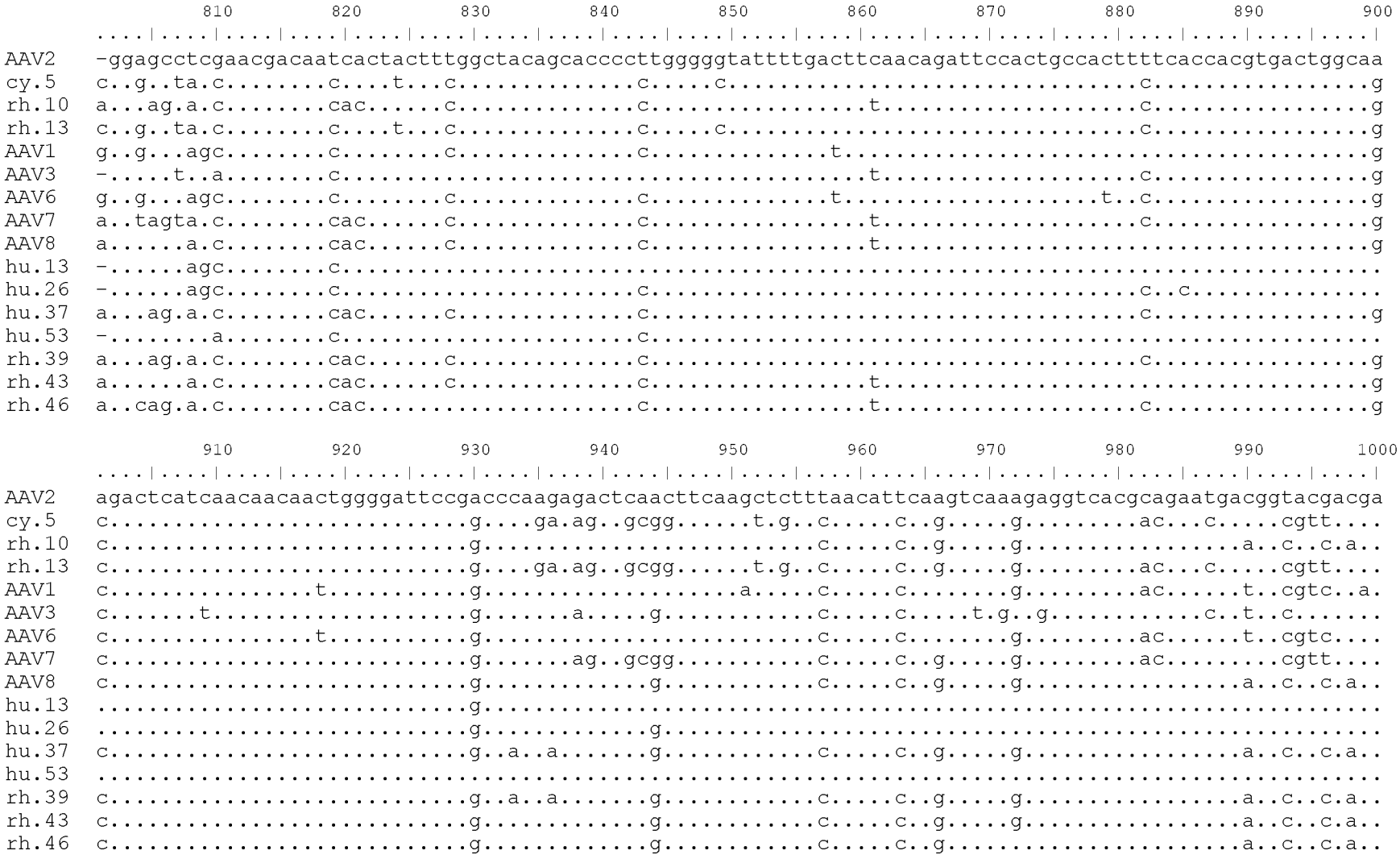


FIG. 4E

Sarepta Exhibit 1002, page 89

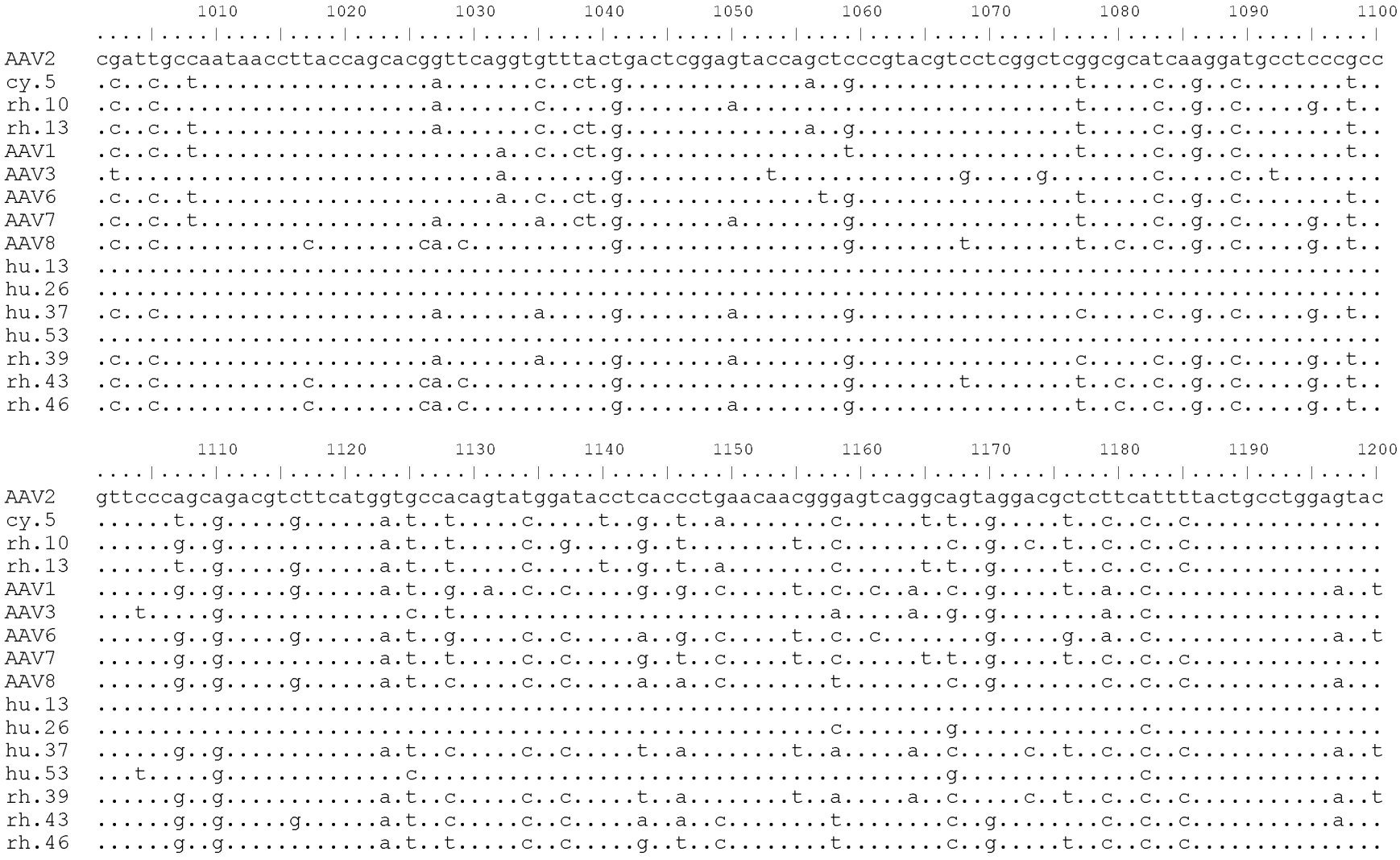


FIG. 4F

Sarepta Exhibit 1002, page 90

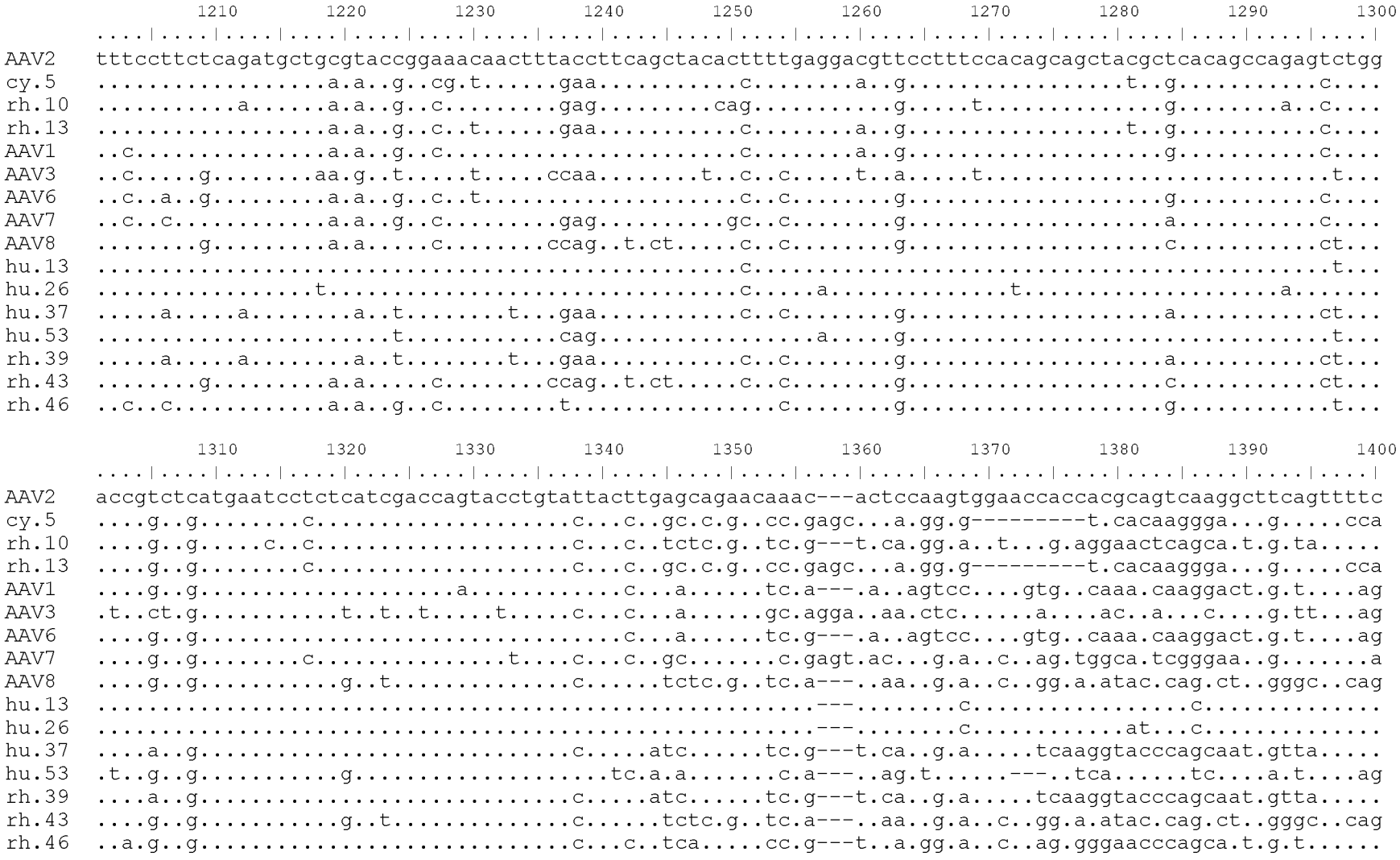

1210 1220 1230 1240 1250 1260 1270 1280 1290 1300
AAV2 tttccttctcagatgctgcgtaccggaaacaactttaccttcagctacacttttgaggacgttcctttccacagcagctacgctcacagccagagtctgg
cy.5 ....a.a..g..cg.t......gaa..........c........a..g.................t..g..........c....
rh.10 ....a......a.a..g..c.........gag.........cag..........g.....t.............g........a..c....
rh.13 ....a.a..g..c..t......gaa..........c........a..g.................t..g..........c....
AAV1 ..c................a.a..g..c.....................c........a..g.................g..........c....
AAV3 ..c.....g........aa.g..t.....t.....ccaa........t..c..c.....t..a.....t.........................t...
AAV6 ..c..a..g.........a.a..g..c..t.................c..c........g.................g..........c....
AAV7 ..c..c............a.a..g..c.........gag.........gc..c........g.................a..........c....
AAV8 ....g.........a.a.....c........ccag..t.ct.....c..c........g.................c..........ct...
hu.13 ....c.....................................t...
hu.26 ....t.............................c.....a.............t.....................a.......
hu.37 .....a.....a........a..t........t...gaa..........c..c........g.................a..........ct...
hu.53 ....t............cag.................a.....g.............................t...
rh.39 .....a.....a........a..t........t...gaa..........c..c........g.................a..........ct...
rh.43 ....g.........a.a.....c........ccag..t.ct.....c..c........g.................c..........ct...
rh.46 ..c..c............a.a..g..c.........t.................c........g.................g..........t...
1310 1320 1330 1340 1350 1360 1370 1380 1390 1400
AAV2 accgtctcatgaatcctctcatcgaccagtacctgtattacttgagcagaacaaac---actccaagtggaaccaccacgcagtcaaggcttcagttttc
cy.5 ....g..g........c.....................c...c..gc.c.g..cc.gagc...a.gg.g---------t.cacaaggga...g.....cca
rh.10 ....g..g.....c..c.....................c...c..tctc.g..tc.g---t.ca.gg.a..t...g.aggaactcagca.t.g.ta.....
rh.13 ....g..g........c.....................c...c..gc.c.g..cc.gagc...a.gg.g---------t.cacaaggga...g.....cca
AAV1 ....g..g.....................a............c...a......tc.a---.a..agtcc....gtg..caaa.caaggact.g.t....ag
AAV3 .t..ct.g...........t..t..t.....t.....c...c...a......gc.agga..aa.ctc......a....ac..a...c....g.tt...ag
AAV6 ....g..g.................................c...a......tc.g---.a..agtcc....gtg..caaa.caaggact.g.t....ag
AAV7 ....g..g........c..............t....c...c..gc.......c.gagt.ac...g.a..c..ag.tggca.tcgggaa..g.......a
AAV8 ....g..g...........g..t.............c......tctc.g..tc.a---..aa..g.a..c..gg.a.atac.cag.ct..gggc..cag
hu.13 ....---........c..................c..............
hu.26 ....---........c............at...c..............
hu.37 ....a..g.............................c.....atc......tc.g---t.ca..g.a.....tcaaggtacccagcaat.gtta.....
hu.53 .t..g..g...........g.....................tc.a.a.......c.a---..ag.t......---..tca......tc....a.t....ag
rh.39 ....a..g.............................c.....atc......tc.g---t.ca..g.a.....tcaaggtacccagcaat.gtta.....
rh.43 ....g..g...........g..t.............c......tctc.g..tc.a---..aa..g.a..c..gg.a.atac.cag.ct..gggc..cag
rh.46 ..a.g..g.............................c...c..tca.....cc.g---t..a.gg.a..c..ag.gggaacccagca.t.g.t......

FIG. 4G



FIG. 4H

Sarepta Exhibit 1002, page 92



FIG. 4I

Sarepta Exhibit 1002, page 93

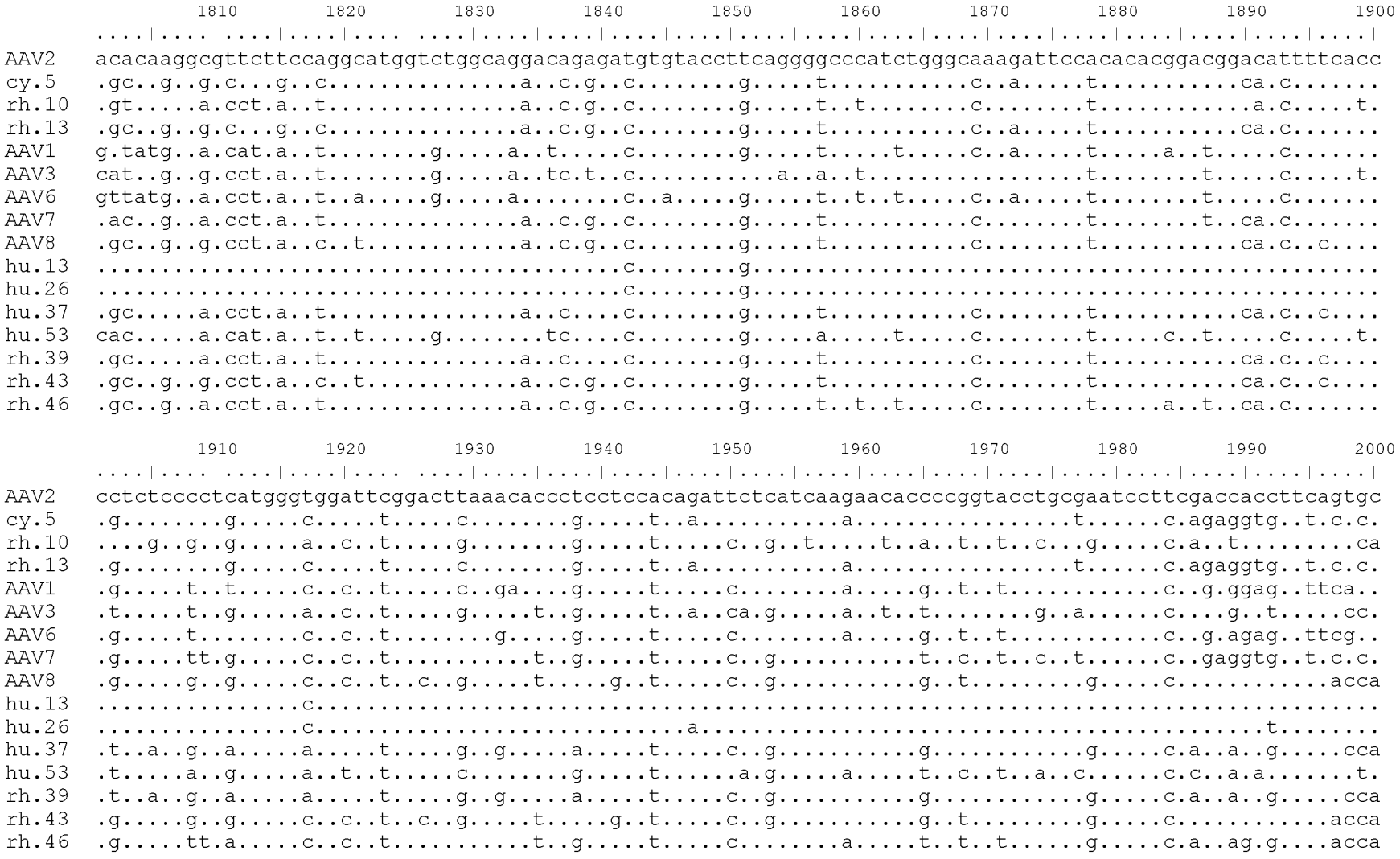


FIG. 4J

Sarepta Exhibit 1002, page 94

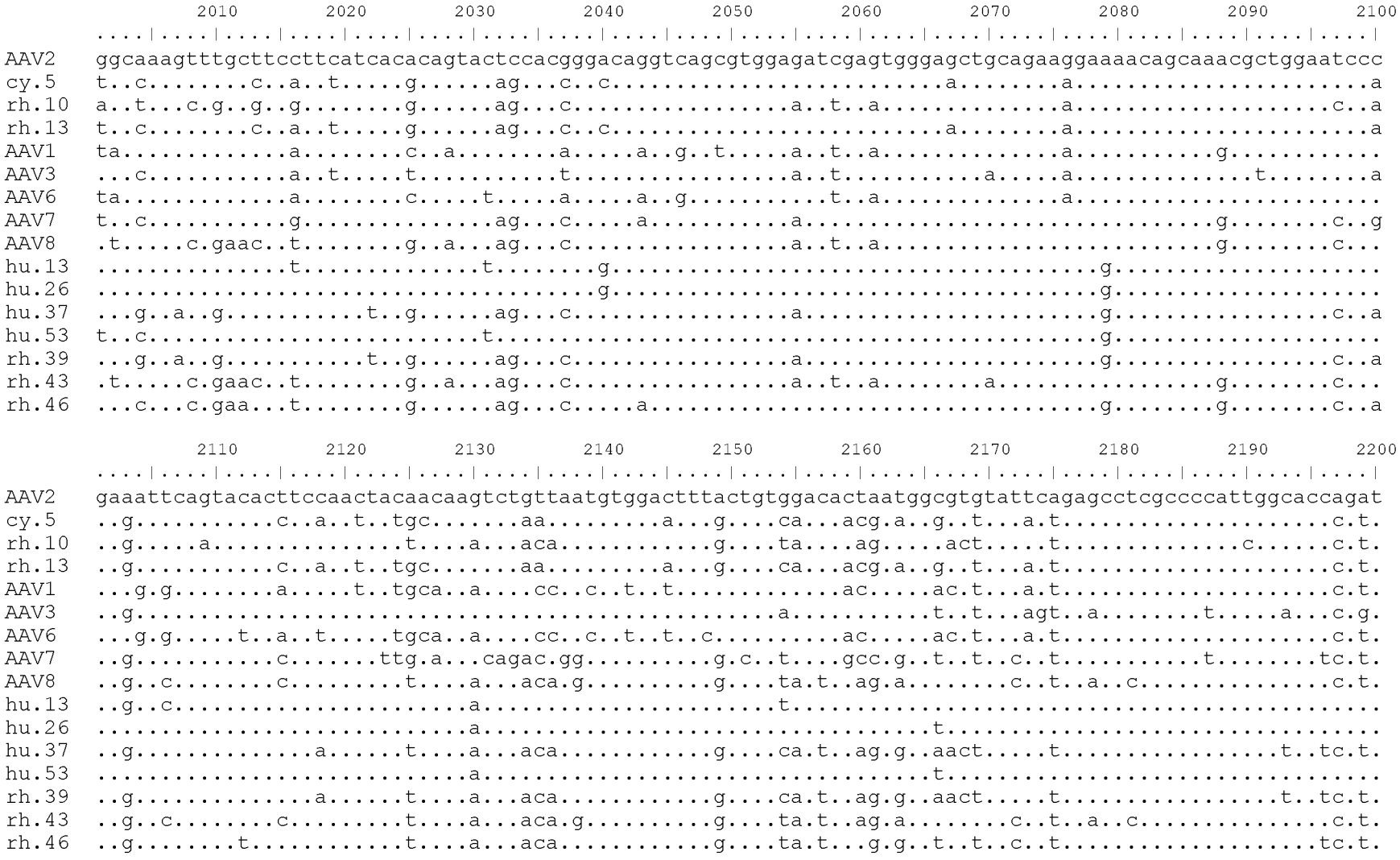


FIG. 4K

Sarepta Exhibit 1002, page 95

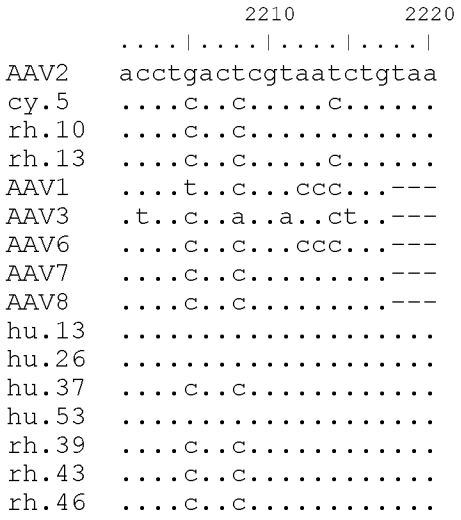
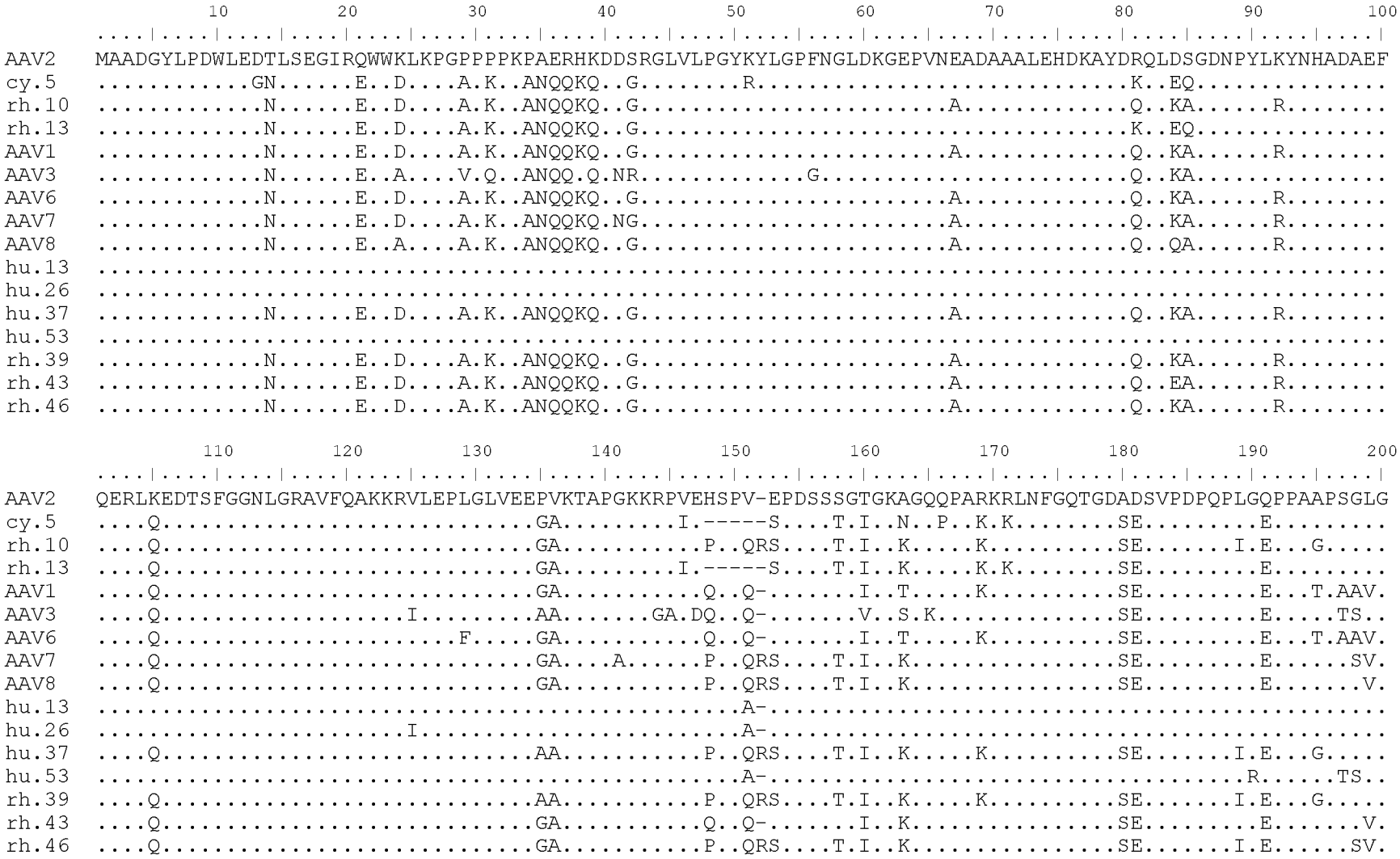


FIG. 4L

Sarepta Exhibit 1002, page 96



```
                10        20        30        40        50        60        70        80        90        100
        ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
AAV2    MAADGYLPDWLEDTLSEGIRQWWKLKPGPPPPKPAERHKDDSRGLVLPGYKYLGPFNGLDKGEPVNEADAAALEHDKAYDRQLDSGDNPYLKYNHADAEF
cy.5    ............GN......E..D....A.K..ANQQKQ..G........R.............................K..EQ..............
rh.10   ............N......E..D....A.K..ANQQKQ..G.....................A.............Q..KA......R........
rh.13   ............N......E..D....A.K..ANQQKQ..G.....................................K..EQ..............
AAV1    ............N......E..D....A.K..ANQQKQ..G.....................A.............Q..KA......R........
AAV3    ............N......E..A....V.Q..ANQQ.Q.NR.............G.....................Q..KA..............
AAV6    ............N......E..D....A.K..ANQQKQ..G.....................A.............Q..KA......R........
AAV7    ............N......E..D....A.K..ANQQKQ.NG.....................A.............Q..KA......R........
AAV8    ............N......E..A....A.K..ANQQKQ..G.....................A.............Q..QA......R........
hu.13   ....................................................................................................
hu.26   ....................................................................................................
hu.37   ............N......E..D....A.K..ANQQKQ..G.....................A.............Q..KA......R........
hu.53   ....................................................................................................
rh.39   ............N......E..D....A.K..ANQQKQ..G.....................A.............Q..KA......R........
rh.43   ............N......E..D....A.K..ANQQKQ..G.....................A.............Q..EA......R........
rh.46   ............N......E..D....A.K..ANQQKQ..G.....................A.............Q..KA......R........

                110       120       130       140       150       160       170       180       190       200
        ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
AAV2    QERLKEDTSFGGNLGRAVFQAKKRVLEPLGLVEEPVKTAPGKKRPVEHSPV-EPDSSSGTGKAGQQPARKRLNFGQTGDADSVPDPQPLGQPPAAPSGLG
cy.5    ....Q.............................GA.........I.-----S....T.I..N..P..K.K.........SE..........E..........
rh.10   ....Q.............................GA............P..QRS....T.I..K.....K...........SE........I.E...G.....
rh.13   ....Q.............................GA.........I.-----S....T.I..K.....K.K.........SE..........E..........
AAV1    ....Q.............................GA............Q..Q-........I..T.....K...........SE..........E...T.AAV.
AAV3    ....Q.....................I.........AA.......GA.DQ..Q-........V..S.K...............SE..........E.....TS..
AAV6    ....Q.......................F.....GA............Q..Q-........I..T.....K...........SE..........E...T.AAV.
AAV7    ....Q.............................GA....A.......P..QRS....T.I..K.................SE..........E......SV.
AAV8    ....Q.............................GA............P..QRS....T.I..K.................SE..........E.......V.
hu.13   ..................................................A-..................................................
hu.26   ........................I.........................A-..................................................
hu.37   ....Q.............................AA............P..QRS....T.I..K.....K...........SE........I.E...G.....
hu.53   ..................................................A-..........................................R......TS..
rh.39   ....Q.............................AA............P..QRS....T.I..K.....K...........SE........I.E...G.....
rh.43   ....Q.............................GA............Q..Q-........I..K.................SE..........E.......V.
rh.46   ....Q.............................GA............P..QRS....T.I..K.................SE........I.E......SV.
```

FIG. 5A

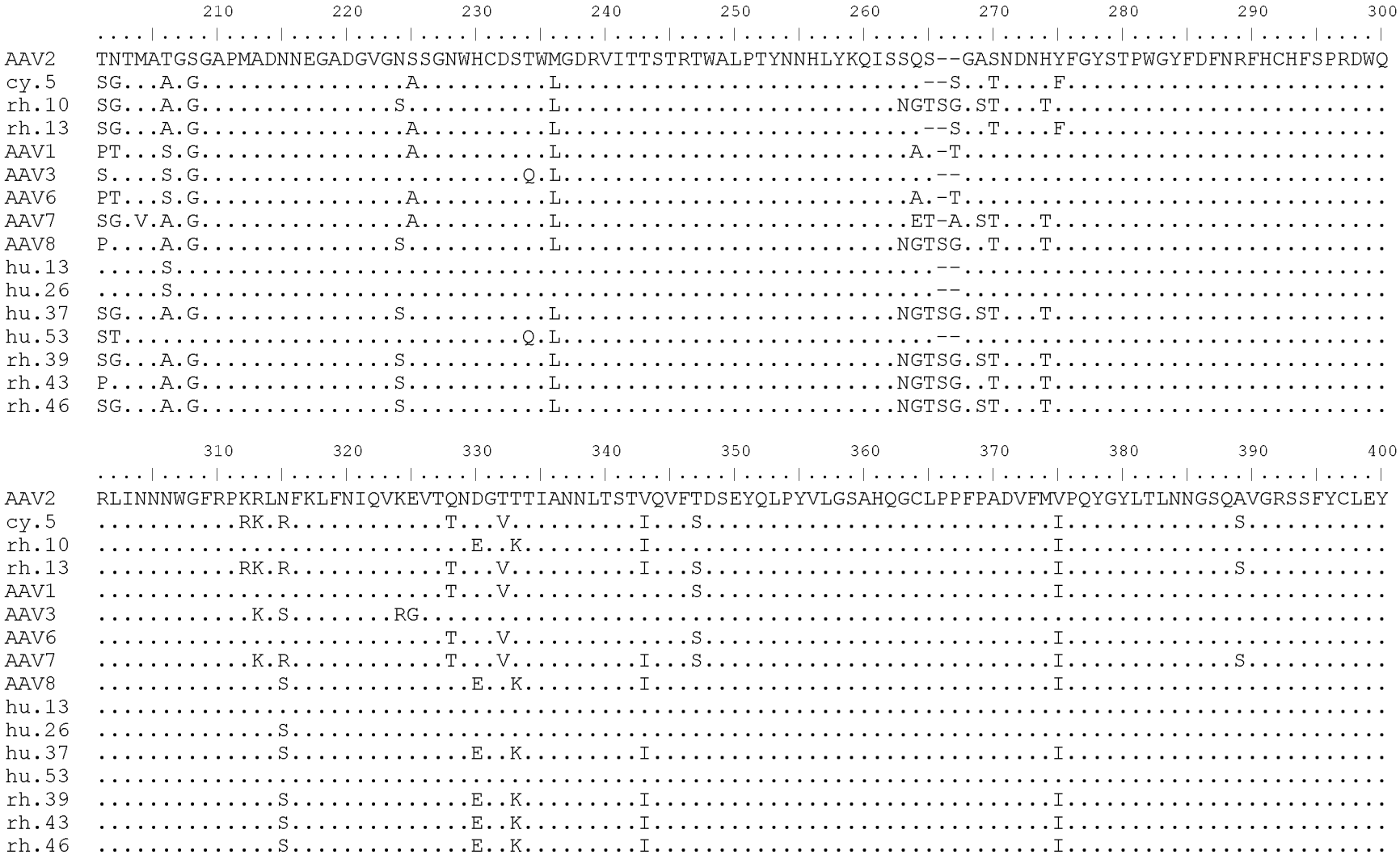


FIG. 5B

Sarepta Exhibit 1002, page 98

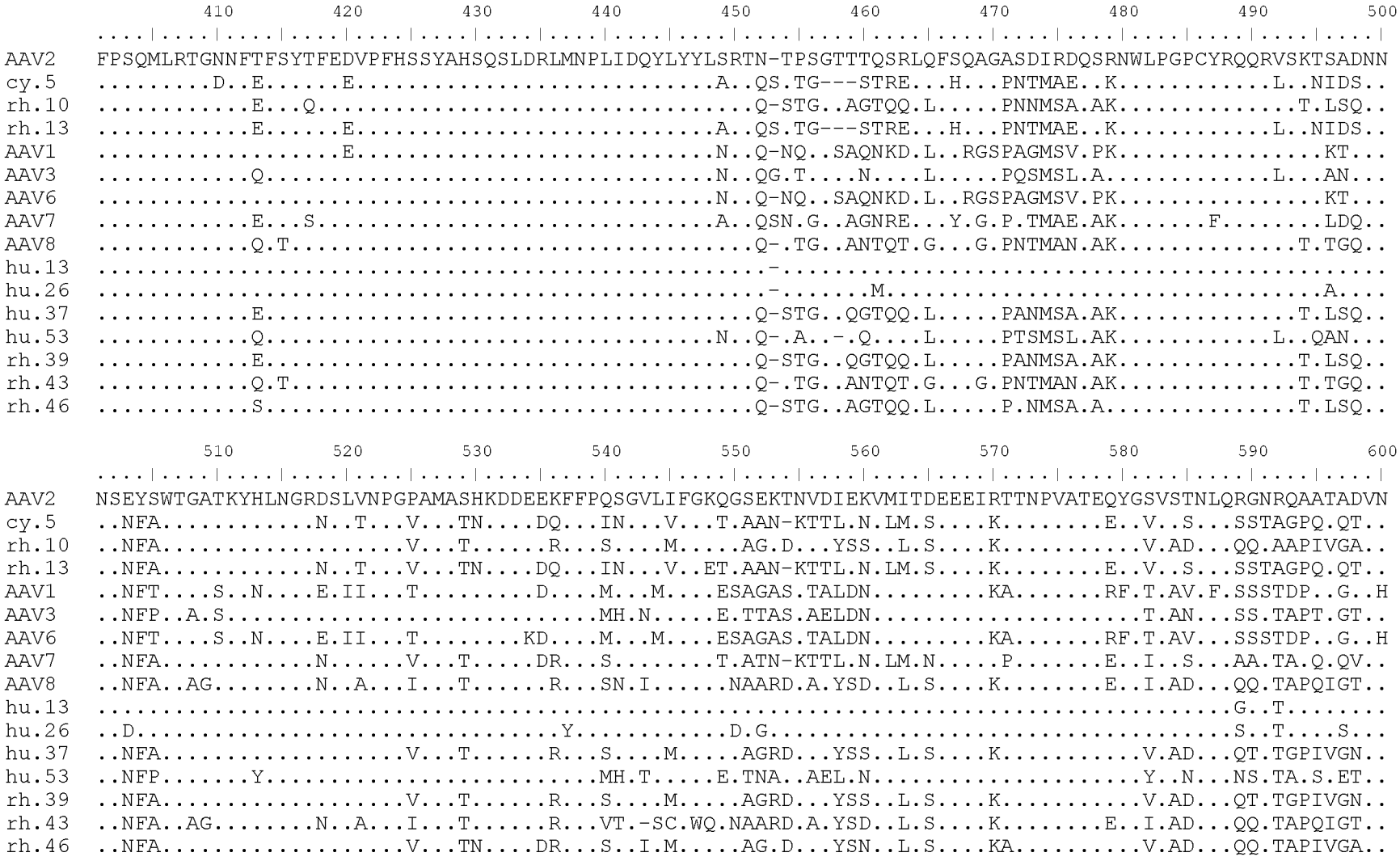


FIG. 5C

Sarepta Exhibit 1002, page 99

```
                610         620         630         640         650         660         670         680         690         700
        ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
AAV2    TQGVLPGMVWQDRDVYLQGPIWAKIPHTDGHFHPSPLMGGFGLKHPPPQILIKNTPVPANPSTTFSAAKFASFITQYSTGQVSVEIEWELQKENSKRWNP
cy.5    S..A.......N.....................N.....................................PEV.TP.....................................
rh.10   S..A.......N.....................N.....................................D.P....Q..L.....................................
rh.13   S..A.......N.....................N.....................................PEV.TP.....................................
AAV1    AM.A.....................................................N.....................PAE...T.....................................
AAV3    H..A.....................................................M.....................P....P.....................................
AAV6    VM.A.....................................................N.....................PAE...T.....................................
AAV7    N..A.......N.....................N.....................................PEV.TP.....................................
AAV8    S..A.......N.....................N.....................................D.P...NQS.LN.....................................
hu.13   ........................................................................................................................
hu.26   ........................................................................................................................
hu.37   S..A.......N.....................N.....................................D.P....Q..L.....................................
hu.53   H..A.....................................................M.....................P.N..S.....................................
rh.39   S..A.......N.....................N.....................................D.P....Q..L.....................................
rh.43   S..A.......N.....................N.....................................D.P...NQS.LN.....................................
rh.46   S..A.......N.....................N.....................................D.P.A.NQ..LN.....................................

                710         720         730         740
        ....|....|....|....|....|....|....|....|
AAV2    EIQYTSNYNKSVNVDFTVDTNGVYSEPRPIGTRYLTRNL*
cy.5    ........A..N..E.A.NNE...T..............*
rh.10   ........Y..T....A.N.D.T................*
rh.13   ........A..N..E.A.NNE...T..............*
AAV1    .V......A..A.......N..L.T............P.-
AAV3    ........................................-
AAV6    .V......A..A.......N..L.T............P.-
AAV7    .......FE.QTG...A..SQ...................-
AAV8    ........Y..TS...A.N.E...................-
hu.13   ........................................*
hu.26   ........................................*
hu.37   ........Y..T....A.N.E.T................*
hu.53   ........................................*
rh.39   ........Y..T....A.N.E.T................*
rh.43   ........Y..TS...A.N.E...................*
rh.46   ........Y..T....A.N.E...................*
```

FIG. 5D

```
                10        20        30        40        50        60        70        80        90        100
        ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
rh.13   MAADGYLPDWLEDNLSEGIREWWDLKPGAPKPKANQQKQDDGRGLVLPGYKYLGPFNGLDKGEPVNEADAAALEHDKAYDKQLEQGDNPYLKYNHADAEF
rh.2    ..................................................................A.............Q..KA......R........
rh.37   ..................................................................A.............Q..KA......R........
rh.8    ..................................................................A.............Q..KA......R........
hu.29   .............T......Q..K....P.P..PAERHK..S.....................................R..DS.............
rh.64   ..................................................................A.............Q..KA......R........

                110       120       130       140       150       160       170       180       190       200
        ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
rh.13   QERLQEDTSFGGNLGRAVFQAKKRVLEPLGLVEEGAKTAPGKKRPIE-----SPDSSTGIGKKGQQPAKKKLNFGQTGDSESVPDPQPLGEPPAAPSGLG
rh.2    ..............................................V.PSPQR.............H...R.R.................I.....G.....
rh.37   ..............................................D-----.....................................................SV.
rh.8    ..............................................V.QSPQ-E....S....T.......R.............................
hu.29   ....K.............................PV.........V.HSP-AE....S.T..S.N...R.R.........D.........Q.........
rh.64   ..............................................V.PSPQR.................R.R.................I........SV.

                210       220       230       240       250       260       270       280       290       300
        ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
rh.13   SGTMAAGGGAPMADNNEGADGVGNASGNWHCDSTWLGDRVITTSTRTWALPTYNNHLYKQIS-SQS-GATNDNHFFGYSTPWGYFDFNRFHCHFSPRDWQ
rh.2    ........................SS.....................................NGT.G.S....TY.........................
rh.37   ...........T.....................................................-.S.S.......Y.........................
rh.8    PN...S...................S.....................................NGT.G.S....TY.........................
hu.29   TN...T.S.................S..........M...........................--SQS..S....Y.........................
rh.64   ........................SS.....................................NGT.G.S....TY.........................

                310       320       330       340       350       360       370       380       390       400
        ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
rh.13   RLINNNWGFRPRKLRFKLFNIQVKEVTTNDGVTTIANNLTSTIQVFSDSEYQLPYVLGSAHQGCLPPFPADVFMIPQYGYLTLNNGSQSVGRSSFYCLEY
rh.2    ...........KR.N............Q.E.TK.............T.........P.............................A...........
rh.37   ...........K.................................V.....................................................
rh.8    ...........KR.N..............E.TK.........V...T.............................V.............AL..........
hu.29   ...........KR.N............Q...T..........V...T.............................V.............A.........G.
rh.64   ...........KR.S............Q.E.TK.............T.....................................A...........
```

FIG. 6A

Sarepta Exhibit 1002, page 101

```
                410         420         430         440         450         460         470         480         490         500
       ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
rh.13  FPSQMLRTGNNFEFSYTFEEVPFHSSYAHSQSLDRLMNPLIDQYLYYLARTQSTT--GSTRELQFHQAGPNTMAEQSKNWLPGPCYRQQRLSKNIDSNNN
rh.2   ....................D.............................S.....GGTQG.QQ.L.S....AN.SA.A.............V.TTLSQ...
rh.37  ................S..D.....................................--.....................................L.F...
rh.8   ............Q......D.............................V...T.G-T.G.QT.A.S....SS..N.AR..V.........V.TTTNQ...
hu.29  ............T......D.............................S..NTPSGTTTQSR...S...ASDIRD..R............V..TSAD...
rh.64  ............S......D.............................S.....GGTAG.QQ.L.S....SN.SA.AR............V.TTLSQ...

                510         520         530         540         550         560         570         580         590         600
       ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
rh.13  SNFAWTGATKYHLNGRNSLTNPGVAMATNKDDEDQFFPINGVLVFGETGAAN-KTTLENVLMTSEEEIKTTNPVATEEYGVVSSNLQSSTAGPQTQTVNS
rh.2   ................D..V........H....ER...SS...M..KQ..GKDNVDYSS.ML..............Q....AD...QTNGA.IVG....
rh.37  ......A................IP.....................K.....-.....................................S..I..
rh.8   ........A.FK....D..M.......SH...D.R...SS...I..KQ..G.DGVDYSQ..I.D.....A..........A.AI.N.AANTQA..GL.HN
hu.29  .EYS............D..V...P...SH....EK...QS...I..KQ.PEKTNVDI.K.MI.D....R........Q..S..T....GNTQAA.AD..T
rh.64  ................D..V..............R...SS.I.M..KQ..GKDNVDYS..ML..............Q....AD...QQNTA.IVGA...

                610         620         630         640         650         660         670         680         690         700
       ....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
rh.13  QGALPGMVWQNRDVYLQGPIWAKIPHTDGNFHPSPLMGGFGLKHPPPQILIKNTPVPANPPEVFTPAKFASFITQYSTGQVSVEIEWELQKENSKRWNPE
rh.2   ..................................................V.......D..TT.SQ..L.............................
rh.37  ..........................................E.......................................................
rh.8   ..VI..................................................D..LT.NQ..LN.............................
hu.29  ..V.......D..................H.............................STT.SA.............................
rh.64  ..........................................................D..TA.NQ..LN..............V..........R...

                710         720         730
       ....|....|....|....|....|....|....|....
rh.13  IQYTSNYAKSNNVEFAVNNEGVYTEPRPIGTRYLTRNL*
rh.2   .......Y..T..D....T..T.S.............*
rh.37  ...................PD.................*
rh.8   .......Y..T..D....T....S.............*
hu.29  .......N..V..D.T.DTN...S.............*
rh.64  .......Y..T..D....T....S.............*
```

FIG. 6B

Sarepta Exhibit 1002, page 102

DocCode – SEQ.TXT

SCORE Placeholder Sheet for IFW Content

Application Number: 16368758 Document Date: 03/28/2019

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Sequence Listing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via eDAN using the Supplemental Content tab, or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: August 26, 2013

```
============================================================
Sequence Listing was accepted.
If you need help call the Patent Electronic Business Center at (866)
217-9197 (toll free).
Reviewer: Anjum, Durreshwar
Timestamp: [year=2019; month=4; day=2; hr=10; min=0; sec=47; ms=510; ]
============================================================
```

Validated By CRFValidator v 1.0.5

Application No: 16368758 Version No: 1.0

Input Set:

Output Set:

Started: 2019-03-28 20:42:08.019
Finished: 2019-03-28 20:42:11.188
Elapsed: 0 hr(s) 0 min(s) 3 sec(s) 169 ms
Total Warnings: 49
Total Errors: 0
No. of SeqIDs Defined: 49
Actual SeqID Count: 49

Error code		Error Description
W	213	Artificial or Unknown found in <213> in SEQ ID (1)
W	213	Artificial or Unknown found in <213> in SEQ ID (2)
W	213	Artificial or Unknown found in <213> in SEQ ID (3)
W	213	Artificial or Unknown found in <213> in SEQ ID (4)
W	213	Artificial or Unknown found in <213> in SEQ ID (5)
W	213	Artificial or Unknown found in <213> in SEQ ID (6)
W	213	Artificial or Unknown found in <213> in SEQ ID (7)
W	213	Artificial or Unknown found in <213> in SEQ ID (8)
W	213	Artificial or Unknown found in <213> in SEQ ID (9)
W	213	Artificial or Unknown found in <213> in SEQ ID (10)
W	213	Artificial or Unknown found in <213> in SEQ ID (11)
W	213	Artificial or Unknown found in <213> in SEQ ID (12)
W	213	Artificial or Unknown found in <213> in SEQ ID (13)
W	213	Artificial or Unknown found in <213> in SEQ ID (14)
W	213	Artificial or Unknown found in <213> in SEQ ID (15)
W	213	Artificial or Unknown found in <213> in SEQ ID (16)
W	213	Artificial or Unknown found in <213> in SEQ ID (17)
W	213	Artificial or Unknown found in <213> in SEQ ID (18)
W	213	Artificial or Unknown found in <213> in SEQ ID (19)
W	213	Artificial or Unknown found in <213> in SEQ ID (20)

Input Set:

Output Set:

Started: 2019-03-28 20:42:08.019
Finished: 2019-03-28 20:42:11.188
Elapsed: 0 hr(s) 0 min(s) 3 sec(s) 169 ms
Total Warnings: 49
Total Errors: 0
No. of SeqIDs Defined: 49
Actual SeqID Count: 49

Error code	Error Description

This error has occured more than 20 times, will not be displayed

SEQUENCE LISTING

<110> Vandenberghe, Luk
The Trustees of the University of Pennsylvania
Gao, Guangping
Wilson, James M.

<120> Method of Increasing the Function of an AAV Vector

<130> UPN-R3895D2USA

<140> US 16/368,758
<141> 2019-03-28

<150> PCT/US06/13375
<151> 2006-04-07

<150> US 14624671
<151> 2015-02-18

<150> US 11887679
<151> 2007-10-02

<150> US 60/733,497
<151> 2005-11-04

<150> US 60/669,083
<151> 2005-04-07

<160> 49

<170> PatentIn version 3.5

<210> 1
<211> 738
<212> PRT
<213> Unknown

<220>
<223> rhesus adeno-associated virus, 20

<400> 1

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
1 5 10 15

Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
20 25 30

Lys Ala Asn Gln Gln Lys Gln Asp Asp Gly Arg Gly Leu Val Leu Pro
35 40 45

Gly Tyr Lys Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
50 55 60

```
Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Lys Ala Tyr Asp
65                  70                  75                  80

Gln Gln Leu Lys Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
                85                  90                  95

Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
            100                 105                 110

Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
        115                 120                 125

Leu Gly Leu Val Glu Glu Gly Ala Lys Thr Ala Pro Gly Lys Lys Arg
    130                 135                 140

Pro Val Glu Pro Ser Pro Gln Arg Ser Pro Asp Ser Ser Thr Gly Ile
145                 150                 155                 160

Gly Lys Thr Gly Gln Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln
                165                 170                 175

Thr Gly Asp Ser Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro
            180                 185                 190

Pro Ala Gly Pro Ser Gly Leu Gly Ser Gly Thr Met Ala Ala Gly Gly
        195                 200                 205

Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser
    210                 215                 220

Ser Ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp Arg Val
225                 230                 235                 240

Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His
                245                 250                 255

Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp
            260                 265                 270

Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn
        275                 280                 285
```

```
Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn
    290                 295                 300

Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn
305                 310                 315                 320

Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ile Ala
                325                 330                 335

Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln
            340                 345                 350

Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe
        355                 360                 365

Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn
    370                 375                 380

Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr
385                 390                 395                 400

Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr
                405                 410                 415

Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser
            420                 425                 430

Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu
        435                 440                 445

Ser Arg Thr Gln Ser Thr Gly Gly Thr Ala Gly Thr Gln Gln Leu Leu
    450                 455                 460

Phe Ser Gln Ala Gly Pro Asn Asn Met Ser Ala Gln Ala Lys Asn Trp
465                 470                 475                 480

Leu Pro Gly Pro Cys Tyr Arg Gln Gln Arg Val Ser Thr Thr Leu Ser
                485                 490                 495

Gln Asn Asn Asn Ser Asn Phe Ala Trp Thr Gly Ala Thr Lys Tyr His
            500                 505                 510
```

```
Leu Asn Gly Arg Asp Ser Leu Val Asn Pro Gly Val Ala Met Ala Thr
        515                 520                 525

His Lys Asp Asp Glu Glu Arg Phe Phe Pro Ser Ser Gly Val Leu Met
    530                 535                 540

Phe Gly Lys Gln Gly Ala Gly Lys Asp Asn Val Asp Tyr Ser Ser Val
545                 550                 555                 560

Met Leu Thr Ser Glu Glu Glu Ile Lys Thr Thr Asn Pro Val Ala Thr
                565                 570                 575

Glu Gln Tyr Gly Val Val Ala Asp Asn Leu Gln Gln Gln Asn Ala Ala
            580                 585                 590

Pro Ile Val Gly Ala Val Asn Ser Gln Gly Ala Leu Pro Gly Met Val
        595                 600                 605

Trp Gln Asn Arg Asp Val Tyr Leu Gln Gly Pro Ile Trp Ala Lys Ile
    610                 615                 620

Pro His Thr Asp Gly Asn Phe His Pro Ser Pro Leu Met Gly Gly Phe
625                 630                 635                 640

Gly Leu Lys His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val
                645                 650                 655

Pro Ala Asp Pro Pro Thr Thr Phe Ser Gln Ala Lys Leu Ala Ser Phe
            660                 665                 670

Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu
        675                 680                 685

Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr
    690                 695                 700

Ser Asn Tyr Tyr Lys Ser Thr Asn Val Asp Phe Ala Val Asn Thr Glu
705                 710                 715                 720

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg
                725                 730                 735

Asn Leu
```

<210> 2
<211> 733
<212> PRT
<213> Unknown

<220>
<223> capsid of Rhesus adeno-associated virus clone 32/33

<400> 2

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
1 5 10 15

Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
20 25 30

Lys Ala Asn Gln Gln Lys Gln Asp Asp Gly Arg Gly Leu Val Leu Pro
35 40 45

Gly Tyr Lys Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
50 55 60

Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Lys Ala Tyr Asp
65 70 75 80

Gln Gln Leu Lys Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
85 90 95

Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
100 105 110

Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
115 120 125

Leu Gly Leu Val Glu Glu Gly Ala Lys Thr Ala Pro Gly Lys Lys Arg
130 135 140

Pro Leu Glu Ser Pro Gln Glu Pro Asp Ser Ser Ser Gly Ile Gly Lys
145 150 155 160

Lys Gly Lys Gln Pro Ala Lys Lys Arg Leu Asn Phe Glu Glu Asp Thr
165 170 175

```
Gly Ala Gly Asp Gly Pro Pro Glu Gly Ser Asp Thr Ser Ala Met Ser
            180                 185                 190

Ser Asp Ile Glu Met Arg Ala Ala Pro Gly Gly Asn Ala Val Asp Ala
        195                 200                 205

Gly Gln Gly Ser Asp Gly Val Gly Asn Ala Ser Gly Asp Trp His Cys
    210                 215                 220

Asp Ser Thr Trp Ser Glu Gly Lys Val Thr Thr Thr Ser Thr Arg Thr
225                 230                 235                 240

Trp Val Leu Pro Thr Tyr Asn Asn His Leu Tyr Leu Arg Leu Gly Thr
                245                 250                 255

Thr Ser Asn Ser Asn Thr Tyr Asn Gly Phe Ser Thr Pro Trp Gly Tyr
            260                 265                 270

Phe Asp Phe Asn Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln
        275                 280                 285

Arg Leu Ile Asn Asn Asn Trp Gly Leu Arg Pro Lys Ala Met Arg Val
    290                 295                 300

Lys Ile Phe Asn Ile Gln Val Lys Glu Val Thr Thr Ser Asn Gly Glu
305                 310                 315                 320

Thr Thr Val Ala Asn Asn Leu Thr Ser Thr Val Gln Ile Phe Ala Asp
                325                 330                 335

Ser Ser Tyr Glu Leu Pro Tyr Val Met Asp Ala Gly Gln Glu Gly Ser
            340                 345                 350

Leu Pro Pro Phe Pro Asn Asp Val Phe Met Val Pro Gln Tyr Gly Tyr
        355                 360                 365

Cys Gly Ile Val Thr Gly Glu Asn Gln Asn Gln Thr Asp Arg Asn Ala
    370                 375                 380

Phe Tyr Cys Leu Glu Tyr Phe Pro Ser Gln Met Leu Arg Thr Gly Asn
385                 390                 395                 400

Asn Phe Glu Met Ala Tyr Asn Phe Glu Lys Val Pro Phe His Ser Met
```

```
                405                 410                 415

Tyr Ala His Ser Gln Ser Leu Asp Arg Leu Met Asn Pro Leu Leu Asp
            420                 425                 430

Gln Tyr Leu Trp His Leu Gln Ser Thr Thr Ser Gly Glu Thr Leu Asn
        435                 440                 445

Gln Gly Asn Ala Ala Thr Thr Phe Gly Lys Ile Arg Ser Gly Asp Phe
    450                 455                 460

Ala Phe Tyr Arg Lys Asn Trp Leu Pro Gly Pro Cys Val Lys Gln Gln
465                 470                 475                 480

Arg Phe Ser Lys Thr Ala Ser Gln Asn Tyr Lys Ile Pro Ala Ser Gly
                485                 490                 495

Gly Asn Ala Leu Leu Lys Tyr Asp Thr His Tyr Thr Leu Asn Asn Arg
            500                 505                 510

Trp Ser Asn Ile Ala Pro Gly Pro Pro Met Ala Thr Ala Gly Pro Ser
        515                 520                 525

Asp Gly Asp Phe Ser Asn Ala Gln Leu Ile Phe Pro Gly Pro Ser Val
    530                 535                 540

Thr Gly Asn Thr Thr Thr Ser Ala Asn Asn Leu Leu Phe Thr Ser Glu
545                 550                 555                 560

Glu Glu Ile Ala Ala Thr Asn Pro Arg Asp Thr Asp Met Phe Gly Gln
                565                 570                 575

Ile Ala Asp Asn Asn Gln Asn Ala Thr Thr Ala Pro Ile Thr Gly Asn
            580                 585                 590

Val Thr Ala Met Gly Val Leu Pro Gly Met Val Trp Gln Asn Arg Asp
        595                 600                 605

Ile Tyr Tyr Gln Gly Pro Ile Trp Ala Lys Ile Pro His Ala Asp Gly
    610                 615                 620

His Phe His Pro Ser Pro Leu Ile Gly Gly Phe Gly Leu Lys His Pro
625                 630                 635                 640
```

```
Pro Pro Gln Ile Phe Ile Lys Asn Thr Pro Val Pro Ala Asn Pro Ala
                645                 650                 655

Thr Thr Phe Thr Ala Ala Arg Val Asp Ser Phe Ile Thr Gln Tyr Ser
            660                 665                 670

Thr Gly Gln Val Ala Val Gln Ile Glu Trp Glu Ile Glu Lys Glu Arg
        675                 680                 685

Ser Lys Arg Trp Asn Pro Glu Val Gln Phe Thr Ser Asn Tyr Gly Asn
    690                 695                 700

Gln Ser Ser Met Leu Trp Ala Pro Asp Thr Thr Gly Lys Tyr Thr Glu
705                 710                 715                 720

Pro Arg Val Ile Gly Ser Arg Tyr Leu Thr Asn His Leu
                725                 730
```

<210> 3
<211> 738
<212> PRT
<213> Unknown

<220>
<223> Rhesus adeno-associated virus clone 39 capsid

<400> 3

```
Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
1               5                   10                  15

Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
            20                  25                  30

Lys Ala Asn Gln Gln Lys Gln Asp Asp Gly Arg Gly Leu Val Leu Pro
        35                  40                  45

Gly Tyr Lys Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
    50                  55                  60

Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Lys Ala Tyr Asp
65                  70                  75                  80

Gln Gln Leu Lys Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
```

```
                85                  90                  95

Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
            100                 105                 110

Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
        115                 120                 125

Leu Gly Leu Val Glu Glu Ala Ala Lys Thr Ala Pro Gly Lys Lys Arg
    130                 135                 140

Pro Val Glu Pro Ser Pro Gln Arg Ser Pro Asp Ser Ser Thr Gly Ile
145                 150                 155                 160

Gly Lys Lys Gly Gln Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln
                165                 170                 175

Thr Gly Asp Ser Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro
            180                 185                 190

Pro Ala Gly Pro Ser Gly Leu Gly Ser Gly Thr Met Ala Ala Gly Gly
        195                 200                 205

Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser
    210                 215                 220

Ser Ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp Arg Val
225                 230                 235                 240

Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His
                245                 250                 255

Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp
            260                 265                 270

Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn
        275                 280                 285

Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn
    290                 295                 300

Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Ser Phe Lys Leu Phe Asn
305                 310                 315                 320
```

```
Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ile Ala
                325                 330                 335

Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln
            340                 345                 350

Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe
        355                 360                 365

Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn
    370                 375                 380

Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr
385                 390                 395                 400

Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr
                405                 410                 415

Thr Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser
            420                 425                 430

Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu
        435                 440                 445

Ser Arg Thr Gln Ser Thr Gly Gly Thr Gln Gly Thr Gln Gln Leu Leu
    450                 455                 460

Phe Ser Gln Ala Gly Pro Ala Asn Met Ser Ala Gln Ala Lys Asn Trp
465                 470                 475                 480

Leu Pro Gly Pro Cys Tyr Arg Gln Gln Arg Val Ser Thr Thr Leu Ser
                485                 490                 495

Gln Asn Asn Asn Ser Asn Phe Ala Trp Thr Gly Ala Thr Lys Tyr His
            500                 505                 510

Leu Asn Gly Arg Asp Ser Leu Val Asn Pro Gly Val Ala Met Ala Thr
        515                 520                 525

His Lys Asp Asp Glu Glu Arg Phe P
```

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/368,758	03/28/2019		1720	UPN-R3895D2US	1	1

CONFIRMATION NO. 7840

270
HOWSON & HOWSON LLP
350 Sentry Parkway
Building 620, Suite 210
Blue Bell, PA 19422

FILING RECEIPT

OC000000107184895

Date Mailed: 04/08/2019

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Luk VANDENBERGHE, Weston, MA;
Guangping GAO, Westborough, MA;
James M. WILSON, Philadelphia, PA;

Applicant(s)

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA;

Assignment For Published Patent Application

The Trustees of the University of Pennsylvania

Power of Attorney: The patent practitioners associated with Customer Number 00270

Domestic Priority data as claimed by applicant

This application is a DIV of 14/624,671 02/18/2015
which is a DIV of 11/887,679 10/02/2007 PAT 8999678

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 04/05/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/368,758**

Projected Publication Date: 07/18/2019

Non-Publication Request: No

Early Publication Request: No
Title

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/368,758

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	1 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 06/20/2019

ASINGLET SALE #00000002 Mailroom Dt: 06/12/2019 083040 16368758
01 FC : 1201 460.00 DA

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/368758	Confirmation No.:	7840
Applicant	:	The Trustees of the University of Pennsylvania		
Filed	:	March 28, 2019		
TC/A.U.	:			
Examiner	:			
Customer No.	:	00270		
Title	:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Sir:

Please enter the following into the record.

Amendments to the Claims begin on page 2.

Remarks/Arguments begin on page 5.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1(Currently Amended) An adeno-associated virus (AAV) ~~vector~~ comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct ~~its~~ expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46) or a sequence having at least 95% identity to ~~selected from the group consisting of~~:

~~rh20, which has an amino acid sequence of SEQ ID NO:1 or a sequence having at least 97% identity thereto;~~

~~rh32/33, which has an amino acid sequence of SEQ ID NO:2 or a sequence having at least 97% identity thereto;~~

~~rh39, which has an amino acid sequence of SEQ ID NO:3 or a sequence having at least 97% identity thereto;~~

~~rh46, which has an~~ amino acids 1 to 738 of ~~sequence of~~ SEQ ID NO:4, wherein amino acid 665 is N ~~or a sequence having at least 97% identity thereto~~;

~~or rh73, which has an amino acid sequence of SEQ ID NO:5~~

~~or a sequence having at least 97% identity thereto;~~

~~rh74 which has an amino acid sequence of SEQ ID NO:6 or a sequence having at least 97% identity thereto~~.

2 (New) The AAV according to claim 1, wherein the AAV vp1 capsid protein is encoded by the nucleic acid sequence of SEQ ID NO: 22.

3 (New) The AAV according to claim 1, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the amino acids 1 to 738 of SEQ ID NO: 4.

4 (New) A method of generating a recombinant AAV comprising an AAV capsid comprising the steps of culturing a host cell containing: (a) a nucleic acid sequence encoding an AAV capsid protein selected from SEQ ID NO: 4 or a sequence sharing at least 95% identity therewith, wherein amino acid 665 is N; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid.

5 (New) A host cell transfected in vitro with the AAV according to claim 1.

6 (New) The AAV according to claim 1, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

7 (New) A composition comprising the AAV according to claim 1 and a physiologically compatible carrier.

8 (New) An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have the sequence of amino acids 1 to 738 of SEQ ID NO: 5 (AAVrh73) or a sequence having at least 95% identity to amino acids 1 to 738 of SEQ ID NO: 5, wherein amino acid 665 is N.

9 (New) The AAV according to claim 8, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the amino acids 1 to 738 of SEQ ID NO: 5.

10 (New) A method of generating a recombinant AAV comprising an AAV capsid comprising the steps of culturing a host cell containing: (a) a nucleic acid sequence encoding an AAV capsid protein selected from SEQ ID NO: 5 or a sequence sharing at least 95% identity therewith, wherein amino acid 665 is N; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid.

11 (New) A host cell transfected in vitro with the AAV according to claim 8.

12 (New) The AAV according to claim 8, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

13 (New) A composition comprising the AAV according to claim 8 and a physiologically compatible carrier.

ARGUMENTS/REMARKS

After entry of this paper, claims 1-13 are pending. Claims 2-13 are new. Support for these new claims can be found throughout the specification.

The Director is hereby authorized to charge any deficiency in any fee due with the filing of this paper, or credit any overpayment in this fee to our Deposit Account No. 08-3040.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: June 12, 2019

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
350 Sentry Parkway
Building 620, Suite 210
Blue Bell, PA 19422
Telephone: 215-540-9211
Facsimile: 215-540-5818

Electronic Acknowledgement Receipt

EFS ID:	36281397
Application Number:	16368758
International Application Number:	
Confirmation Number:	7840
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Customer Number:	270
Filer:	Colleen M. Schaller
Filer Authorized By:	
Attorney Docket Number:	UPN-R3895D2US
Receipt Date:	12-JUN-2019
Filing Date:	28-MAR-2019
Time Stamp:	17:39:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		R3895D2US_20190612_Prelim-Amend.pdf	87797 3a464e68be4b5be1111fc3b705d91fb90457d57c	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Claims	2	4
	Applicant Arguments/Remarks Made in an Amendment	5	5
Warnings:			
Information:			
	Total Files Size (in bytes):	87797	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/368,758	Filing Date 03/28/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	06/12/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 13	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/ANNIE C SINGLETON/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

R3895D2US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/368,758	Confirmation No.: 7840
Applicant	:	The Trustees of the University of Pennsylvania	
Filed	:	March 28, 2019	
TC/A.U.	:		
Examiner	:		
Customer No.	:	00270	
Title	:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CORRECTED FILING RECEIPT

Sir:

Upon review of the Filing Receipt issued April 8, 2019, an error was found in the section titled "Domestic Priority data as claimed by applicant". Specifically, the national stage and priority information for US Patent Application No. 11/887,679, now US Patent No. 8,999,678, was omitted. Please correct the priority data for this application as follows:

Prior Application Status	Patented				
Application Number	Continuity Type	Prior App. Number	Filing Date	Patent No.	Issue Date
16368758	Division of	14624671	2015-02-18	10,301,648	2019-05-28
Prior Application Status	Patented				
Application Number	Continuity Type	Prior App. Number	Filing Date	Patent No.	Issue Date
14624671	Division of	11887679	2007-10-02	8999678	2015-04-07
Prior Application Status	Expired				
Application Number	Continuity Type	Prior App. Number	Filing Date		
11887679	a 371 of international	PCTUS2006013375	2006-04-07		
Prior Application Status	Expired				
PCTUS2006013375	Claims benefit of provisional	60733497	2005-11-04		
Prior Application Status	Expired				
PCTUS2006013375	Claims benefit of provisional	60669083	2005-04-07		

A supplemental application data sheet marking the changes required is also enclosed.

The Director is hereby authorized to charge any deficiency in any fees due with the filing of this paper or during the pendency of this application or credit any overpayment in any fees to our Deposit Account No. 08-3040.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: July 1, 2019

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
350 Sentry Parkway
Building 620, Suite 210
Blue Bell, PA 19422
Telephone: 215-540-9211
Facsimile: 215-540-5818

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	16/368,758
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Luk		VANDENBERGHE	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Weston	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	14 Indian Hill Road		
Address 2			
City	Weston	State/Province	MA
Postal Code	02493	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Guangping		GAO	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Westborough	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	4 Edward Dunn Way		
Address 2			
City	Westborough	State/Province	MA
Postal Code	01581	Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James	M.	WILSON	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	16/368,758
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

City	Philadelphia	State/Province	PA	Country of Residence	US

Mailing Address of Inventor:

Address 1	1831 Delancey Street		
Address 2			
City	Philadelphia	State/Province	PA
Postal Code	19103	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	00270		
Email Address	docketing@howsoniplaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR		
Attorney Docket Number	UPN-R3895D2US	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	21	Suggested Figure for Publication (if any)	

Filing By Reference :

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	16/368,758
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	00270		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the application number blank.

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16368758	Division of	14624671	2015-02-18	10301648	2019-05-28
Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14624671	Division of	11887679	2007-10-02	8999678	2015-04-07
Prior Application Status	Expired			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
11887679	a 371 of international	PCTUS2006013375	2006-04-07		
Prior Application Status	Expired			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
PCTUS2006013375	Claims benefit of provisional	60733497	2005-11-04		
Prior Application Status	Expired			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
PCTUS2006013375	Claims benefit of provisional	60669083	2005-04-07		

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	16/368,758
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	16/368,758
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

Organization Name	THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA

Mailing Address Information For Applicant:

Address 1	3160 Chestnut Street, Suite 200		
Address 2			
City	Philadelphia	**State/Province**	PA
Country	US	Postal Code	19104
Phone Number		Fax Number	

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	16/368,758
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

Email Address	

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/Colleen M. Schaller/			Date (YYYY-MM-DD)	2019-07-01
First Name	Colleen M.	Last Name	Schaller	Registration Number	67751

Additional Signature may be generated within this form by selecting the Add button.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	UPN-R3895D2US
	Application Number	16/368,758
Title of Invention	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent C o o p eration Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	36464590
Application Number:	16368758
International Application Number:	
Confirmation Number:	7840
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Customer Number:	270
Filer:	Colleen M. Schaller
Filer Authorized By:	
Attorney Docket Number:	UPN-R3895D2US
Receipt Date:	01-JUL-2019
Filing Date:	28-MAR-2019
Time Stamp:	16:30:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	R3895D2US_20190701_Request-Corrected-Filing-Receipt.pdf	75206 fa0c93d55737dd7fadb12472b4b6db4cc056d20c	no	2

Warnings:

Information:					
2	Application Data Sheet	UPNR3895D2US_20190701_Supp_ADS-pto.pdf	196204 4649343f8061173ac23ef7f3b7a01b3bc5b8f2e3	no	8
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
			Total Files Size (in bytes):	271410	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/08A (12-07)
Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	15

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1.	2003/0138772 A1	07-24-2003	Gao et al.	
	2.	2004/0170611 A1	09-02-2004	Morgan et al.	
	3.	2004/0180440	09-16-2004	Zolotukhin	
	4.	2007/0036760 A1	02-15-2007	Wilson et al.	
	5.	2008/0269149 A1	10-30-2008	Bowles et al.	
	6.	2009/0275107 A1	11-05-2009	Lock	
	7.	2009/0317417 A1	12-24-2009	Vandenberghe	
	8.	2010/0129405 A1	05-27-2010	Schmidt et al.	
	9.	6,156,303	12-05-2000	Russell et al.	
	10.	6,410,300	06-25-2002	Samulski et al.	
	11.	6,596,539	07-22-2003	Stemmer et al.	
	12.	6,703,237	03-09-2004	Samulski et al.	
	13.	6,733,757	05-11-2004	Patel et al.	
	14.	6,962,815	11-08-2005	Bartlett	
	15.	7,252,997	08-07-2007	Halleck et al.	
	16.	7,314,912	01-01-2008	Halleck et al.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. this collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Group Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	2	of	15	Attorney Docket Number	UPN-R3895D2US

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document: Country Code[3]- Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	17.	EP 1 359 217 A1	11-05-2003	The Trustees of the Univ. of Pennsylvania		
	18.	WO 1998/011244	03-19-1998	US Government		
	19.	WO 1999/061601	12-02-1999	US Government		
	20.	WO 2000/028004	05-18-2000	The University of North Carolina at Chapel Hill		
	21.	WO 2000/028061	05-18-2000	The Trustees of the Univ. of Pennsylvania		
	22.	WO 2003/023032	03-20-2003	Nautilus Biotech		
	23.	WO 2003/093460 A1	11-13-2003	The Trustees of the Univ. of Pennsylvania		
	24.	WO 2005/005610 A2	01-20-2005	The Reagents of the University of California		
	25.	WO 2005/033321	04-14-2005	The Trustees of the Univ. of Pennsylvania		
	26.	WO 2007/127264 A2	11-08-2007	The Trustees of the Univ. of Pennsylvania		
	27.	WO 2008/027084 A2	03-06-2008	The Trustees of the Univ. of Pennsylvania		
Examiner Signature				Date Considered		

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. this collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

PTO/SB/08B (12-07)
Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **3** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	28.	AFIONE et al., In vivo model of adeno-associated virus vector persistence and rescue, Journal of Virology, Vol. 70(5):3235-3241, May 1996.	
	29.	BEVAN et al., Systemic Gene Delivery in Large Species for Targeting Spinal Cord, Brain, and Peripheral Tissues for Pediatric Disorders, Mol Ther. 2011 Nov;19(11):1971-80. doi: 10.1038/mt.2011.157. Epub 2011 Aug 2	
	30.	BLACK et al., Adeno-associated virus 8-mediated gene therapy for choroideremia: preclinical studies in in vitro and in vivo models, The Journal of Gene Medicine, Vol. 16:122-130, June 2014.	
	31.	BOWLES et al., Marker rescue of adeno-associated virus (AAV) capsid mutants: a novel approach for chimeric AAV production.Marker rescue of adeno-associated virus (AAV) capsid mutants: a novel approach for chimeric AAV production. J Virol. 2003 Jan;77(1):423-32.	
	32.	BROWN et al., Cloning and sequencing of the simial parvovirus genome, Virology, Vol. 210:314-322, May 1995.	
	33.	CHARAN et al., Adeno-associated Virus Serotype 8 (AAV8) Delivery of Recombinant A20 to Skeletal Muscle Reduces Pathological Activation of Nuclear Factor (NF)-kB in Muscle of mdx Mice, Molecular Medicine, Vol. 18:1527-1535, November 2012.	
	34.	CHEN et al., Epidemiology of hepatitis B virus infection in the Asia-Pacific region, J Gastroenterol Hepatol. 2000 May;15 Suppl:E3-6	
	35.	CHILDERS et al., Gene Therapy Prolongs Survival and Restores Function in Murine and Canine Models of Myotubular Myopathy, Sci Transl Med, Vol. 6(220):1-31, January 2014.	
	36.	CHIRMULE et al., Immune responses to adenovirus and adeno-associated virus in humans, Gene Therapy, 6:1574-1583, Sept 1999	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

PTO/SB/08B (12-07)
Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **4** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	37.	ClinicalTrials.org, "AAV8 Vector Trials", November 2017.	
	38.	DAI et al., "Long-term retinal cone rescue using a capsid mutant AAV8 vector in a mouse model of CNGA3-achromatopsia", PLOS One, Vol. 12(11):e0188032, November 2017.	
	39.	DAVIDSON et al., Recombinant adeno-associated virus type 2, 4, and 5 vectors: transduction of variant cell types and regions in the mammalian central nervous system. Proc Natl Acad Sci U S A. 2000 Mar 28;97(7):3428-32.	
	40.	DURIGON et al., Multiple primer pairs for polymerase chain reaction (PCR) amplification of human parvovirus B19 DNA, Journal of Virological Methods, Vol. 44:155-165, February 1993.	
	41.	ELLIS et al, Virology Journal, March 2013, A survey of ex vivo/in vitro transduction efficiency of mammalian primary cells and cell lines with Nine natural adeno-associated virus (AAV1-9) and one engineered adeno-associated virus serotype, 10:74	
	42.	FARIA et al., The early spread and epidemic ignition of HIV-1 in human populations, Science, Oct 2014, 346(6205):56-61	
	43.	FISCHER et al., Codon-Optimized RPGR Improves Stability and Efficacy of AAV8 Gene Therapy in Two Mouse Models of X-Linked Retinitis Pigmentosa, Molecular Therapy, Vol. 25(8):1854-1865, May 2017.	
	44.	GAO et al., "Novel adeno-associated viruses from rhesus monkeys as vectors for human gene therapy", PNAS, Vol. 99(18):11854-11859, September 2002.	
	45.	GAO et al., Adeno-Associated Viruses Undergo Substantial Evolution in Primates during Natural Infections, PNAS, Vol. 100, No. 10, pp. 6081-6086, (May 13, 2003)	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **5** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	46.	GAO et al., Biology of Adenovirus vectors with E1 and E4 deletions for liver-directed gene therapy, Journal of Viroloy, Vol. 70(12):8934-8943, December 1996.	
	47.	GAO et al., Clades of Adeno Associated Viruses Are Widely Disseminated in Human Tissues, J. Virol, June 2004, 78(12) :6381-8	
	48.	GAO et al., Origin of HIV-1 in the chimpanzee Pan troglodytes troglodytes, Nature, Feb 1999, 397 :436-440	
	49.	GenBank entry AF513851, September 2002.	
	50.	GenBank entry AF513852, September 2002.	
	51.	GILES et al., Deamidation of Amino Acids on the Surface of Adeno-Associated Virus Capsids Leads to Charge Heterogeneity and Altered Vector Function, Mol Ther, 26(12), Dec 2018.	
	52.	GILKES et al., Mucopolysaccharidosis IIIB confers enhanced neonatal intracranial transduction by AAV8 but not by 5, 9 or rh10, Gene Therapy, Vol. 23:263-271, January 2016.	
	53.	GIROD et al., The VP1 capsid protein of adeno-associated virus type 2 is carrying a phospholipase A2 domain required for virus infectivity, J. General Virol, 2002, 83:973-978	
	54.	GREEN et al., Rhesus and pig-tailed macaque parvoviruses: identification of two new members of the erythrovirus genus in monkeys, Virology, Vol. 269:105-112, January 2000.	
	55.	GRIEGER et al., Separate basic region motifs within the adeno-associated virus capsid proteins are essential for infectivity and assembly. J Virol. 2006 Jun;80(11):5199-210.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **6** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	56.	GRIEGER et al., Surface-Exposed Adeno-Associated Virus Vpl-NLS Capsid Fusion Protein Rescues Infectivity of Noninfectious Wild-Type Vp2/Vp3 and Vp3-Only Capsids but Not That of Fivefold Pore Mutant Virions, J. Virol, 81(15):7833-7483, Aug 2007	
	57.	GROSSE et al, Relevance of Assembly-Activating Protein for Adeno-associated Virus Vector Production and Capsid Protein Stability in Mammalian and Insect Cells, J Virol 91:e01198-17, Aug 2017	
	58.	HALBERT et al., Repeat Transduction in the Mouse Lung by Using Adeno-Associated Virus Vectors with Different Serotypes, J. Virol, 74(3):1524-1532, Feb 2000	
	59.	HAMILTON et al., Adenoviral-Mediated Gene Transfer to Murine Small Intestine Is More Efficient in Neonates Than Adults, J Pediatr Surg. 1997 Feb;32(2):373-7	
	60.	HAUCK et al., Characterization of Tissue Tropism Determinants of Adeno-Associated Virus Type 1, Journal of Virology, Vol. 77, No. 4, p. 2768-2774, (February 2003)	
	61.	HERNANDEZ et al., Latent Adeno-associated virus infection elicits humoral but no cell-mediated immune responses in a nonhuman primate model, Journal of Virology, Vol. 73(10):8549-8558, October 1999.	
	62.	HINDERER et al., Severe Toxicity in nonhuman primates and piglets following hi-dose intravenous administration of an adeno-associated virus vector expressing human SMN, Human Gene Therapy, 29(3):285-98 (Jan 29, 2018)	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **7** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	63.	HU et al., RH10 provides superior transgene expression in mice when compared with natural AAV serotypes for neonatal gene therapy, J. Gene Med, Sept 2010, 12(9): 766–778	
	64.	HUTTNER et al., Genetic Modifications of the Adeno-Associated Virus Type 2 Capsid Reduce the Affinity and the Neutralizing Effects of Human Serum Antibodies, Gene Therapy, 10, (26), pp. 2139-2147, (December 2003)	
	65.	KAWAMURA et al., Hiv-2 in West Africa in 1966, The Lancet, Feb 1989, 385.	
	66.	KWON and SCHAFFER, Designer gene delivery vectors: molecular engineering and evolution of adeno-associated viral vectors for enhanced gene transfer. Pharm Res. 2008 Mar;25(3):489-99. Epub 2007 Sep 1.	
	67.	LE GUENNO, HIV1 and HIV2: two ancient viruses for a new disease? Transactions of the Royal Society of Tropical Medicine and Hygiene, 1989, 83, 847.	
	68.	LI et al., 2015, Site-Directed Mutagenesis of Surface-Exposed Lysine Residues Leads to Improved Transduction by AAV2,But Not AAV8, Vectors in Murine Hepatocytes In Vivo, Hum Gene Ther Methods. 2015 Oct;26(6):211-20.	
	69.	LING et al., Human Hepatocyte Growth Factor Receptor is a Cellular Coreceptor for Adeno-Associated Virus Serotype 3, Human Gene Therapy, 21:1741-1747 (Dec 2010)	
	70.	LING et al., Selective In Vivo Targeting of Human Liver Tumors by Optimized AAV3 Vectors in a Murine Xenograft Model, Hum Gene Ther. 2014 Dec;25(12):1023-34	
	71.	LIU et al., Neutralizing antibodies against AAV2, AAV5 and AAV8 in healthy and HIV-1-infected subjects in China: implications for gene therapy using AAV vectors, Gene Therapy, 21:732-738, May 2014	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **8** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	72.	LOILER et al., Targeting recombinant adeno-associated virus vectors to enhance gene transfer to pancreatic islets and liver. Gene Ther. 2003 Sep;10(18):1551-8.	
	73.	LOOKER et al., An estimate of the global prevalence and incidence of herpes simplex virus type 2, Bull World Health Organ. 2008 Oct;86(10):805-12, A	
	74.	LYTLE et al., Effects of FVIII immunity on hepatocyte and hematopoietic stem cell-directed gene therapy of murine hemophilia A, Methods & Clinical Development, Vol. 3:15056, February 2016.	
	75.	MAO et al., Angiotensin 1-7 Overexpression Mediated by a Capsid-optimized AAV8 Vector Leads to Significant Growth Inhibition of Hepatocellular Carcinoma In vivo, Int. J. Biol. Sci, 14, Jan 2018.	
	76.	MESSINA et al., 2012, Repeat Transduction in the Mouse Lung by Using Adeno-Associated Virus Vectors with Different Serotypes	
	77.	MIMURO et al., The Prevalence of Neutralizing Antibodies Against Adeno-Associated Virus Capsids Is Reduced in Young Japanese Individuals, J. Med Virol, 86:1990-7 Oct 2013	
	78.	MOSKALENO et al., Epitope Mapping of Human Anti-Adeno-Associated Virus Type 2 Neutralizing Antibodies: Implications for Gene Therapy and Virus Structure, J Virol, Feb 2000, 74(4):1761-6	
	79.	MOUNTZ, Monkey see, monkey do, Vol. 10:194-196, Gene Therapy, Vol. 10:194, January 2003.	
	80.	NAM et al., Structure of Adeno-Associated Virus Serotype 8, a Gene Therapy Vector, J Virol, 81(22) :12260-71, Nov 2007	
	81.	NICKLIN et al., Efficient and selective AAV2-mediated gene transfer directed to human vascular endothelial cells. Mol Ther. 2001 Sep;4(3):174-81.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **9** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	82.	NZILAMBI et al., The prevalence of infection with human immunodeficiency virus over a 10-year period in rural zaire, NE J Med, 318(5):276-279, Feb 1988	
	83.	OPIE et al., Identification of Amino Acid Residues in the Capsid Proteins of Adeno-Associated Virus Type 2 that Contribute to Heparan Sulfate Proteoglycan Binding, Journal of Virology, Vol. 77, No. 12, pp. 6995-7006, (June 2003)	
	84.	PIGNATARO et al., Adeno-Associated Viral Vectors Serotype 8 for Cell-Specific Delivery of Therapeutic Genes in the Central Nervous System, Frontiers in Neuroanatomy, Vol. 11(2):1-13, February 2017.	
	85.	RIED et al., Adeno-associated virus capsids displaying immunoglobulin-binding domains permit antibody-mediated vector retargeting to specific cell surface receptors. J Virol. 2002 May;76(9):4559-66.	
	86.	RUTLEDGE et al., Infectious clones and vectors derived from Adeno-Associated Virus (AAV) serotypes other than AAV Type 2, Journal of Virology, Vol. 72(1):309-319, January 1998.	
	87.	SCHNELL et al., Activation of innate immunity in nonhuman primates following intraportal administration of adenoviral vectors, Molecular Therapy, Vol. 3(5):708-722, May 2001.	
	88.	SHEN et al., Characterization of the Relationship of AAV Capsid Domain Swapping to Liver Transduction Efficiency, Mol Ther, Aug 2007, 15(11):1955-62	
	89.	SHI and BARTLETT, RGD inclusion in VP3 provides adeno-associated virus type 2 (AAV2)-based vectors with a heparan sulfate-independent cell entry mechanism. Mol Ther. 2003 Apr;7(4):515-25.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **10** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	90.	SONNTAG et al., A viral assembly factor promotes AAV2 capsid formation in the nucleolus, PNAS, 107(22):10220-5, June 2010	
	91.	SUHY et al. Safe, Long-term Hepatic Expression of Anti-HCV shRNA in a Nonhuman Primate Model, Mol Ther. 2012 Sep;20(9):1737-49. doi: 10.1038/mt.2012.119. Epub 2012 Jun 26	
	92.	SUN et al., RGD inclusion in VP3 provides adeno-associated virus type 2 (AAV2)-based vectors with a heparan sulfate-independent cell entry mechanism. Mol Ther. 2003 Apr;7(4):515-25.	
	93.	TOMAR et al., Use of adeno-associated viral vector for delivery of small interfering RNA. Oncogene. 2003 Aug 28;22(36):5712-5.	
	94.	VANDENBERGHE et al., Mutational Strategy to Enhance or Rescue Functionality of Existing AAV Vectors, Molecular Therapy, Vol. 11, Supplement 1, 503. pg. 195, (August 15, 2005)	
	95.	VANDENBERGHE et al., Naturally Occurring Singleton Residues in AAV Capsid Impact Vector Performance and Illustrate Structural Constraints, Gene Therapy, 16(12):1416-1428, (December 2009), Supplementary Information, pp. 1-4	
	96.	VERCAUTEREN, Superior In vivo Transduction of Human Hepatocytes Using Engineered AAV3 Capsid, Mol Therapy, 24(6):1042-1049, June 2016	
	97.	WANG et al., Comparative Study of Liver Gene Transfer With AAV Vectors Based on Natural and Engineered AAV Capsids, Molecular Therapy, Dec 2015, 23(12):1877-87	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Group Art Unit	1636
(Use as many sheets as necessary)				Examiner Name	Catherine S. Hibbert
Sheet	**11**	of	**15**	Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	98.	WANG et al., Enhancing Transgene Expression from Recombinant AAV8 Vectors in Different Tissues Using Woodchuck Hepatitis Virus Post-Transcriptional Regulatory Element, International Journal of Medical Sciences, Vol. 13(4):286-291, April 2016.	
	99.	WARRINGTON et al., Adeno-Associated Virus Type 2 VP2 Capsid Protein Is Nonessential and Can Tolerate Large Peptide Insertions at Its N Terminus, J Virol, 78(1):6595-6609, June 2004	
	100.	WEITZMAN et al., Adeno-associated virus (AAV) Rep proteins mediate complex formation between AAV DNA and its integration site in human DNA, PNAS, Vol. 91:5808-5812, June 1994.	
	101.	WHITE et al., Targeted gene delivery to vascular tissue in vivo by tropism-modified adeno-associated virus vectors. Circulation. 2004 Feb 3;109(4):513-9. Epub 2004 Jan 19.	
	102.	WOBUS et al., Monoclonal Antibodies against the Adeno-Associated Virus Type 2 (AAV-2) Capsid: Epitope Mapping and identification of Capsid Domains Involved in AAV-2-Cell Interaction and Neutralization of AAV-2 Infection, J Virol, Oct 2000, 74(19) :9281-93	
	103.	WU et al., Mutational Analysis of the Adeno-Associated Virus Type 2 (AAV2) Capsid Gene and Construction of AAV2 Vectors With Altered Tropism, J. Virol, Sept 2000, 74(18) :8635-47.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	12	of	15

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	104.	WU, ASOKAN & SAMULSKI, Adeno-associated Virus Serotypes: Vector Toolkit for Human Gene Therapy, Molecular Therapy, 14(3):316-327, September 2006.	
	105.	XIAO et al., Gene therapy vectors based on Adeno-Associated Virus Type 1, Journal of Virology, Vol. 73(5):3994-4003, May 1999.	
	106.	ZADORI et al., A viral phospholipase A2 is required for parvovirus infectivity, Developmental Cell, Vol. 1:291-302, August 2001.	
	107.	ZHU et al., Sustained Whole-Body Functional Rescue by Systemic Delivery of AAV8 Vectors in Heart Failure and Muscular Dystrophy Hamsters, Molecular Therapy, Vol. 11(suppl 1):916, May 2005.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	13	of	15	Attorney Docket Number	UPN-R3895D2US

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	108.	International Search Report and Written Opinion issued in PCT/US2006/013375, mailed December 13, 2006	
	109.	Restriction Requirement in US Patent Application No. 11/887,679, issued April 1, 2010	
	110.	Response to Restriction Requirement in US Patent Application No. 11/887,679, filed April 30, 2010	
	111.	Non-Final Office Action in US Patent Application No. 11/887,679, issued October 15, 2010	
	112.	Response to Non-Final Office Action in US Patent Application No. 11/887,679, filed January 18, 2011	
	113.	Response to Non-Final Office Action in US Patent Application No. 11/887,679, filed April 1, 2011	
	114.	Final Office Action in US Patent Application No. 11/887,679, issued June 10, 2011	
	115.	Response to Final Office Action in US Patent Application No. 11/887,679, filed August 10, 2011	
	116.	Advisory Action in US Patent Application No. 11/887,679, issued September 1, 2011	
	117.	Response and Request for Continued Examination in US Patent Application No. 11/887,679, filed October 3, 2011	
	118.	Non-Final Office Action in US Patent Application No. 11/887,679, issued August 12, 2013	
	119.	Response to Non-Final Office Action in US Patent Application No. 11/887,679, filed December 12, 2013	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				**Complete if Known**	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	**14**	of	**15**	Attorney Docket Number	UPN-R3895D2US

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	120.	Non-Final Office Action in US Patent Application No. 11/887,679, issued April 7, 2014	
	121.	Response to Non-Final Office Action in US Patent Application No. 11/887,679, filed September 4, 2014	
	122.	Notice of Allowance in US Patent Application No. 11/887,679, mailed November 17, 2014	
	123.	Restriction Requirement in US Patent Application No. 14/624,671, issued February 13, 2017	
	124.	Response to Restriction Requirement in US Patent Application No. 14/624,671, issued August 14, 2017	
	125.	Non-Final Office Action in US Patent Application No. 14/624,671, issued November 16, 2017	
	126.	Response to Non-Final Office Action in US Patent Application No. 14/624,671, filed May 5, 2015	
	127.	Final Office Action in US Patent Application No. 14/624,671, issued June 25, 2018	
	128.	Response to Final Office Action in US Patent Application No. 14/624,671, filed December 18, 2019	
	129.	Notice of Allowance in US Patent Application No. 14/624,671, mailed January 9, 2019	
	130.	Non-Final Office Action in US Patent Application No. 15/408,567, issued June 30, 2017	
	131.	Response to Non-Final Office Action in US Patent Application No. 15/408,567, filed August 15, 2017	
	132.	Declaration of Oliver Danos, Ph.D. dated August 14, 2018, submitted in Opposition of EP Patent No. 1453547	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	15	of	15	Attorney Docket Number	UPN-R3895D2US

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	133.	Declaration of Prof Asokan, dated August 23, 2018, submitted in Opposition of EP Patent No. 1453547	
	134.	Declaration of Roberto Calcedo, PhD dated September 24, 2018, submitted in Opposition of EP Patent No. 1453547	
	135.	Second declaration of Olivier Danos, Ph.D. dated September 25, 2018, submitted in Opposition of EP Patent No. 1453547	
	136.	Proprietor's Submission pursuant to Rule 116 prior to oral proceedings dated August 24, 2018 submitted in Opposition of EP Patent No. 1453547	
	137.	Opposer's Submission pursuant to Rule 116 prior to oral proceedings dated August 24, 2018 submitted in Opposition of EP Patent No. 1453547	
	138.	Proprietor's Further Submission prior to oral proceedings dated September 26, 2018 submitted in Opposition of EP Patent No. 1453547	
	139.	Opposer's Further Submission prior to oral proceedings dated October 23, 2018 submitted in Opposition of EP Patent No. 1453547	
	140.	Summons to attend oral proceedings and Communication dated March 29, 2018, issued in related European Patent No. 1453547	
	141.	Interlocutory decision in Opposition proceedings issued in related European Patent No. 1453547 on November 30, 2018	
	142.	Statement of Opposition, dated June 20, 2017, filed on related European Patent No. 1453547.	
	143.	Proprietor's Response to the Opposition, dated December 5, 2017, filed on related European Patent No. 1453547.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	36467433
Application Number:	16368758
International Application Number:	
Confirmation Number:	7840
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Customer Number:	270
Filer:	Francis J. Coffey
Filer Authorized By:	
Attorney Docket Number:	UPN-R3895D2US
Receipt Date:	02-JUL-2019
Filing Date:	28-MAR-2019
Time Stamp:	13:45:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	EP1359217A1.pdf	1051564 4e26143e8af08b12a6f083d2097f2f35cb96cade	no	16

Warnings:

Information:					
2	Foreign Reference	WO2000028004A1.pdf	3907200 963d36740ef9373e428451b9f7b4bb01c80db0d0	no	153
Warnings:					
Information:					
3	Foreign Reference	WO2003023032A2.pdf	3446708 eaeff42aa5630edc0250f4214be83fc15f548f26	no	141
Warnings:					
Information:					
4	Foreign Reference	WO2003093460.pdf	1535001 20bc537dac2b2f825eba6c70d608b4af1624cb5e	no	35
Warnings:					
Information:					
5	Foreign Reference	WO2005005610.pdf	10800584 0bcc6fd1c4de705a17cf7a9c22509bf4a2d6242c	no	147
Warnings:					
Information:					
6	Foreign Reference	WO2007127264.pdf	1483342 c20ba4246bf95a6c3d70939e94d221a8a0874132	no	33
Warnings:					
Information:					
7	Foreign Reference	WO2008027084.pdf	2727346 7c45ff1484dfbe769b27c3e44130a57e4d5d80fc	no	56
Warnings:					
Information:					
8	Foreign Reference	WO2005033321_Part1.pdf	20963244 f0e38c85362820ff0e8e15c4682eea4e04ac277f	no	384
Warnings:					
Information:					

9	Foreign Reference	WO2005033321_Part2.pdf	6064234 e22f044693196f90574a76bf91f443deb5987a3f	no	185
Warnings:					
Information:					
10	Foreign Reference	WO_0028061_uspto_Part1.pdf	20701183 96c29dc8f5a75629af256db63c0d3c81399714ee	no	19
Warnings:					
Information:					
11	Foreign Reference	WO_0028061_uspto_Part2.pdf	20497027 223a1121055d915ebb56f78d0939670c9b6df4fc	no	21
Warnings:					
Information:					
12	Foreign Reference	WO_0028061_uspto_Part3.pdf	20214743 5f145251f9d39c9e53d3008d6a62f1552dd93b5e	no	31
Warnings:					
Information:					
13	Foreign Reference	WO_0028061_uspto_Part4.pdf	20771874 8428fb259c42bda7ed5a4c1603fbd1b3f3a715ab	no	31
Warnings:					
Information:					
14	Foreign Reference	WO_0028061_uspto_Part5.pdf	4740365 7cb67e0722def49d9c2c3bbc6976c85a1a5cde33	no	6
Warnings:					
Information:					
15	Foreign Reference	WO_9961601_uspto_Part1.pdf	19969075 f07c11b6df1dca8192386cb81bb171c1b195c20c	no	18
Warnings:					
Information:					

16	Foreign Reference	WO_9961601_uspto_Part2.pdf	20669411 4abc57c0d206b273084c7e208b2f5834f8bd815c	no	17
Warnings:					
Information:					
17	Foreign Reference	WO_9961601_uspto_Part3.pdf	20530117 89eb99564edb0e70134a520dff3552799ffb79d4	no	21
Warnings:					
Information:					
18	Foreign Reference	WO_9961601_uspto_Part4.pdf	20602119 18ac83a3a01654e9969a92cef3a291a36d4ce043	no	20
Warnings:					
Information:					
19	Foreign Reference	WO_9961601_uspto_Part5.pdf	16374085 0cedbf96abea85d37b64e9152f76b26f89d5ad87	no	15
Warnings:					
Information:					
20	Foreign Reference	WO_9811244_uspto_Part1.pdf	20625502 7e58cb8c24d369289858097d5eaed8104a715871	no	20
Warnings:					
Information:					
21	Foreign Reference	WO_9811244_uspto_Part2.pdf	19805443 54974d78bb6b94372569c17bf9cb405fbd5dbc40	no	17
Warnings:					
Information:					
22	Foreign Reference	WO_9811244_uspto_Part3.pdf	20129543 47ffe1da39ddf2019872ac59ab903c0411572d74	no	20
Warnings:					
Information:					

23	Foreign Reference	WO_9811244_uspto_Part4.pdf	20595866 ca2221ccb9566fd74781eea363681b5aa2526e9a	no	19
Warnings:					
Information:					
24	Foreign Reference	WO_9811244_uspto_Part5.pdf	2463002 f41377140f0286f80e4b47b8028437e8958e4d50	no	8
Warnings:					
Information:					
25	Non Patent Literature	Bevan_pto.pdf	2922637 5097e8d217e6a3ba4f875b13c38d33e428ceb7b6	no	10
Warnings:					
Information:					
26	Non Patent Literature	BOWLES.pdf	1303071 bd300b3e7c496ab645d37fa11a52be66b6a922d8	no	10
Warnings:					
Information:					
27	Non Patent Literature	Chen_2000_J-Gastroenterology-Hepatol_15_Suppl_E3-6-pto.pdf	354704 4901683f4bb1e52ef899df139ba6db7fadc01b82	no	6
Warnings:					
Information:					
28	Non Patent Literature	Chirmule_1999_Gene-Ther_6-9_1574-83-pto.pdf	1277733 399ac9929b2eff7ea56e2472d86421aae3d23390	no	10
Warnings:					
Information:					
29	Non Patent Literature	Afione_Journal-Virology_70-5_uspto.pdf	8892978 902069d4f9677bde2e4551963c6e5f2880db61a8	no	8
Warnings:					
Information:					

30	Non Patent Literature	Black_uspto.pdf	2130059 b9bdaf5c78ce03d6e26ce57540646b19ad7f58a7	no	9
Warnings:					
Information:					
31	Non Patent Literature	Brown_Virology_210_314-322_uspto.pdf	14728507 54c40a39312006874b25fcefe8b659caf29a8afd	no	9
Warnings:					
Information:					
32	Non Patent Literature	Charan_uspto.pdf	2632626 8d1f40cfb0535f694544add7bc225976fef1bac9	no	9
Warnings:					
Information:					
33	Non Patent Literature	Childers_uspto.pdf	4232171 4488f7281059181c3b668ae48c87f66e29a91653	no	31
Warnings:					
Information:					
34	Non Patent Literature	Davidson.pdf	287604 39f761ceaa9416b7a6a8e241a32cb62a970c64e0	no	5
Warnings:					
Information:					
35	Non Patent Literature	Ellis_D74.pdf	802906 43ffc89e21f92122e399014666bb54f4ef3cd51b	no	10
Warnings:					
Information:					
36	Non Patent Literature	Faria-pto.pdf	5199782 cac56be7cef84ab68caa986f7775d715216054ff	no	7
Warnings:					
Information:					

37	Non Patent Literature	Gao_Clades-Adeno-Associated-Viruses-Widely-Disseminated-pto.pdf	913233 94a0a9137073b3f45f91aeaca665d064ad2fa404	no	8
Warnings:					
Information:					
38	Non Patent Literature	ClinicalTrials_uspto.pdf	80612 e6093bf58bfa7e137a4dc40f46e6bdbe6866ffc9	no	2
Warnings:					
Information:					
39	Non Patent Literature	Dai_uspto.pdf	4196967 68fabc0efd4902caeb1304ac0d75e844cf6f8d45	no	16
Warnings:					
Information:					
40	Non Patent Literature	Durigon_Multiple-primer-pairs_uspto.pdf	1897537 08dc8963d3e29cf42a90ec38e8afb482e8f003da	no	11
Warnings:					
Information:					
41	Non Patent Literature	Fischer_uspto.pdf	2484689 12161da31212185551ce98d5f9704e8cf01805fc	no	12
Warnings:					
Information:					
42	Non Patent Literature	Gao_Journal_of_Virology_70_uspto.pdf	14590169 dbf17bcdc8122b5538830609a8156a9c13c20e73	no	10
Warnings:					
Information:					
43	Non Patent Literature	Gao_PNAS_99_2002_11854-11859.pdf	1568328 38f389ef8e6f6056fb750696b291489b7d42864e	no	6
Warnings:					
Information:					

44	Non Patent Literature	Gao_Origin-HIV-1-chimpanzee-Pantroglodytes_uspto.pdf	1025513 63647da3bb868b2d4c8da62e1718bd776281ad01	no	6
Warnings:					
Information:					
45	Non Patent Literature	Gao_Adeno_Viruses_Evolution_Primates.pdf	384524 1c22e4cef59a344b816a005516634371f0e937ee	no	6
Warnings:					
Information:					
46	Non Patent Literature	GenBank_AF513851.pdf	160590 d64a50e4e64f3aae243d00e61784f74f75999e30	no	2
Warnings:					
Information:					
47	Non Patent Literature	GenBank_AF513852.pdf	152999 985a4af75771216fdf924274c9cd4a73a0014bc3	no	2
Warnings:					
Information:					
48	Non Patent Literature	giles_sims_2018-pto.pdf	2874077 bbb9cd6ff080aab6ccc8074a06898d5b2c675368	no	15
Warnings:					
Information:					
49	Non Patent Literature	Girod_VP1-capsid-protein.pdf	684599 a1694096a3d3e149c1fa8c4fae91a6d03939c507	no	6
Warnings:					
Information:					
50	Non Patent Literature	Grieger2006.pdf	877756 22deedbc2ab23300e37445850c770d8e2765386e	no	12
Warnings:					
Information:					

51	Non Patent Literature	Gilkes_uspto.pdf	2312935 17663224e2b2c9f3b8ed2f8907fa1ad745b3f5e7	no	9
Warnings:					
Information:					
52	Non Patent Literature	Green_Rhesus-pig-tailed-macaque_uspto.pdf	12119527 7a1d0997e2936995a66352a017b3cd3af4062a4e	no	8
Warnings:					
Information:					
53	Non Patent Literature	Grieger.pdf	1524250 7496e0481d6d27ae762514519922c6ffc188ef9b	no	12
Warnings:					
Information:					
54	Non Patent Literature	Grosse_Relevance-Assembly-Activating-Protein.pdf	2721198 c21cbafd51c51b967a1e533490c070520bd3b263	no	30
Warnings:					
Information:					
55	Non Patent Literature	Halbert_2000_J-Virol_74_1524-1532-pto.pdf	1546263 c690f6763e80bb52edaa91bc10936b916447955f	no	9
Warnings:					
Information:					
56	Non Patent Literature	Hamilton_1997_J-Ped-Surg_32-2_373-pto.pdf	1149625 044b19bdc66b873587caf87c1ceae64c26733f92	no	5
Warnings:					
Information:					
57	Non Patent Literature	Hauck.pdf	155176 6624eb691f9caf7bc15fb23d5ee466e3af57a3dd	no	7
Warnings:					
Information:					

58	Non Patent Literature	Hernandez_Latent-Adeno-associated-virus_uspto.pdf	9622935 e25a7951f829354eb5b4e984442901b52008a172	no	10
Warnings:					
Information:					
59		R3895D2US_20190702_First_IDS.pdf	296643 7520d92c0ac60e171e31fe1472ba0aae293488ac	yes	17

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	2
	Information Disclosure Statement (IDS) Form (SB08)	3	17

Warnings:	
Information:	
Total Files Size (in bytes):	428773501

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. No.	: 16/368,758	Confirmation No.: 7840
Applicant	: The Trustees of the University of Pennsylvania	
Filed	: March 28, 2019	
TC/A.U.	: 1636	
Examiner	: Catherine S. Hibbert	
Customer No.	: 00270	
Title	: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

FIRST INFORMATION DISCLOSURE STATEMENT

Sir:

Applicant submits to the Examiner the attached document listings and this paper pursuant to 37 CFR §§1.56 and 1.97-1.98. The forms and documents are attached.

This Information Disclosure Statement is submitted before the receipt of a first Office Action on the merits. Therefore, no fees are believed due.

The Director is hereby authorized to charge any deficiency in any fees due with the filing of this paper or credit any overpayment in any fees to our Deposit Account Number 08-3040.

REMARKS

The following information is provided in accordance with the requirement of 37 CFR §§1.97-1.98. In the event that the Examiner considers the inclusion of these items on the attached forms inappropriate and strikes out the citation on the forms, Applicant requests that the Examiner indicate consideration of the attached documents in the body of the next paper, *i.e.*, Office Action or Notice of Allowability. Because this information disclosure statement (IDS) is in accordance with the provisions of 37 CFR §§1.97-1.98, consideration of these documents by the Examiner is required (See MPEP §609).

The Examiner is respectfully requested to consider the documents identified on the attached forms during the course of examination of this application.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: July 2, 2019

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
350 Sentry Parkway
Building 620, Suite 210
Blue Bell, PA 19422
Telephone: 215-540-9211
Facsimile: 215-540-5818

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
UPN-R3895PCT		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2006/013375	07/04/2006	07/04/2005
Applicant		
THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 10 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language,** the international search was carried out on the basis of:
      [X] the international application in the language in which it was filed
      [ ] a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. [X] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. [X] **Certain claims were found unsearchable** (See Box No. II)

3. [ ] **Unity of invention is lacking** (see Box No III)

4. With regard to the **title,**
   [X] the text is approved as submitted by the applicant
   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**
   [X] the text is approved as submitted by the applicant
   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings,**
   a. the figure of the **drawings** to be published with the abstract is Figure No. _____
      [ ] as suggested by the applicant
      [ ] as selected by this Authority, because the applicant failed to suggest a figure
      [ ] as selected by this Authority, because this figure better characterizes the invention
   b. [X] none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/013375

Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:

   a. type of material

   [X] a sequence listing

   [ ] table(s) related to the sequence listing

   b. format of material

   [X] on paper

   [X] in electronic form

   c. time of filing/furnishing

   [X] contained in the international application as filed

   [X] filed together with the international application in electronic form

   [ ] furnished subsequently to this Authority for the purpose of search

2. [ ] In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

INTE ATIONAL SEARCH REPORT

national application No
PCT/US2006/013375

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N15/864 C12N7/00 A61K35/76 A61K48/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, Sequence Search, PAJ, WPI Data, BIOSIS, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	VANDENBERGHE ET AL: "503. Mutational Strategy To Enhance or Rescue Functionality of Existing AAV Vectors" MOLECULAR THERAPY, ACADEMIC PRESS, SAN DIEGO, CA,, US, vol. 11, 15 August 2005 (2005-08-15), page 195, XP005015842 ISSN: 1525-0016 abstract ----- -/--	1-16

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 September 2006	13. 12. 06

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Roscoe, Richard

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,L	HAUCK BERND ET AL: "Characterization of tissue tropism determinants of Adeno-associated virus type 1." JOURNAL OF VIROLOGY, vol. 77, no. 4, February 2003 (2003-02), pages 2768-2774, XP002400210 ISSN: 0022-538X L: Unity the whole document	1-16
L	WO 2005/005610 A (THE REGENTS OF THE UNIVERSITY OF CALIFORNIA; SCHAFFER, DAVID, V; KASPA) 20 January 2005 (2005-01-20) L: Unity the whole document	
A	US 2004/170611 A1 (MORGAN BRUCE A ET AL) 2 September 2004 (2004-09-02) p.13, col.2	1-16
A	GAO GUANGPING ET AL: "Adeno-associated viruses undergo substantial evolution in primates during natural infections" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE, WASHINGTON, DC, US, vol. 100, no. 10, 13 May 2003 (2003-05-13), pages 6081-6086, XP002255703 ISSN: 0027-8424 the whole document	
A	GAO GUANGPING ET AL: "Clades of adeno-associated viruses are widely disseminated in human tissues" JOURNAL OF VIROLOGY, THE AMERICAN SOCIETY FOR MICROBIOLOGY, US, vol. 78, no. 12, June 2004 (2004-06), pages 6381-6388, XP002321999 ISSN: 0022-538X the whole document	
A	EP 1 359 217 A (THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA) 5 November 2003 (2003-11-05) the whole document	

1

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Although claims 23 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

Continuation of Box II.2

Claims Nos.: -

The present claims 17 , 22, 23 relate to an extremely large number of possible compounds. Support and disclosure in the sense of Article 6 and 5 PCT is to be found however for only a very small proportion of the compounds claimed. In particular, the number of AAV sequences is forever increasing so the number of singletons (to use applicants terminology) is neither static, nor is it clear where further singletons could appear. Infact every position in the sequence of an AAV is a potential singleton. Hence, the scope of the claim is not finite. The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search of claim 17, 22, 23 (PCT Guidelines 9.19 and 9.23).

The search of claims 17, 22, 23 was restricted to those claimed compounds which appear to be structurally defined, i.e. those mutants which are defined by sequence.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/013375

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.: 17, 23, 23 (all part)
because they relate to subject matter not required to be searched by this Authority, namely:

Although claims 23 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

2. [X] Claims Nos.: -
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

see FURTHER INFORMATION sheet PCT/ISA/210

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. [X] No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-16

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16

   Method of creating AAVs with improved packaging yield, transduction efficiency and/or gene transfer efficiency involving modifying a parental AAV at a position (singleton) identified as differing in another AAV sequence. Methods involving the comparison of varying amounts and types of AAVs to find singleton positions are covered.

   ---

2. claims: 17-19, 22-25 (all part)

   AAV Mutant rh20, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

   ---

3. claims: 17-19, 22-25 (all part)

   AAV Mutant rh32/33, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

   ---

4. claims: 17-19, 22-25 (all part)

   AAV Mutant rh39, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

   ---

5. claims: 17-19, 22-25 (all part)

   AAV Mutant rh46, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

   ---

6. claims: 17-19, 22-25 (all part)

   AAV Mutant rh73, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

   ---

7. claims: 17-19, 22-25 (all part)

   AAV Mutant rh74, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

8. claims: 17, 20, 22-25 (all part)

AAV mutants AAV6.1 and AAV6.1.2, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.
It is noted that this invention group may need to be split further if it turns out that modification of position 531 is not inventive and thus cannot serve as a unifying feature.

---

9. claims: 17, 20, 22-25 (all part)

AAV mutant AAV6.2, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

---

10. claims: 17, 21-25 (all part)

AAV mutant rh8R, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

---

11. claims: 17, 21-25 (all part)

AAV mutants rh48.1, rh48.1.2, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.
It is noted that this invention group may need to be split further if it turns out that modification of position 217 is not inventive and thus cannot serve as a unifying feature.

---

12. claims: 17, 21-25 (all part)

AAV mutant rh48.2, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

---

13. claims: 17, 21-25 (all part)

AAV mutant hu.44R1, hu.44R2, hu.44R3, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.
It is noted that this invention group may need to be split further if it turns out that modification of position 137 is not inventive and thus cannot serve as a unifying feature.

---

14. claims: 17, 21-25 (all part)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

AAV mutant hu.29R, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

---

15. claims: 17, 21-25 (all part)

AAV mutant hu.48R1, hu.48R2, hu.48R3, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.
It is noted that this invention group may need to be split further if it turns out that modification of position 277 is not inventive and thus cannot serve as a unifying feature.

---

16. claims: 17, 25 (all part)

AAV mutant rh54, DNA encoding said mutant, and use thereof in the manufacture of a medicament or for introducing viral DNA into a subject.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2005005610 A	20-01-2005	AU 2004256444 A1	20-01-2005
		CA 2530029 A1	20-01-2005
		CN 1826414 A	30-08-2006
		EP 1660678 A2	31-05-2006
US 2004170611 A1	02-09-2004	US 2002114772 A1	22-08-2002
EP 1359217 A	05-11-2003	AU 2003231031 A1	17-11-2003
		CA 2426283 A1	29-10-2003
		JP 2003310252 A	05-11-2003
		WO 03093460 A1	13-11-2003

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2006/013375	07.04.2006	07.04.2005

International Patent Classification (IPC) or both national classification and IPC
INV. C12N15/864 C12N7/00 A61K35/76 A61K48/00

Applicant
THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	see form PCT/ISA/210	Roscoe, Richard Telephone No. +49 89 2399-2554

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

      ☒ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material:

      ☒ on paper

      ☒ in electronic form

   c. time of filing/furnishing:

      ☒ contained in the international application as filed.

      ☒ filed together with the international application in electronic form.

      ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. II Priority

1. ☐ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

   see separate sheet

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has, within the applicable time limit:

   ☐ paid additional fees

   ☐ paid additional fees under protest and, where applicable, the protest fee

   ☐ paid additional fees under protest but the applicable protest fee was not paid

   ☒ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☐ all parts.

   ☒ the parts relating to claims Nos. 1-16

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	2-7, 9-12, 14
	No:	Claims	1, 8, 13, 15, 16
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-16
Industrial applicability (IA)	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations

   see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (SEPARATE SHEET)

International application No.
PCT/US2006/013375

II. **Priority**

Will be assessed in the regional phase. At present it has been assumed that priority is valid for all of the claims. If this situation changes the D1 will be relevant to all of the claims of the first invention group.

IV. **Lack of Unity**

The invention groups address different problems. Invention group 1 addresses the problem of providing a method for the identification (and optionally production) of AAV variants which have increased packaging yield, transduction efficiency and / or gene transfer efficiency. Invention groups 2-16 all address the different problem of providing AAV mutants having increased packaging yield, transduction efficiency and / or gene transfer efficiency. The respective solutions are defined in the abovelisted invention groups.

The method cannot serve to unify the above invention groups for several reasons, neither are any of the mutants unitary beyond the groupings indicated above.
Simply because a skilled person provides a method which can identify mutants does not mean that the mutants per se have any technical features which can be attributed to the method by which they were obtained or are unified with eachother or the method by their derivation. A simple analogy is that a skilled person inventing a new microscope cannot claim everything novel that he can see with the microscope in a single application. The microscope is also not unitary with any of the objects seen through it. The objects seen through it are not unitary with eachother either due to the fact that they could be seen through the microscope
Further, variations and mutants in AAV capsid proteins are of course known and cannot serve as a unifying concept per se. In particular, it is noted that AAV mutants with increased packaging yield, transduction efficiency and / or gene transfer efficiency are by no means exclusive products of applicants method and can arise naturally or by random mutagenesis and selection. This alone is reason enough to raise the objection to lack of unity a priori.
The mutants provided by applicant can not by grouped in any other meaningful way such as according to any common structural features such as belonging into a

particular motif that hadnt been mutated before. The application suggests no means of grouping the mutants further, nor are any prima facie evident to the search authority. AAV capsid proteins and mutants thereof are disclosed in e.g. Hauck and Xiao, 2003 or in WO2005005610 (to name just a couple of the myriad of documents providing such matter).

In addition to the above, depending on which AAVs are taken for making the comparison in the method of claim 1, a multitude of functionally and structurally unrelated mutants can be obtained. Basically any AAV fullfilling the functional desiderata can be considered as obtainable by the process of e.g. claim 1, if AAV sequences to be used in the method are chosen accordingly (applicant can choose any known, newly discovered or artificial AAV sequence for his comparison). For example, every time a point mutation is artificially made or newly identified, one can define it as a singleton by way of comparison to its parental sequence (and if necessary further sequences similar to the parental sequence) in a method of claim 1. Then one changes the singleton residue back to the parental residue according to step (c) of claim 1 and comes out with the parental sequence again (which is known). Hence, all AAV mutants can be considered as obtainable/identifiable by the method of claim 1. For purposes of illustration the reason why such mutants could be obtained by the method of claim 1 is explained below.

In Hauck and Xiao, 2003, one even sees how the concept of changing two singletons (pos.363 and 427) identified by comparing two AAV sequences is applied to modify transduction efficiency. The virus hereby obtained clearly falls under the broad concept of "a viral vector comprising an AAV capsid modified according to the method of claim 1 (modified has to be interpreted as "obtainable")". One also has further AAV capsid sequences in the document which can be used make a library of more than one member which would still identify the residues at positions 363 and 427 as singletons according to the method of claim 1. Alternatively, other AAV1 and AAV2 isolates could be taken.

Alternatively, taking WO2005005610 mutants as an example: We choose mutant M235V as the parental AAV. We compare it with the AAV2 sequence it was derived from and with e.g. Q401R (these two isolates are defined as the library). Position

M235V is recognized as a singleton by the method and is changed back to M according to step (c) of the method of claim 1. We thus have parental AAV again (which has an increased transduction efficiency compared to the M235V strain.

V. Reasoned statement on Novelty, Inventive Step and Industrial Applicability

The documents mentioned in the present written opinion / International Preliminary Examination Report are numbered as in the search report, i.e. D1 corresponds to the first document of the search report etc.

- **Novelty (Art.33(2) PCT)**

Claims 1, 8, 13, 15, 16 are anticipated by D2, since the size of the library is unclear and can be considered as comprising one AAV sequence. D2 teaches comparing two sequences and then replacing a segment with two singletons on it in one of the two sequences. This method is technically indistinguishable from the method of the claims objected to, although the wording is of course quite different.

The other claims of invention group 1 appear to be novel.

- **Inventive Step (Art.33(3) PCT)**

Comparison of sequences by alignment to determine which residues can be changed is one of the most basic concepts in protein engineering. D2 already does this, yet only two sequences are compared. However, comparison of multiple sequences rather than two is of course absolutely trivial. Applicants method basically simply involves changing residues that are known to be variable and transfering this variation to other related AAVs. This obviously avoids screening mutations at invariable positions. Introducing variation at positions known to be variable after sequence alignment analysis is commonplace technology (see e.g. US2004/0170611 p.13, col.2, para. [0155]) and is so trivial that it is rarely actually explicitly explained. The SR cannot see any inventive merit in specifying which AAV sequences to align as irrespective of those chosen, the method remains obvious to the skilled person.

- **Industrial Applicability (Art.33(4) PCT)**

For the assessment of the present claim 23 on the question whether it is industrially applicable, no unified criteria exist in the PCT Contracting States. The patentability can also be dependent upon the formulation of the claims. The EPO, for example, does not recognize as industrially applicable the subject-matter of claims to the use of a compound in medical treatment, but may allow, however, claims to a known compound for first use in medical treatment and the use of such a compound for the manufacture of a medicament for a new medical treatment.

Claim 23 relates to subject-matter considered by this Authority to be covered by the provisions of Rule 67.1(iv) PCT. Consequently, no opinion will be formulated with respect to the industrial applicability of the subject-matter of these claims (Article 34(4)(a)(i) PCT).

VIII. **Certain observations**

- **Clarity (Art.6 PCT)**

The terminology singleton should be properly defined in the claims since it evidently has a large number of possible meanings.

The claims largely relate to results to be achieved. Applicant is basically merely changing any variable residue to those different amino acids found at the corresponding position in other isolates. This methodology in no way provides any information on the effect that will be achieved by each change. The skilled person is not told which of the inumerable posibilities to introduce if he wishes to achieve a particular effect. Hence, the claims are not supported (and not enabled) insofar as mutants with particular activities are sought.

The size of a "library" is unclear and is consequently considered to cover from 1 to an infinite number of entries.

Electronic Acknowledgement Receipt

EFS ID:	36474491
Application Number:	16368758
International Application Number:	
Confirmation Number:	7840
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Customer Number:	270
Filer:	Francis J. Coffey
Filer Authorized By:	
Attorney Docket Number:	UPN-R3895D2US
Receipt Date:	02-JUL-2019
Filing Date:	28-MAR-2019
Time Stamp:	13:50:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	HINDERER_2018.pdf	23631840 62b403fe528b903956a0831dcfd88362b5d72bbd	no	14

Warnings:

Information:					
2	Non Patent Literature	Hu-Chuhong_RH10-provides-superior-transgeneexpression-pto.pdf	1768560 b4a25d8f7cc0971ad4363dd0040cc71ad8858780	no	13
Warnings:					
Information:					
3	Non Patent Literature	Huttner_2003_Gene_Ther_10_26_213947.pdf	267190 92554144af055957444772 52dab88cdb67e4009a	no	9
Warnings:					
Information:					
4	Non Patent Literature	Kawamura_The-Lancet_1989-pto.pdf	184277 c85f5ae894cf066ee5937b81c16594405f41ffff	no	1
Warnings:					
Information:					
5	Non Patent Literature	KWONandSCHAFFER.pdf	317144 52d4814d923c53aca107787f42a1081f84ae0308	no	11
Warnings:					
Information:					
6	Non Patent Literature	Le-Guenno_Bernard.pdf	149442 0c529ae104f273a794b980f5d1bdbdbf0f866280	no	1
Warnings:					
Information:					
7	Non Patent Literature	Li_Site-Directed-Mutagenesis-Surface-Exposed-Lysine.pdf	1183870 fbf7ccc5e37e76771764cb112a7756f7887b57c4	no	10
Warnings:					
Information:					
8	Non Patent Literature	Ling_2010_Hum-Gene-Ther_21_1741-1747-pto.pdf	749476 5d0b96d96bc54306f325942c2799c3f238c6bfc1	no	8
Warnings:					
Information:					

9	Non Patent Literature	Ling_2014_Human-gene-Ther_25_1023-1034-pto.pdf	1928533 6814ff8e34192a0067d88131f67ac7c9104aba30	no	12
Warnings:					
Information:					
10	Non Patent Literature	Liu_Neutralizing-antibodies-against-AAV2-AAV5-AAV8.pdf	869422 6cd0c80526a3e6911b2aaf7c182d260c1bb6002f	no	8
Warnings:					
Information:					
11	Non Patent Literature	Loiler.pdf	269309 10c4d07aa84944187a2f64464cebfe020305f0d5	no	8
Warnings:					
Information:					
12	Non Patent Literature	Looker_2008_Bulletin_WHO_86_10_805-813-pto.pdf	1311789 57f7be4d215aa58bd47cbd5aa11e1a5e7a969251	no	9
Warnings:					
Information:					
13	Non Patent Literature	Mao_2018-pto.pdf	1719952 71cf46ab70dac81a32bfe2483f206f78b301f887	no	12
Warnings:					
Information:					
14	Non Patent Literature	Messina_pto.pdf	1607459 09bbca5e4671b3f866bf45fc2b779a03bf72577d	no	12
Warnings:					
Information:					
15	Non Patent Literature	Mimuro_The-Prevalence-Neutralizing-Antibodies-pto.pdf	15335729 a1ecaa56f522fbb7c0ad63b07939db6946c106e9	no	8
Warnings:					
Information:					

16	Non Patent Literature	Moskaleno-pto.pdf	1212761 5379a02cbd64acddb1a9b6662f56c9f25b50f647	no	6
Warnings:					
Information:					
17	Non Patent Literature	Nam-pto.pdf	2560328 184cebc1b4ea0552dcbc6d9306c2bc001e2dcb04	no	12
Warnings:					
Information:					
18	Non Patent Literature	Lytle_uspto.pdf	846746 ecb23b63321a4a2e6b40cefe1d8a8257afc9280c	no	11
Warnings:					
Information:					
19	Non Patent Literature	Mountz_uspto.pdf	6473576 dda62127296c638a0467fe2ff9cf96ddec9804a5	no	3
Warnings:					
Information:					
20	Non Patent Literature	Nicklin_uspto.pdf	9558033 196d3d2fd188f61cc8a496d493fab5ab9cf12914	no	8
Warnings:					
Information:					
21	Non Patent Literature	Nzilambi.pdf	210161 18c7377bcc2ab40eb8065d035bb0e54b540f7b53	no	4
Warnings:					
Information:					
22	Non Patent Literature	Opie.pdf	1647265 88b889d6562ac1c48a784ffcb535ac2ccc6e04da	no	12
Warnings:					
Information:					

23	Non Patent Literature	RIED.pdf	636644 01fb2ff9c91756ea927e2d200136502d162d1282	no	8
Warnings:					
Information:					
24	Non Patent Literature	Shen-pto.pdf	2167848 bc4f30e5560fae995bdd6ac3a09d4a8ce22489f6	no	8
Warnings:					
Information:					
25	Non Patent Literature	ShiandBartlett.pdf	638618 1de051dcb0489c57cfc202ce6b825d610ef2d6ea	no	11
Warnings:					
Information:					
26	Non Patent Literature	Pignataro_uspto.pdf	10683949 3700a6d4bb9d3134b8d6b2de3c20019eb61c3730	no	13
Warnings:					
Information:					
27	Non Patent Literature	Rutledge_Infectious-Clones_uspto.pdf	4151733 01ce011ff6036e076992e44562e8ba67fb2dfb59	no	11
Warnings:					
Information:					
28	Non Patent Literature	Schnell_Activation-innate-immunity_uspto_Part1.pdf	20010238 a621451bfcf8c5d271b18b2dc7d6d36f716a8cd7	no	8
Warnings:					
Information:					
29	Non Patent Literature	Schnell_Activation-innate-immunity_uspto_Part2.pdf	12337809 b2204a3e64ed1f9759032a667f296d50ea9b6b6c	no	7
Warnings:					
Information:					

30	Non Patent Literature	Sonntag_A-viral-assembly-factor-promotesformation.pdf	1605802 84af5cc8be85fc1674c57288a5f50b19c5eaca05	no	12
Warnings:					
Information:					
31	Non Patent Literature	Suhy_2012_Mol-Ther_20_1737-1749-pto.pdf	2326434 831b4bab5edd2b806d640ec402a5b942865fd5ec	no	13
Warnings:					
Information:					
32	Non Patent Literature	Sun.pdf	193429 c640a842ace30c6963321226576ea2d1a23156b4	no	13
Warnings:					
Information:					
33	Non Patent Literature	VANDENBERGHE_2005.pdf	68956 5002da3c4cc81f1de9dcd14ad527802bc57b7c27	no	1
Warnings:					
Information:					
34	Non Patent Literature	VANDENBERGHE_2009.pdf	880052 b9c7a0b715393d8f4d78bdabd068b4a009363357	no	13
Warnings:					
Information:					
35	Non Patent Literature	Vercauteren-pto.pdf	17254469 764192f578df81f177ddb7f80ae0c0e72cb74d93	no	8
Warnings:					
Information:					
36	Non Patent Literature	Wang_Comparative-Study-Liver-Gene-Transfer-With-AAV-pto.pdf	4402504 e0195d4fc6ececcabfcf818bfe47a17f7ca8542f	no	15
Warnings:					
Information:					

37	Non Patent Literature	Tomar.pdf	143478 07ddee8f4aab61f9c8790ccfdf8158fe59a76f22	no	4
Warnings:					
Information:					
38	Non Patent Literature	Warrington.pdf	1672491 4e8f135737709dd9b0424b39dde4bcbc31a56505	no	16
Warnings:					
Information:					
39	Non Patent Literature	Wobus-pto.pdf	2601535 2cf727c0ee334bba119f35294f27f772d9374cb1	no	13
Warnings:					
Information:					
40	Non Patent Literature	Wu_Mutational-Analysis-Adeno-AssociatedVirus-Type-2-Capsid-pto.pdf	2203195 32b36cc59e394592e42ffa6916b3f9f50ef259aa	no	13
Warnings:					
Information:					
41	Non Patent Literature	White_uspto.pdf	567053 a6f3a077d6d5d8291e6a07cc1c1203408746bbf7	no	7
Warnings:					
Information:					
42	Non Patent Literature	Wang_2016_uspto.pdf	649045 11fe62e9bd38149b9a5d644ba86190c4889ff938	no	6
Warnings:					
Information:					
43	Non Patent Literature	Weitzman_Adeno-associated-virus-AAV-Rep_uspto.pdf	5292527 959de880c7872d439344ab11c015f6db5a99f982	no	5
Warnings:					
Information:					

44	Non Patent Literature	Wu_Samulski_2006_Mol-Ther_14_316-pto.pdf	1549017 1d628657486f41852007ba778577936dc34972b7	no	12
Warnings:					
Information:					
45	Non Patent Literature	Xiao_Journal-Virology_73-5_3994-4003_uspto.pdf	16254996 8f29a155905cbef6e8192dfa8a392dd128c3f723	no	10
Warnings:					
Information:					
46	Non Patent Literature	Zadori_Developmental-Cell_Vol_1_291-302_uspto.pdf	17703017 071d9e236f184b0d633bf514c9cd3724e0cde44f	no	12
Warnings:					
Information:					
47	Non Patent Literature	Zhu_2005_uspto.pdf	86688 25b734f790dd4dbba4c1a1596cc8c1c89c711648	no	1
Warnings:					
Information:					
48	Other Reference-Patent/App/Search documents	ISRandWO.pdf	663257 37cb697699849b40e321ce873eb0c89b6f65381b	no	18
Warnings:					
Information:					
49	Other Reference-Patent/App/Search documents	RR679.pdf	330946 9d6870ac76896d6ddbcc573e5ee2a45ef881c471	no	9
Warnings:					
Information:					
50	Other Reference-Patent/App/Search documents	RRresp679.pdf	408082 c833e658d11e21ff66b1190e1869c08d4a41a239	no	11
Warnings:					
Information:					

51	Other Reference-Patent/App/Search documents	NFOA679.pdf	318268 ccda2c4141bc0cdd09844565d5fb65690f9d1c27	no	9
Warnings:					
Information:					
52	Other Reference-Patent/App/Search documents	NFOAresp679.pdf	290348 69765cc63c78ac52bf5ad93404817490fee110d2	no	7
Warnings:					
Information:					
53	Other Reference-Patent/App/Search documents	NFOAresp2679.pdf	177319 3511334a473f5ee62a53b363cca6968999b87436	no	5
Warnings:					
Information:					
54	Other Reference-Patent/App/Search documents	FOA679.pdf	361620 c5aaeec6b0e8a88b9922512fb52e8479ecc4fc9e	no	10
Warnings:					
Information:					
55	Other Reference-Patent/App/Search documents	FOAresp679.pdf	225047 842fc2199e4342e19668a0bd43b703e39a0b76fa	no	8
Warnings:					
Information:					
56	Other Reference-Patent/App/Search documents	AA679.pdf	178613 853c94eec8b4446725668506eea714adf4bdfc0f	no	4
Warnings:					
Information:					
57	Other Reference-Patent/App/Search documents	RCEafterfinalresp679.pdf	282925 8872c48c3f202ccad2870a50818dbd70896138c8	no	8
Warnings:					
Information:					

58	Other Reference-Patent/App/Search documents	NFOA2679.pdf	265711 2d1ba3c1366d3ce00a87241ebdc2a551e17b6271	no	7
Warnings:					
Information:					
59	Other Reference-Patent/App/Search documents	NFOA3679.pdf	198668 08af9d8da75904e73441934171b5eb7a51a67e05	no	7
Warnings:					
Information:					
60	Other Reference-Patent/App/Search documents	NFOA4679.pdf	325488 2e9938311aa4559c51c0de4c52070915bc2887e0	no	8
Warnings:					
Information:					
		Total Files Size (in bytes):	203910681		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Electronic Acknowledgement Receipt

EFS ID:	36475550
Application Number:	16368758
International Application Number:	
Confirmation Number:	7840
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Customer Number:	270
Filer:	Francis J. Coffey
Filer Authorized By:	
Attorney Docket Number:	UPN-R3895D2US
Receipt Date:	02-JUL-2019
Filing Date:	28-MAR-2019
Time Stamp:	14:00:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Other Reference-Patent/App/Search documents	NFOAresp3679.pdf	177188 eed63c5ed88692d0be5cf53c137dfc0f1ec3d890	no	6

Warnings:

Information:					
2	Other Reference-Patent/App/Search documents	NOA679.pdf	355735 f26c4b04b6e04dbe2dc42485d9fbe40c8f2d8243	no	5
Warnings:					
Information:					
3	Other Reference-Patent/App/Search documents	RR671.pdf	308065 75b4bfa71e7bd586049e3c4439a8700fb65756c2	no	8
Warnings:					
Information:					
4	Other Reference-Patent/App/Search documents	RRresp671.pdf	134482 778bd4b96d9fa68dcd94ed4abe1ebd23d1bdbc83	no	6
Warnings:					
Information:					
5	Other Reference-Patent/App/Search documents	NFOA671.pdf	231926 9ff6fb9e88cc73624b0759325190b8b8c45be6f4	no	8
Warnings:					
Information:					
6	Other Reference-Patent/App/Search documents	NFOAresp671.pdf	177309 1326882f6c662ee8d0a256cb4299d519fba8b237	no	6
Warnings:					
Information:					
7	Other Reference-Patent/App/Search documents	R3895D1US_20180625_FinalOA.pdf	614993 4dfb31c71a56458bac90900ca1d81ef10901e1e4	no	13
Warnings:					
Information:					
8	Other Reference-Patent/App/Search documents	FOAresp671.pdf	114070 a874204f88194d85a66890cc4e21986d307305ff	no	5
Warnings:					
Information:					

9	Other Reference-Patent/App/Search documents	NOA671.pdf	414537 2f2c1811f316e72c8c12b1fc9009ddb4abeda9b5	no	8
Warnings:					
Information:					
10	Other Reference-Patent/App/Search documents	NFOA567.pdf	298972 12559fd34237a15ef79afcb0bf08973ba3a58fc1	no	8
Warnings:					
Information:					
11	Other Reference-Patent/App/Search documents	NFOAresp567.pdf	275077 d65fc2af9e56136759e5c180987bc9d4f4187fdb	no	9
Warnings:					
Information:					
12	Other Reference-Patent/App/Search documents	Declaration_Oliver-Danos-PTO.pdf	3390511 523ec2696b04f7734f5f24378b9c339b76cd02c0	no	14
Warnings:					
Information:					
13	Other Reference-Patent/App/Search documents	DECLARATION_ASOKAN.pdf	489579 28a939bf8bb596e34b5c9cc94d3a884ccf947fd2	no	8
Warnings:					
Information:					
14	Other Reference-Patent/App/Search documents	Declaration_Roberto-Calcedo-PTO.pdf	409016 44e69b1898788ec80c6404051c191be478a915cb	no	1
Warnings:					
Information:					
15	Other Reference-Patent/App/Search documents	O2733EP_Opp_Decision.pdf	6705475 d0f5487b96c7bfb579b1950a97ea86047be0279f	no	88
Warnings:					
Information:					

16	Other Reference-Patent/App/Search documents	O2733EP_Summons_to_oral_proceedings.pdf	765761 1e80d920717b71bd42d0290dc903b0bade0a848a	no	11
Warnings:					
Information:					
17	Other Reference-Patent/App/Search documents	TUP18443OP_Further_submission_before_oral_proceedings.pdf	345440 3da6e25b73da3e3ac4d25d806b81dfc8003353b5	no	25
Warnings:					
Information:					
18	Other Reference-Patent/App/Search documents	TUP18443OP_OP01_submission_before_oral_proceedings.pdf	6077158 5a7a83ec5e3d681d2e61930867f065989ae3abd6	no	41
Warnings:					
Information:					
19	Other Reference-Patent/App/Search documents	TUP18443OP_Submission_before_oral_proceedings.pdf	330254 c5d77e1f7d71383cbaa0aea262a68d1fdcb693fe	no	22
Warnings:					
Information:					
20	Other Reference-Patent/App/Search documents	Z1643_EPOPP_S3_submission.pdf	249774 8d0dd24b620f12284a7a8f53744d3a121302217a	no	4
Warnings:					
Information:					
21	Other Reference-Patent/App/Search documents	EP_Notice_and_Statement_in_Opp_2795539_2_Part1.pdf	20120915 4abe53783c9962e32b5e9c84e589be17deb113ae	no	21
Warnings:					
Information:					
22	Other Reference-Patent/App/Search documents	EP_Notice_and_Statement_in_Opp_2795539_2_Part2.pdf	20520313 5ad0807e46cffd738db5541b093d5475375d455b	no	19
Warnings:					
Information:					

23	Other Reference-Patent/App/Search documents	EP_Notice_and_Statement_in_Opp_2795539_2_Part3.pdf	20070155 eecfe9aae24632486585d3fa9389e29cc9bd1d7f	no	15
Warnings:					
Information:					
24	Other Reference-Patent/App/Search documents	Second-declaration-Olivier-Danos-PTO.pdf	14066490 138d5e94a66da2f7d6390189770f59edd0f91f08	no	15
Warnings:					
Information:					
25	Other Reference-Patent/App/Search documents	174_EP_RespOpposition.pdf	299888 f954f361c64164cd06ff1189117637c0e0ab9807	no	33
Warnings:					
Information:					
			Total Files Size (in bytes):	96943083	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/368,758	03/28/2019	1636	2180	UPN-R3895D2US	1	1

CONFIRMATION NO. 7840

CORRECTED FILING RECEIPT

270
HOWSON & HOWSON LLP
350 Sentry Parkway
Building 620, Suite 210
Blue Bell, PA 19422

OC000000109343285

Date Mailed: 07/03/2019

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Luk VANDENBERGHE, Weston, MA;
Guangping GAO, Westborough, MA;
James M. WILSON, Philadelphia, PA;

Applicant(s)

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA;

Assignment For Published Patent Application

The Trustees of the University of Pennsylvania

Power of Attorney: The patent practitioners associated with Customer Number 00270

Domestic Priority data as claimed by applicant

This application is a DIV of 14/624,671 02/18/2015 PAT 10301648
which is a DIV of 11/887,679 10/02/2007 PAT 8999678
which is a 371 of PCT/US2006/013375 04/07/2006
which claims benefit of 60/733,497 11/04/2005
and claims benefit of 60/669,083 04/07/2005

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 04/05/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/368,758**

Projected Publication Date: 07/18/2019

Non-Publication Request: No

Early Publication Request: No

Title

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Preliminary Class

514

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor

community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US

CONFIRMATION NO. 7840

270
HOWSON & HOWSON LLP
350 Sentry Parkway
Building 620, Suite 210
Blue Bell, PA 19422

PUBLICATION NOTICE

OC000000109738514

Title:METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Publication No.US-2019-0218574-A1
Publication Date:07/18/2019

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	2

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	144.	US-2015/0023924	01-22-2015	High et al.	
	145.	US-2012/0322861	12-20-2012	Byrne et al.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. this collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	2	of	2	Attorney Docket Number	UPN-R3895D2US

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	146.	Non-Final Office Action issued on US Patent Application No. 15/796,115, dated August 21, 2019.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. No.	: 16/368,758	Confirmation No.: 7840
Applicant	: The Trustees of the University of Pennsylvania	
Filed	: March 28, 2019	
TC/A.U.	: 1636	
Examiner	: Catherine S. Hibbert	
Customer No.	: 00270	
Title	: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SECOND INFORMATION DISCLOSURE STATEMENT

Sir:

Applicant submits to the Examiner the attached document listings and this paper pursuant to 37 CFR §§1.56 and 1.97-1.98. The forms and documents are attached.

This Information Disclosure Statement is submitted before the receipt of a first Office Action on the merits. Therefore, no fees are believed due.

The Director is hereby authorized to charge any deficiency in any fees due with the filing of this paper or credit any overpayment in any fees to our Deposit Account Number 08-3040.

REMARKS

The following information is provided in accordance with the requirement of 37 CFR §§1.97-1.98. In the event that the Examiner considers the inclusion of these items on the attached forms inappropriate and strikes out the citation on the forms, Applicant requests that the Examiner indicate consideration of the attached documents in the body of the next paper, *i.e.*, Office Action or Notice of Allowability. Because this information disclosure statement (IDS) is in accordance with the provisions of 37 CFR §§1.97-1.98, consideration of these documents by the Examiner is required (See MPEP §609).

The Examiner is respectfully requested to consider the documents identified on the attached forms during the course of examination of this application.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: November 22, 2019

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
325 Sentry Parkway East
Five Sentry Parkway, Suite 160
Blue Bell, PA 19422
Telephone: 215-540-9211
Facsimile: 215-540-5818

Electronic Acknowledgement Receipt

EFS ID:	37829154
Application Number:	16368758
International Application Number:	
Confirmation Number:	7840
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Customer Number:	270
Filer:	Colleen M. Schaller
Filer Authorized By:	
Attorney Docket Number:	UPN-R3895D2US
Receipt Date:	22-NOV-2019
Filing Date:	28-MAR-2019
Time Stamp:	15:12:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Other Reference-Patent/App/Search documents	R3895C2US_20190821_NFOA.pdf	951669 8064860d88b71929cc54fc8084b4e88f474c1203	no	23

Warnings:

Information:					
2		R3895D2US_20191122_Second_IDS.pdf	185872 ab71646dea815dfc63c9809f7c23f0554992adbe	yes	4

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Information Disclosure Statement (IDS) Form (SB08)	3	4
Transmittal Letter	1	2

Warnings:	
Information:	
Total Files Size (in bytes):	1137541

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/368,758	Confirmation No.:	7840
Applicant	:	The Trustees of the University of Pennsylvania		
Filed	:	March 28, 2019		
TC/A.U.	:	1639		
Examiner	:	Heather Calamita		
Customer No.	:	00270		
Title	:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Sir:

Please enter the following into the record.

Amendments to the Claims begin on page 2.

Remarks begin on page 11.

Electronic Patent Application Fee Transmittal

Application Number:	16368758
Filing Date:	28-Mar-2019
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Filer:	Francis J. Coffey
Attorney Docket Number:	UPN-R3895D2US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	23	100	2300
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	9	460	4140
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**6440**

Electronic Acknowledgement Receipt

EFS ID:	38279965
Application Number:	16368758
International Application Number:	
Confirmation Number:	7840
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Customer Number:	270
Filer:	Francis J. Coffey
Filer Authorized By:	
Attorney Docket Number:	UPN-R3895D2US
Receipt Date:	13-JAN-2020
Filing Date:	28-MAR-2019
Time Stamp:	15:52:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$6440
RAM confirmation Number	E20201CF54362219
Deposit Account	083040
Authorized User	Francis Coffey

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		R3895D2US_20200113_Prelim Amend.pdf	114954 c1dd53d2bae23cdadc44f286e12020eece563b79	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	11	11
	Claims	2	10
	Preliminary Amendment	1	1

Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32110 c38777f40fb165f4b6df5ed91af9215e849ae199	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	147064	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

REMARKS

After entry of this paper, claims 1-4, 6-10, and 12-45 are pending. Claims 5 and 11 have been cancelled. Claim 1 has been amended to address minor informalities. Claims 14-45 are new. Support for these new claims can be found throughout the specification. No new matter is added.

The Director is hereby authorized to charge any deficiency in any fee due with the filing of this paper, or credit any overpayment in this fee to our Deposit Account No. 08-3040.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: January 13, 2020

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
325 Sentry Parkway
5 Sentry East, Suite 160
Blue Bell, PA 19422
Telephone: 215-540-9211
Facsimile: 215-540-5818

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1(Currently Amended). An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46) or a sequence having at least 95% identity to~~:~~ amino acids 1 to 738 of SEQ ID NO:4, wherein amino acid 665 is N~~;~~.

2 (Previously Presented). The AAV according to claim 1, wherein the AAV vp1 capsid protein is encoded by the nucleic acid sequence of SEQ ID NO: 22.

3 (Previously Presented). The AAV according to claim 1, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the amino acids 1 to 738 of SEQ ID NO: 4.

4 (Previously Presented). A method of generating a recombinant AAV comprising an AAV capsid comprising the steps of culturing a host cell containing: (a) a nucleic acid sequence encoding an AAV capsid protein selected from SEQ ID NO: 4 or a sequence sharing at least 95% identity therewith, wherein amino acid 665 is N; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid.

5 (Cancelled).

6 (Previously Presented). The AAV according to claim 1, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

7 (Previously Presented). A composition comprising the AAV according to claim 1 and a physiologically compatible carrier.

8 (Previously Presented). An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have the sequence of amino acids 1 to 738 of SEQ ID NO: 5 (AAVrh73) or a sequence having at least 95% identity to amino acids 1 to 738 of SEQ ID NO: 5, wherein amino acid 665 is N.

9 (Previously Presented). The AAV according to claim 8, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the amino acids 1 to 738 of SEQ ID NO: 5.

10 (Previously Presented). A method of generating a recombinant AAV comprising an AAV capsid comprising the steps of culturing a host cell containing: (a) a nucleic acid sequence encoding an AAV capsid protein selected from SEQ ID NO: 5 or a sequence sharing at least 95% identity therewith, wherein amino acid 665 is N; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid.

11 (Cancelled).

12 (Previously Presented). The AAV according to claim 8, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

13 (Previously Presented). A composition comprising the AAV according to claim 8 and a physiologically compatible carrier.

14 (New). An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46) or a sequence having at least 95% identity to amino acids 1 to 738 of SEQ ID NO: 4, wherein amino acid 665 is T.

15 (New). The AAV according to claim 14, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the amino acids 1 to 738 of SEQ ID NO: 4.

16 (New). The AAV according to claim 14, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

17 (New). A composition comprising the AAV according to claim 14 and a physiologically compatible carrier.

18 (New). A method of generating a recombinant AAV comprising an AAV capsid comprising the steps of culturing a host cell containing: (a) a nucleic acid sequence encoding an AAV capsid protein selected from SEQ ID NO: 4 or a sequence sharing at least 95% identity therewith, wherein amino acid 665 is T; (b) a functional rep

gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid.

19 (New). An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have the sequence of amino acids 1 to 738 of SEQ ID NO: 5 (AAVrh73) or a sequence having at least 95% identity to amino acids 1 to 738 of SEQ ID NO: 5, wherein amino acid 665 is T.

20 (New). The AAV according to claim 19, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the amino acids 1 to 738 of SEQ ID NO: 5.

21 (New). The AAV according to claim 19, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

22 (New). A composition comprising the AAV according to claim 19 and a physiologically compatible carrier.

23 (New). A method of generating a recombinant AAV comprising an AAV capsid comprising the steps of culturing a host cell containing: (a) a nucleic acid sequence encoding an AAV capsid protein selected from SEQ ID NO: 5 or a sequence sharing at least 95% identity therewith, wherein amino acid 665 is T; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid.

24 (New). The AAV according to claim 1, wherein the AAV vp1 capsid protein has one or more amino acid modifications in the amino acids 1 to 738 of SEQ ID NO: 4 selected from: N14T, E21Q, D24A, D24K, A29P, A29V, K31Q, K31P, A34P, N35A, Q36E, Q37R, K38H, Q39K, G42R, G42S, A67E, Q81K, Q81R, K84E, K84D, K84Q, A85Q, A85S, R92K, Q105K, G135A, G135P, A136V, P148Q, P148H, Q151A, Q151V, S153E, T158S, I160T, I160V, K163T, K163S, K163N, K163A, S180A, E181D, I189L, E191Q, S198A, S198G, V199L, S201P, S201T, G202T, G202N, A206S, A206T, G208S, S224N, L236M, N263S, G264E, G264A, G264Q, T265S, G267A, G267T, G267S, S269A, T270S, T274H, S315R, S315N, E330D, K333T, I343V, I375V, S413Q, S413E, S413T, Q452N, S453N, S453T, T454A, T454Q, T454P, G455S, A458Q, A458T, G459N, G459Q, G459S, G459T, T460M, T460N, T460Q, Q461R, Q461K, Q461S, Q462T, Q462E, Q462D, Q462R, L464G, L464Q, P470A, N472T, N472S, N472G, N472D, M473I, S474A, S474R, A475N, A475L, A475E, A475V, A475D, A477P, A477S, T493K, L495I, L495T, L495A, L495K, L495S, S496G, S496N, S496D, S496T, S496A, Q497S, Q497D, N502D, N502E, F503Y, A504T, A504P, A504S, V524I, V524T, V524P, T528S, N529H, D534E, R535Q, R535K, S539V, S539M, S539I, S539Q, I542T, I542N, I542V, M544C, M544V, M544I, A550T, A550S, G551A, G551N, G551T, G551E, D553S, D553T, Y557L, Y557I, S558D, S558E, N559D, N559S, N559K, L562M, L562I, S564N, S564D, K569R, A570P, A570T, V581I, V581T, V581S, A583S, D584N, D584S, D584V, D584T, Q588N, Q588S, Q588G, Q588A, Q588R, Q589T, Q589S, Q589A, Q589G, T591A, T591R, A592G, A592D, A592Q, P593A, I594Q, I594S, I594T, I594A, V595I, V595T, G596E, G596S, G596Q, G596A, A597T, A597N, A597V, A597D, S600A, S600H, S600N, S600V, S600T, A603V, N611D, N630H, D659N, P661S, A663N, A663E, A663V, A663T, Q666S, Q666P, Q666A, L669F, N670A, Y708E, Y708A, Y708N, T711A, T711N, T711V, A716T, N718D, E720Q, E720D, or E720N.

25 (New). The AAV according to claim 1, wherein the heterologous gene encodes an ornithine transcarbamylase, arginosuccinate synthetase, arginosuccinate lyase, arginase, fumarylacetacetate hydrolase, carbamoyl phosphate synthetase I, phenylalanine

hydroxylase, alpha-1 antitrypsin, glucose-6-phosphatase, porphobilinogen deaminase, cystathione beta-synthase, branched chain ketoacid decarboxylase, isovaleryl-coA dehydrogenase, propionyl-CoA carboxylase, methylmalonyl-CoA mutase, glutaryl-CoA dehydrogenase (GCDH), betaglucosidase, pyruvate carboxylate, hepatic phosphorylase, phosphorylase kinase, β-glucuronidase (GUSB), or glycine decarboxylase, a low density lipoprotein (LDL) receptor, high density lipoprotein (HDL) receptor, very low density lipoprotein (VLDL) receptor, scavenger receptor, glucocorticoid receptor, estrogen receptor, Vitamin D receptor, nuclear receptor, cystic fibrosis transmembrane regulator (CFTR) sequence, Factor IX or variants thereof, Factor VIII or variants thereof, a dystrophin gene product, or an immunoglobulin.

26 (New). The AAV according to claim 25, wherein the immunoglobulin comprises IgG, IgM, IgA, IgD, IgE, a chimeric immunoglobulin, a humanized antibody, and/or a single chain antibody.

27 (New). The AAV according to claim 25, wherein the dystrophin gene product is a mini-dystrophin or micro-dystrophin.

28 (New). A cultured host cell containing the recombinant nucleic acid molecule encoding an AAV vp1 capsid protein having a sequence comprising amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46) or a sequence at least 95% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 4, wherein amino acid 665 is N; and wherein the recombinant nucleic acid molecule further comprises a heterologous non-AAV sequence.

29 (New). The cultured host cell according to claim 28, which further comprises a rep gene.

30 (New). The cultured host cell according to claim 28, wherein the rep gene is from AAV2.

31 (New). The cultured host cell according to claim 28, wherein the recombinant nucleic acid molecule is a plasmid.

32 (New). A cultured host cell containing the recombinant nucleic acid molecule encoding an AAV vp1 capsid protein having a sequence comprising amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46) or a sequence at least 95% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 4, wherein amino acid 665 is T; and wherein the recombinant nucleic acid molecule further comprises a heterologous non-AAV sequence.

33 (New). The cultured host cell according to claim 32, which further comprises a rep gene.

34 (New). The cultured host cell according to claim 32, wherein the rep gene is from AAV2.

35 (New). The cultured host cell according to claim 32, wherein the recombinant nucleic acid molecule is a plasmid.

36 (New). A cultured host cell containing a recombinant nucleic acid molecule comprising

(a) nucleotides 1 to 2217 of SEQ ID NO: 22 or a sequence at least 98% identical to nucleotides 1 to 2217 of SEQ ID NO: 22 that encodes an AAV capsid protein;

(b) nucleotides 412 to 2217 of SEQ ID NO: 22 or a sequence at least 98% identical to nucleotides 412 to 2217 of SEQ ID NO: 22 that encodes an AAV capsid protein; or

(c) nucleotides 610 to 2217 of SEQ ID NO: 22 or a sequence at least 98% identical to nucleotides 610 to 2217 of SEQ ID NO: 22 that encodes an AAV capsid protein,

wherein the recombinant nucleic acid molecule further comprises a heterologous non-AAV sequence.

37 (New). The cultured host cell according to claim 36, wherein said nucleotide sequence is at least 99% identical to nucleotides 1 to 2217 of SEQ ID NO: 22.

38 (New). A cultured host cell containing the recombinant nucleic acid molecule encoding an AAV vp1 capsid protein having a sequence comprising amino acids 1 to 738 of SEQ ID NO: 5 (AAVrh73) or a sequence at least 95% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 5, wherein amino acid 665 is N; and wherein the recombinant nucleic acid molecule further comprises a heterologous non-AAV sequence.

39 (New). The cultured host cell according to claim 38, which further comprises a rep gene.

40 (New). The cultured host cell according to claim 38, wherein the rep gene is from AAV2.

41 (New). The cultured host cell according to claim 38, wherein the recombinant nucleic acid molecule is a plasmid.

42 (New). A cultured host cell containing the recombinant nucleic acid molecule encoding an AAV vp1 capsid protein having a sequence comprising amino acids 1 to 738 of SEQ ID NO: 5 (AAVrh73) or a sequence at least 95% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 5, wherein amino acid 665 is T; and wherein the recombinant nucleic acid molecule further comprises a heterologous non-AAV sequence.

43 (New). The cultured host cell according to claim 42, which further comprises a rep gene.

44 (New). The cultured host cell according to claim 42, wherein the rep gene is from AAV2.

45 (New). The cultured host cell according to claim 42, wherein the recombinant nucleic acid molecule is a plasmid.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/368,758	Filing Date 03/28/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	01/13/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 43	Minus	** 20	= 23		x $100 =	2300
	Independent (37 CFR 1.16(h))	* 13	Minus	*** 4	= 9		x $460 =	4140
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	6440

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/LAVINIA D JOHNSON/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

270 7590 07/28/2021

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER
HIBBERT, CATHERINE S

ART UNIT	PAPER NUMBER
1636	

NOTIFICATION DATE	DELIVERY MODE
07/28/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ckodroff@howsoniplaw.com
docketing@howsoniplaw.com

Office Action Summary	Application No. 16/368,758	Applicant(s) VANDENBERGHE et al.	
	Examiner CATHERINE S HIBBERT	Art Unit 1636	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-4,6-10 and 12-45 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☐ Claim(s) _____ is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☑ Claim(s) 1-4,6-10 and 12-45 are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☑ Other: PTO-2301.

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Claims 1-4, 6-10, 12-45 are pending.

Nucleotide and/or Amino Acid Sequence Disclosures

Please see attached PTO-2301 Notice to Comply. Briefly, the date of creation and the size of the ASCII text file in bytes is missing from the Incorporation by Reference Statement regarding the Sequence Listing. (Page 1 of specification).

DETAILED ACTION

Election/Restriction

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-4, 6-7, 14-18, and 24-37, drawn to an adeno-associated virus comprising an AAV capsid and a minigene having AAV ITRs and a heterologous gene, wherein the AAV capsid comprises AAV vp1 proteins having a sequence at least 95% identical to amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), and method of making such AAV, classified in C12N 15/861; A61K 48/0091; A61K 48/00.

II. Claims 8-10, 12-13, 19-23, and 38-46, drawn to an adeno-associated virus comprising an AAV capsid and a minigene having AAV ITRs and a heterologous gene, wherein the AAV capsid comprises AAV vp1 proteins having a sequence at least 95% identical to amino acids 1 to 738 of SEQ ID NO: 5 (AAVrh73), and method of making such AAV, classified in C12N 15/861; A61K 48/0091; A61K 48/00.

The inventions are independent or distinct, each from the other because:

Inventions I and II are directed to related products and methods. The related inventions are distinct if: (1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants. See MPEP § 806.05(j). In the instant case, the inventions as claimed can have a materially different design. The products and method of Group I require a sequence at least 95% identical to amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46) which is not required of Group II, whereas, the products and method of Group II require a sequence at least 95% identical to amino acids 1 to 738 of SEQ ID NO: 5 (AAVrh73) which is not required of Group I. Furthermore, the inventions as claimed do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants.

Restriction for examination purposes as indicated is proper because all the inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because one or more of the following reasons apply:

- the inventions have acquired a separate status in the art in view of their different classification
- the inventions have acquired a separate status in the art due to their recognized divergent subject matter
- the inventions require a different field of search (e.g., searching different classes/subclasses or electronic resources, or employing different search strategies or search queries).

Applicant is advised that the reply to this requirement to be complete must include (i) an election of an invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

Species Election

This application contains claims directed to the following patentably distinct species:

Regarding Group I: Applicants must choose one single type of vp1 amino acid sequence from among the following:

a) wherein the amino acid at position 665 is N or T (for example, choose from between claim 1 and claim 14).

-If applicant's election includes claim 1, applicant must further choose one single type of modification (or one single grouping of patentably indistinct modifications) from among those listed in claim 24.

- If applicant's election includes claim 1, applicant must further choose one single type of gene (or one single grouping of patentably indistinct genes) from among those listed in claim 25.

Regarding Group II: Applicants must choose one single type of vp1 amino acid sequence from among the following:

b) wherein the amino acid at position 665 is N or T (for example, choose from between claim 8 and claim 19).

The species are independent or distinct because the claims to the different species recite the mutually exclusive characteristics of such species. For example, the species require different amino acid sequence structures (or different nucleic acid sequence structures encoding the different amino acid sequence structures) which are mutually exclusive of each other. In addition, these species are not obvious variants of each other based on the current record.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species, or a single grouping of patentably indistinct species, for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 1 is generic to the types of modifications (claim 24) and types of genes (claim 25).

There is a search and/or examination burden for the patentably distinct species as set forth above because at least the following reason(s) apply:

- the species or groupings of patentably indistinct species have acquired a separate status in the art in view of their different classification
- the species or groupings of patentably indistinct species have acquired a separate status in the art due to their recognized divergent subject matter
- the species or groupings of patentably indistinct species require a different field of search (e.g., searching different classes/subclasses or electronic resources, or employing different search strategies or search queries).

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected species or grouping of patentably indistinct species**, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

The election may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the election of species requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected species or grouping of patentably indistinct species.

Should applicant traverse on the ground that the species, or groupings of patentably indistinct species from which election is required, are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing them to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the species unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other species.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be corrected in compliance with 37 CFR 1.48(a) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. A request to correct inventorship under 37 CFR 1.48(a) must be accompanied by an application data sheet in accordance with 37 CFR 1.76 that identifies each inventor by his or her legal name and by the processing fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CATHERINE S HIBBERT whose telephone number is (571)270-3053. The examiner can normally be reached on M-F 8:00-5:00.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an

interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mindy Brown can be reached on 571-272-2813. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CATHERINE S HIBBERT/
Primary Examiner, Art Unit 1636

Notice to Comply	Application No. 16/368,758	Applicant(s) VANDENBERGHE et al.	
	Examiner CATHERINE S HIBBERT	Art Unit 1636	AIA (FITF) Status No

NOTICE TO COMPLY WITH REQUIREMENTS FOR PATENT APPLICATIONS CONTAINING NUCLEOTIDE SEQUENCE AND/OR AMINO ACID SEQUENCE DISCLOSURES

Applicant must file the items indicated below within the time period set the Office action to which the Notice is attached to avoid abandonment under 35 U.S.C. § 133 (extensions of time may be obtained under the provisions of 37 CFR 1.136(a)).

The nucleotide and/or amino acid sequence disclosure contained in this application does not comply with the requirements for such a disclosure as set forth in 37 C.F.R.1.8211.825 for the following reason(s):

☐ 1. This application clearly fails to comply with the requirements of 37 C.F.R. 1.821-1.825. Applicant's attention is directed to the final rulemaking notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990).
If the effective filing date is on or after July 1, 1998, see the final rulemaking notice published at 63 FR 29620 (June 1, 1998) and 1211 OG 82 (June 23, 1998).

☐ 2.This application does not contain, as a separate part of the disclosure on paper copy, a “Sequence Listing” as required by 37 C.F.R.1.821(c).

☐ 3. A copy of the “Sequence Listing” in computer readable form has not been submitted as required by 37 C.F.R.1.821(e).

☐ 4. A copy of the “Sequence Listing” in computer readable form has been submitted. However, the content of the computer readable form does not comply with the requirements of 37 C.F.R.1.822 and/or 1.823, as indicated on the attached copy of the marked -up “Raw Sequence Listing.”

☐ 5. The computer readable form that has been filed with this application has been found to be damaged and/or unreadable as indicated on the attached CRF Diskette Problem Report. A Substitute computer readable form must be submitted as required by 37 C.F.R.1.825(d).

☐ 6. The paper copy of the “Sequence Listing” is not the same as the computer readable form of the “Sequence Listing” as required by 37 C.F.R.1.821(e).

☑ 7. Other: See Continuation Sheet

Applicant Must Provide:

☐ An initial or substitute computer readable form (CRF) copy of the “Sequence Listing”.

☐ An initial or substitute paper copy of the “Sequence Listing”, **as an amendment specifically directing its entry into the application.**

☐ A statement that the content of the paper and computer readable copies are the same and, where applicable , include no new matter, as required by 37 C.F.R.1.821(e) or 1.821(f) or 1.821(g) or 1.825(b) or 1.825(d).

For questions regarding compliance to these requirements, please contact:

For Rules Interpretation, call (571) 270-5300
For CRF Submission Help, call (571) 272-2510
PatentIn Software Program Support
Technical Assistance.1-866-217-9197
PatentIn Software is Available At www.USPTO.gov

PLEASE RETURN A COPY OF THIS NOTICE WITH YOUR REPLY

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1636	

Continuation of 7. Other: The statement regarding Incorporation by Reference on page 1 of the specification is missing some required elements, specifically (ii) the date of creation and iii) the size of the ASCII text file in bytes) see below:

Nucleotide and/or Amino Acid Sequence Disclosures

Items 1) and 2) provide general guidance related to requirements for sequence disclosures.

1) 37 CFR 1.821(c) requires that patent applications which contain disclosures of nucleotide and/or amino acid sequences that fall within the definitions of 37 CFR 1.821(a) must contain a "Sequence Listing," as a separate part of the disclosure, which presents the nucleotide and/or amino acid sequences and associated information using the symbols and format in accordance with the requirements of 37 CFR 1.821 - 1.825. This "Sequence Listing" part of the disclosure may be submitted:

a) via EFS-Web (see Section I.1 of the Legal Framework for EFS-Web (https://www.uspto.gov/patents-application-process/filing-online/legal-framework-efs-web), hereinafter "Legal Framework") as an ASCII text file, together with an incorporation-by-reference of the material in the ASCII text file in a separate paragraph of the specification identifying:

i) the name of the ASCII text file;

ii) the date of creation; and

iii) the size of the ASCII text file in bytes;

b) on compact disc(s) in duplicate according to 37 CFR 1.52(e)(1)(ii) and (4), labeled according to 37 CFR 1.52(e)(6), together with a statement that the duplicate compact discs are identical and an incorporation-by-reference of the material in the ASCII text file according to 37 CFR 1.52(e)(5) in a separate paragraph of the specification identifying:

i) the name of the ASCII text file;

ii) the date of creation; and

iii) the size of the ASCII text file in bytes;

c) via EFS-Web as a PDF (not recommended); or

d) on paper.

2) 37 CFR 1.821(e) requires that a copy of the "Sequence Listing" must also be submitted in computer readable form (CRF) in accordance with the requirements of 37 CFR 1.824.

a) If a "Sequence Listing" ASCII text file submitted via EFS-Web on the application filing date complies with the requirements of 37 CFR 1.824(a)(2) - (6) and (b), and applicant has not filed a "Sequence Listing" as a PDF, the text file will serve as both the "Sequence Listing" required by 37 CFR 1.821(c) and the CRF required by 37 CFR 1.821(e), and the statement of identity under the "Legal Framework" is not required.

b) If the "Sequence Listing" required by 37 CFR 1.821(c) is filed via EFS-Web as a PDF, then the "Legal Framework" requires submission of a statement that the "Sequence Listing" content of the PDF copy and the ASCII text file copy submitted via EFS-Web are identical.

c) If the "Sequence Listing" required by 37 CFR 1.821(c) is filed on paper or compact disc, then 37 CFR 1.821(f) requires submission of a statement that the "Sequence Listing" content of the paper or compact disc copy and the CRF are identical.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/368,758	Filing Date 03/28/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	01/28/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 19	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/KATARA D SINGLETARY/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/368,758	Confirmation No.:	7840
Applicant	:	The Trustees of the University of Pennsylvania		
Filed	:	March 28, 2019		
TC/A.U.	:	1636		
Examiner	:	Catherine S Hibbert		
Customer No.	:	00270		
Title	:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE AND AMENDMENT

Sir:

This paper is in response to the Restriction Requirement dated July 28, 2021, setting a two-month period for response. A Petition to extend the period for response for four (4) months from September 28, 2021 to January 28, 2022 is being filed herewith.

Kindly enter the following:

Election begins on page 2.

Amendments to the Claims begin on page 4.

Remarks/Arguments begin on page 9.

ELECTION

The Examiner has required election from the following allegedly patentably distinct inventions. These are as follows:

Group I: claims 1-4, 6-7, 14-18, and 24-37, drawn to an adeno-associated virus comprising an AAV capsid and a minigene having AAV ITRs and a heterologous gene, wherein the AAV capsid comprises AAV vp1 proteins and having a sequence at least 95% identical to amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), and method of making such AAV, classified in C12N 15/861; A61K 48/0091; A61K 48/00; and

Group II: claims 8-10, 12-13, 19-23, and 38-46, drawn to an adeno-associated virus comprising an AAV capsid and a minigene having AAV ITRs and a heterologous gene, wherein the AAV capsid comprises AAV vp1 proteins having a sequence at least 95% identical to amino acids 1 to 738 of SEQ ID NO: 5 (AAVrh73), and method of making such AAV, classified in C12N 15/861; A61K 48/0091; A61K 48/00.

The Examiner has further required election from the following allegedly patentably distinct species:

If Group I is elected, Applicants must choose a single type of vp1 amino acid sequence from among the following: a) wherein the amino acid at position 665 is N or T, b) a single type of modification from those listed in claim 24, and c) one single type of gene from those listed in claim 25.

If Group II is elected, Applicants must choose one single type of vp1 amino acid sequence from among the following: wherein the amino acid at position 665 is N or T.

Applicant hereby elects:

A) the claims of the Group I invention, i.e., claims 1-4, 6-7, and 24-37, drawn to an adeno-associated virus comprising an AAV capsid and a minigene having AAV ITRs and a heterologous gene, wherein the AAV capsid comprises AAV vp1 proteins and having a sequence at least 95% identical to amino acids 1 to 738 of SEQ ID NO: 4

(AAVrh46), and method of making such AAV, classified in C12N 15/861; A61K 48/0091; A61K 48/00;

B) the vp1 amino acid sequence wherein the amino acid at position 665 is N, i.e., the subject matter of new claim 46;

C) the modification is A67E; and

D) the gene dystrophin.

Claims 1-4, 6-7, 24-31, 36-37, and 46-48 are believed to read on the election of Group I invention. Claims 46-48 are believed to read on the election of B, with the remaining claims being generic to that election. Claims 24 is believed to read on the election of C, with the remaining claims being generic to that election. Claims 25 and 27 are believed to read on the election of D, with claims 1-4, 6-7, 24, 28, and 46-48 being generic to the election of D.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1(Currently Amended). An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have i) the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), or ii) a sequence having at least 95% identity to amino acids 1 to 738 of SEQ ID NO:4, wherein amino acid 665 is not S[[N]].

2 (Previously Presented). The AAV according to claim 1, wherein the AAV vp1 capsid protein is encoded by the nucleic acid sequence of SEQ ID NO: 22.

3 (Previously Presented). The AAV according to claim 1, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the amino acids 1 to 738 of SEQ ID NO: 4.

4 (Currently Amended). A method of generating a recombinant AAV comprising an AAV capsid comprising the steps of culturing a host cell containing: (a) a nucleic acid sequence encoding an AAV capsid protein selected from SEQ ID NO: 4 or a sequence sharing at least 95% identity therewith, wherein amino acid 665 is [[N]]not S; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid.

5 (Cancelled).

6 (Previously Presented). The AAV according to claim 1, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

7 (Previously Presented). A composition comprising the AAV according to claim 1 and a physiologically compatible carrier.

8-23 (Canceled).

24 (Previously Presented). The AAV according to claim 1, wherein the AAV vp1 capsid protein has one or more amino acid modifications in the amino acids 1 to 738 of SEQ ID NO: 4 selected from: N14T, E21Q, D24A, D24K, A29P, A29V, K31Q, K31P, A34P, N35A, Q36E, Q37R, K38H, Q39K, G42R, G42S, A67E, Q81K, Q81R, K84E, K84D, K84Q, A85Q, A85S, R92K, Q105K, G135A, G135P, A136V, P148Q, P148H, Q151A, Q151V, S153E, T158S, I160T, I160V, K163T, K163S, K163N, K163A, S180A, E181D, I189L, E191Q, S198A, S198G, V199L, S201P, S201T, G202T, G202N, A206S, A206T, G208S, S224N, L236M, N263S, G264E, G264A, G264Q, T265S, G267A, G267T, G267S, S269A, T270S, T274H, S315R, S315N, E330D, K333T, I343V, I375V, S413Q, S413E, S413T, Q452N, S453N, S453T, T454A, T454Q, T454P, G455S, A458Q, A458T, G459N, G459Q, G459S, G459T, T460M, T460N, T460Q, Q461R, Q461K, Q461S, Q462T, Q462E, Q462D, Q462R, L464G, L464Q, P470A, N472T, N472S, N472G, N472D, M473I, S474A, S474R, A475N, A475L, A475E, A475V, A475D, A477P, A477S, T493K, L495I, L495T, L495A, L495K, L495S, S496G, S496N, S496D, S496T, S496A, Q497S, Q497D, N502D, N502E, F503Y, A504T, A504P, A504S, V524I, V524T, V524P, T528S, N529H, D534E, R535Q, R535K, S539V, S539M, S539I, S539Q, I542T, I542N, I542V, M544C, M544V, M544I, A550T, A550S, G551A, G551N, G551T, G551E, D553S, D553T, Y557L, Y557I, S558D, S558E, N559D, N559S, N559K, L562M, L562I, S564N, S564D, K569R, A570P, A570T, V581I, V581T, V581S,

A583S, D584N, D584S, D584V, D584T, Q588N, Q588S, Q588G, Q588A, Q588R, Q589T, Q589S, Q589A, Q589G, T591A, T591R, A592G, A592D, A592Q, P593A, I594Q, I594S, I594T, I594A, V595I, V595T, G596E, G596S, G596Q, G596A, A597T, A597N, A597V, A597D, S600A, S600H, S600N, S600V, S600T, A603V, N611D, N630H, D659N, P661S, A663N, A663E, A663V, A663T, Q666S, Q666P, Q666A, L669F, N670A, Y708E, Y708A, Y708N, T711A, T711N, T711V, A716T, N718D, E720Q, E720D, or E720N.

25 (Previously Presented). The AAV according to claim 1, wherein the heterologous gene encodes an ornithine transcarbamylase, arginosuccinate synthetase, arginosuccinate lyase, arginase, fumarylacetacetate hydrolase, carbamoyl phosphate synthetase I, phenylalanine hydroxylase, alpha-1 antitrypsin, glucose-6-phosphatase, porphobilinogen deaminase, cystathione beta-synthase, branched chain ketoacid decarboxylase, isovaleryl-coA dehydrogenase, propionyl-CoA carboxylase, methylmalonyl-CoA mutase, glutaryl-CoA dehydrogenase (GCDH), betaglucosidase, pyruvate carboxylate, hepatic phosphorylase, phosphorylase kinase, β-glucuronidase (GUSB), or glycine decarboxylase, a low density lipoprotein (LDL) receptor, high density lipoprotein (HDL) receptor, very low density lipoprotein (VLDL) receptor, scavenger receptor, glucocorticoid receptor, estrogen receptor, Vitamin D receptor, nuclear receptor, cystic fibrosis transmembrane regulator (CFTR) sequence, Factor IX or variants thereof, Factor VIII or variants thereof, a dystrophin gene product, or an immunoglobulin.

26 (Previously Presented). The AAV according to claim 25, wherein the immunoglobulin comprises IgG, IgM, IgA, IgD, IgE, a chimeric immunoglobulin, a humanized antibody, and/or a single chain antibody.

27 (Previously Presented). The AAV according to claim 25, wherein the dystrophin gene product is a mini-dystrophin or micro-dystrophin.

28 (Currently Amended). A cultured host cell containing ~~the~~a recombinant nucleic acid molecule encoding an AAV vp1 capsid protein having i) a sequence comprising amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), or ii) a sequence at least 95% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 4, wherein amino acid 665 is ~~N~~ not S; and wherein the recombinant nucleic acid molecule further comprises a heterologous non-AAV sequence.

29 (Previously Presented). The cultured host cell according to claim 28, which further comprises a rep gene.

30 (Previously Presented). The cultured host cell according to claim 28, wherein the rep gene is from AAV2.

31 (Previously Presented). The cultured host cell according to claim 28, wherein the recombinant nucleic acid molecule is a plasmid.

32-35 (Canceled).

36 (Previously Presented). A cultured host cell containing a recombinant nucleic acid molecule comprising

(a) nucleotides 1 to 2217 of SEQ ID NO: 22 or a sequence at least 98% identical to nucleotides 1 to 2217 of SEQ ID NO: 22 that encodes an AAV capsid protein;

(b) nucleotides 412 to 2217 of SEQ ID NO: 22 or a sequence at least 98% identical to nucleotides 412 to 2217 of SEQ ID NO: 22 that encodes an AAV capsid protein; or

(c) nucleotides 610 to 2217 of SEQ ID NO: 22 or a sequence at least 98% identical to nucleotides 610 to 2217 of SEQ ID NO: 22 that encodes an AAV capsid protein,

wherein the recombinant nucleic acid molecule further comprises a heterologous non-AAV sequence.

37 (Previously Presented). The cultured host cell according to claim 36, wherein said nucleotide sequence is at least 99% identical to nucleotides 1 to 2217 of SEQ ID NO: 22.

38-45 (Canceled).

46 (New). The AAV according to claim 1, wherein amino acid 665 is N.

47 (New). The method according to claim 4, wherein amino acid 665 is N.

48 (New). The cultured host cell according to claim 28, wherein amino acid 665 is N.

ARGUMENTS/REMARKS

Claims 1-4, 6-7, and 24-31, 36-37, and 46-48 are pending. Although the Examiner indicates that claim 46 is part of Group II, Applicants note that claim 46 was not previously pending in this application. New claims 46-48 are believed to be part of Group 1. Claims 1, 4, and 28, have been amended to clarify the recited modification. Support for these amendments can be found, e.g., in FIG. 5 and throughout the specification.

The Director is hereby authorized to charge any deficiency in any fee due with the filing of this paper, or credit any overpayment in this fee to our Deposit Account No. 08-3040.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: January 28, 2022

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
325 Sentry Parkway East
5 Sentry East, Suite 160
Blue Bell, PA 19422
Telephone: 215-540-9211
Facsimile: 215-540-5818
cschaller@howsoniplaw.com

PTO/AIA/22 (10-20)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): UPN-R3895D2US

Application Number: 16/368,758

Filed: March 28, 2019

For: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Art Unit: 1636

Examiner: Catherine S Hibbert

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	Micro Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$220	$110	$55	$
☐	Two months (37 CFR 1.17(a)(2))	$640	$320	$160	$
☐	Three months (37 CFR 1.17(a)(3))	$1,480	$740	$370	$
☑	Four months (37 CFR 1.17(a)(4))	$2,320	$1,160	$580	$ 2320
☐	Five months (37 CFR 1.17(a)(5))	$3,160	$1,580	$790	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 08-3040.

☑ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 67,751.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Colleen M. Schaller/ — Signature

January 28, 2022 — Date

Colleen M. Schaller — Typed or printed name

215-540-9211 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☐ * Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	16368758
Filing Date:	28-Mar-2019
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Filer:	Colleen M. Schaller/Dacia Ferris
Attorney Docket Number:	UPN-R3895D2US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 4 months with $0 paid	1254	1	2320	2320
Miscellaneous:				
			Total in USD ($)	**2320**

Electronic Acknowledgement Receipt

EFS ID:	44868436
Application Number:	16368758
International Application Number:	
Confirmation Number:	7840
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR
First Named Inventor/Applicant Name:	Luk VANDENBERGHE
Customer Number:	270
Filer:	Colleen M. Schaller
Filer Authorized By:	
Attorney Docket Number:	UPN-R3895D2US
Receipt Date:	28-JAN-2022
Filing Date:	28-MAR-2019
Time Stamp:	17:56:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$2320
RAM confirmation Number	E20221RH57130301
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		R3895_20220128_Response-RR.pdf	122921 ef8521ac318c76d6aa9d138cc14f3f19270d63b9	yes	9
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Response to Election / Restriction Filed		1	3	
	Claims		4	8	
	Applicant Arguments/Remarks Made in an Amendment		9	9	
Warnings:					
Information:					
2	Extension of Time	R3895D2US_20220128_EOT.pdf	176652 128a16f04d457972e3e6bb2eefb59b1a02808585	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	38523 188f90d4c5f84711776620a9d1aac16c31a538f2	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	338096		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

270 7590 05/12/2022

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER
HIBBERT, CATHERINE S

ART UNIT	PAPER NUMBER
1658	

NOTIFICATION DATE	DELIVERY MODE
05/12/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ckodroff@howsoniplaw.com
docketing@howsoniplaw.com

Office Action Summary	Application No. 16/368,758	Applicant(s) VANDENBERGHE et al.	
	Examiner CATHERINE S HIBBERT	Art Unit 1658	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 28 January 2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-4,6-7,24-31,36-37 and 46-48 is/are pending in the application.

5a) Of the above claim(s) 26 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-4,6-7,24-25,27-31,36-37 and 46-48 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 28 March 2019 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

This is the First Office Action on the Merits of US16/368,758 filed on 03/28/2019 which is a DIV of 14/624,671 filed on 02/18/2015 (US Patent 10,301,648) which is a DIV of US 11/887,679 filed on 10/02/2007 (US Patent 8,999,678) which is a 371 of PCT/US2006/013375 filed on 04/07/2006 which claims US Priority benefit of US Provisionals 60/733,497 filed on 11/04/2005 and 60/669,083 filed on 04/07/2005.

The Applicants' Amendment to the Claims filed on 01/28/2022 is entered.

Claims 5, 8-23, 32-35, 38-45 are cancelled.

Claims 46-48 are new.

Claims 1-4, 6-7, 24-31, 36-37, and 46-48 are pending.

Claim 26 is withdrawn to non-elected species.

Claims 1-4, 6-7, 24, 25, 27-31, 36-37, and 46-48 are under examination.

Election/Restrictions

Applicant's election without traverse of invention Group I (i.e., 1-4, 6-7, 24-31, 36-37, and newly added claims 46-48) in the reply filed on 01/28/2022 is acknowledged.

Applicant's election without traverse of the species:

- the vp1 amino acid sequence wherein the amino acid at position 665 is N, (i.e., new claims 46-48);
- the modification is A67E (i.e., claim 24); and
- the gene dystrophin (i.e., claims 25 and 27).

in the reply filed on 01/28/2022 is acknowledged.

Claim 26 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 01/28/2022.

Nucleotide and/or Amino Acid Sequence Disclosures

REQUIREMENTS FOR PATENT APPLICATIONS CONTAINING NUCLEOTIDE AND/OR AMINO ACID SEQUENCE DISCLOSURES

Items 1) and 2) provide general guidance related to requirements for sequence disclosures.

1) 37 CFR 1.821(c) requires that patent applications which contain disclosures of nucleotide and/or amino acid sequences that fall within the definitions of 37 CFR 1.821(a) must contain a "Sequence Listing," as a separate part of the disclosure, which presents the nucleotide and/or amino acid sequences and associated information using the symbols and format in accordance with the requirements of 37 CFR 1.821 - 1.825. This "Sequence Listing" part of the disclosure may be submitted:
   a) In accordance with 37 CFR 1.821(c)(1) via the USPTO's electronic filing system (see Section I.1 of the Legal Framework for EFS-Web or Patent Center (https://www.uspto.gov/patents-application- process/filing-online/legal-framework-efs-web), hereinafter "Legal Framework") as an ASCII text file, together with an incorporation-by-reference of the material in the ASCII text file in a separate paragraph of the specification as required by 37 CFR 1.823(b)(1) identifying:
      i) the name of the ASCII text file;
      ii) the date of creation; and
      iii) the size of the ASCII text file in bytes;
   b) In accordance with 37 CFR 1.821(c)(1) on read-only optical disc(s) as permitted by 37 CFR 1.52(e)(1)(ii), labeled according to 37 CFR 1.52(e)(5), with an incorporation-by-reference of the material in the ASCII text file according to 37 CFR 1.52(e)(8) and 37 CFR 1.823(b)(1) in a separate paragraph of the specification identifying:

i) the name of the ASCII text file;

ii) the date of creation; and

iii) the size of the ASCII text file in bytes;

c) In accordance with 37 CFR 1.821(c)(2) via EFS-Web or Patent Center as a PDF file (not recommended); or

d) In accordance with 37 CFR 1.821(c)(3) on physical sheets of paper (not recommended).

2) When a "Sequence Listing" has been submitted as a PDF file as in 1(c) above (37 CFR 1.821(c)(2)) or on physical sheets of paper as in 1(d) above (37 CFR 1.821(c)(3)), 37 CFR 1.821(e)(1) requires a computer readable form (CRF) of the "Sequence Listing" in accordance with the requirements of 37 CFR 1.824.

a) If the "Sequence Listing" required by 37 CFR 1.821(c) is filed via EFS-Web or Patent Center as a PDF, then 37 CFR 1.821(e)(1)(ii) or 1.821(e)(2)(ii) requires submission of a statement that the "Sequence Listing" content of the PDF copy and the CRF copy (the ASCII text file copy) are identical.

b) If the "Sequence Listing" required by 37 CFR 1.821(c) is filed on paper or read-only optical disc, then 37 CFR 1.821(e)(1)(ii) or 1.821(e)(2)(ii) requires submission of a statement that the "Sequence Listing" content of the paper or read-only optical disc copy and the CRF are identical.

Specific deficiencies and the required response to this Office Action are as follows: *As noted in the previous office action*, the date of creation and the size of the ASCII text file in bytes is missing from the Incorporation by Reference Statement regarding the Sequence Listing. (Page 1 of specification).

Appropriate correction is required as part of a complete response to this action.

Claim Objections

Claims **2, 3, and 24** are objected to because of the following informalities:

For improved clarity, amend claim **2**, line 1, as follows: wherein the AAV vp1 capsid protein~~s~~ ~~is~~ are.

For improved clarity, amend claim **3**, lines 1-2 as follows: wherein the AAV vp1 capsid proteins ~~has~~ have.

For improved clarity, amend claim **24**, lines 1-2 as follows: wherein the AAV vp1 capsid proteins ~~has~~ have.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims **3 and 30** are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

The present claim **3** reads on wild-type AAV vp1 capsid protein sequence because it does not include the proviso that amino acid 665 is not S. Since the intended invention is drawn to the full-length AAVrh46 variant, including the proviso that amino acid 665 is not S, the interpretation of claim 3 is unclear. For purpose of applying prior art, the claim is being construed to have intended this limitation including the proviso that amino acid 665 is not S.

Claim **30** recites the limitation "the rep gene" in line 2. There is insufficient antecedent basis for this limitation in the claim because claim 28 upon which claim 30

depends does not recite a rep gene. It would be remedial to amend the claim to depend from claim 29 which does recite a rep gene.

The following is a quotation of 35 U.S.C. 112(d):

> (d) REFERENCE IN DEPENDENT FORMS.—Subject to subsection (e), a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

The following is a quotation of pre-AIA 35 U.S.C. 112, fourth paragraph:

> Subject to the following paragraph [i.e., the fifth paragraph of pre-AIA 35 U.S.C. 112], a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

Claim **24** is rejected under 35 U.S.C. 112(d) or pre-AIA 35 U.S.C. 112, 4th paragraph, as being of improper dependent form for failing to further limit the subject matter of the claim upon which it depends, or for failing to include all the limitations of the claim upon which it depends. Specifically, claim 24 fails to include all the limitations of the claim upon which it depends. Claim 24 recites an alternative embodiment wherein the AAV vp1 proteins have the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46). However, claim 24 requires at least one or more amino acid changes to SEQ ID NO: 4 and therefore fails to include all the limitations of this embodiment. Applicant may cancel the claim(s), amend the claim(s) to place the claim(s) in proper dependent form, rewrite the claim(s) in independent form, or present a sufficient showing that the dependent claim(s) complies with the statutory requirements.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

Claim 1-4, 6-7, 25, 27-31, 36-37, and 46-48 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over the USPGPub 2007/0036760 to **Wilson** et al (published 02/15/2007 with priority to at least the PCT/US04/28817 filed on 09/30/2004, as evidenced by the Score reports for instant SEQ ID NO: 4 and SEQ ID NO: 22 being "Result 1" and "Result 1" to Wilson et al, both shown just below).

Wilson et al disclose AAV clades, sequences, vectors containing the same and uses of such. (See title, entire document).

Regarding claim **1**, Wilson et al disclose an adeno-associated virus (AAV) comprising a AAV Vp1 capsid (rh46) having a 100% identical amino acid sequence as the instant SEQ ID NO: 4 (see Score Result 1 just below)

Wilson et al disclose AAVs having a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins. (See ref claim 32).

Wilson disclose an AAV vp1 protein having the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46). See Sequence Listing in the reference disclosure and as evidenced by the Score report result. Note that this amino acid sequence has an N amino acid at position 665.

RESULT 1 (for instant SEQ ID NO: 4)
US-15-227-418-101
; Sequence 101, Application US/15227418
; Patent No. 10265417
; GENERAL INFORMATION
; APPLICANT: The Trustees of the University of Pennsylvania
; APPLICANT:Wilson, James M.

```
;  APPLICANT:Gao, Guangping
;  APPLICANT:Alvira, Mauricio R.
;  APPLICANT:Vandenberghe, Luc H.
;  TITLE OF INVENTION: Adeno-Associated Virus (AAV) Clades, Sequences,
Vectors
;  TITLE OF INVENTION:Containing Same, and Uses Therefor
;  FILE REFERENCE: UPN-P3230C1USA
;  CURRENT APPLICATION NUMBER: US/15/227,418
;  CURRENT FILING DATE: 2016-08-03
;  PRIOR APPLICATION NUMBER: US 60/508,226
;  PRIOR FILING DATE: 2003-09-30
;  PRIOR APPLICATION NUMBER: US 10/573,600
;  PRIOR FILING DATE: 2006-03-24
;  PRIOR APPLICATION NUMBER: PCT/US04/028817
;  PRIOR FILING DATE: 2004-09-30
;  PRIOR APPLICATION NUMBER: US 60/566,546
;  PRIOR FILING DATE: 2004-04-29
;  NUMBER OF SEQ ID NOS: 236
;  SOFTWARE: PatentIn version 3.5
; SEQ ID NO 101
;  LENGTH: 738
;  TYPE: PRT
;  ORGANISM: Unknown
;  FEATURE:
;  OTHER INFORMATION: vp1, clone rh.46
US-15-227-418-101

  Query Match             100.0%;  Score 3993;  DB 1;  Length 738;
  Best Local Similarity   100.0%;
  Matches  738;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps
0;

Qy          1 MAADGYLPDWLEDNLSEGIREWWDLKPGAPKPKANQQKQDDGRGLVLPGYKYLGPFNGLD 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MAADGYLPDWLEDNLSEGIREWWDLKPGAPKPKANQQKQDDGRGLVLPGYKYLGPFNGLD 60

Qy         61 KGEPVNAADAAALEHDKAYDQQLKAGDNPYLRYNHADAEFQERLQEDTSFGGNLGRAVFQ
120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 KGEPVNAADAAALEHDKAYDQQLKAGDNPYLRYNHADAEFQERLQEDTSFGGNLGRAVFQ
120

Qy        121 AKKRVLEPLGLVEEGAKTAPGKKRPVEPSPQRSPDSSTGIGKKGQQPARKRLNFGQTGDS
180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 AKKRVLEPLGLVEEGAKTAPGKKRPVEPSPQRSPDSSTGIGKKGQQPARKRLNFGQTGDS
180

Qy        181 ESVPDPQPIGEPPAAPSSVGSGTMAAGGGAPMADNNEGADGVGSSSGNWHCDSTWLGDRV
240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 ESVPDPQPIGEPPAAPSSVGSGTMAAGGGAPMADNNEGADGVGSSSGNWHCDSTWLGDRV
240

Qy        241 ITTSTRTWALPTYNNHLYKQISNGTSGGSTNDNTYFGYSTPWGYFDFNRFHCHFSPRDWQ
300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
```

```
Db        241 ITTSTRTWALPTYNNHLYKQISNGTSGGSTNDNTYFGYSTPWGYFDFNRFHCHFSPRDWQ
300

Qy        301 RLINNNWGFRPKRLSFKLFNIQVKEVTQNEGTKTIANNLTSTIQVFTDSEYQLPYVLGSA
360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 RLINNNWGFRPKRLSFKLFNIQVKEVTQNEGTKTIANNLTSTIQVFTDSEYQLPYVLGSA
360

Qy        361 HQGCLPPFPADVFMIPQYGYLTLNNGSQAVGRSSFYCLEYFPSQMLRTGNNFSFSYTFED
420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 HQGCLPPFPADVFMIPQYGYLTLNNGSQAVGRSSFYCLEYFPSQMLRTGNNFSFSYTFED
420

Qy        421 VPFHSSYAHSQSLDRLMNPLIDQYLYYLSRTQSTGGTAGTQQLLFSQAGPSNMSAQARNW
480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VPFHSSYAHSQSLDRLMNPLIDQYLYYLSRTQSTGGTAGTQQLLFSQAGPSNMSAQARNW
480

Qy        481 LPGPCYRQQRVSTTLSQNNNSNFAWTGATKYHLNGRDSLVNPGVAMATNKDDEDRFFPSS
540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 LPGPCYRQQRVSTTLSQNNNSNFAWTGATKYHLNGRDSLVNPGVAMATNKDDEDRFFPSS
540

Qy        541 GILMFGKQGAGKDNVDYSNVMLTSEEEIKATNPVATEQYGVVADNLQQQNTAPIVGAVNS
600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 GILMFGKQGAGKDNVDYSNVMLTSEEEIKATNPVATEQYGVVADNLQQQNTAPIVGAVNS
600

Qy        601 QGALPGMVWQNRDVYLQGPIWAKIPHTDGNFHPSPLMGGFGLKHPPPQILIKNTPVPADP
660
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 QGALPGMVWQNRDVYLQGPIWAKIPHTDGNFHPSPLMGGFGLKHPPPQILIKNTPVPADP
660

Qy        661 PTAFNQAKLNSFITQYSTGQVSVEIEWELQKENSKRWNPEIQYTSNYYKSTNVDFAVNTE
720
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        661 PTAFNQAKLNSFITQYSTGQVSVEIEWELQKENSKRWNPEIQYTSNYYKSTNVDFAVNTE
720

Qy        721 GVYSEPRPIGTRYLTRNL 738
              ||||||||||||||||||
Db        721 GVYSEPRPIGTRYLTRNL 738
```

RESULT 1 **(for instant SEQ ID NO: 22)**
US-15-227-418-19
; Sequence 19, Application US/15227418
; Patent No. 10265417

```
; GENERAL INFORMATION
;  APPLICANT: The Trustees of the University of Pennsylvania
;  APPLICANT:Wilson, James M.
;  APPLICANT:Gao, Guangping
;  APPLICANT:Alvira, Mauricio R.
;  APPLICANT:Vandenberghe, Luc H.
;  TITLE OF INVENTION: Adeno-Associated Virus (AAV) Clades, Sequences,
Vectors
;  TITLE OF INVENTION:Containing Same, and Uses Therefor
;  FILE REFERENCE: UPN-P3230C1USA
;  CURRENT APPLICATION NUMBER: US/15/227,418
;  CURRENT FILING DATE: 2016-08-03
;  PRIOR APPLICATION NUMBER: US 60/508,226
;  PRIOR FILING DATE: 2003-09-30
;  PRIOR APPLICATION NUMBER: US 10/573,600
;  PRIOR FILING DATE: 2006-03-24
;  PRIOR APPLICATION NUMBER: PCT/US04/028817
;  PRIOR FILING DATE: 2004-09-30
;  PRIOR APPLICATION NUMBER: US 60/566,546
;  PRIOR FILING DATE: 2004-04-29
;  NUMBER OF SEQ ID NOS: 236
;  SOFTWARE: PatentIn version 3.5
; SEQ ID NO 19
;  LENGTH: 2217
;  TYPE: DNA
;  ORGANISM: Unknown
;  FEATURE:
;  OTHER INFORMATION: new AAV serotype, clone rh.46
US-15-227-418-19

  Query Match             100.0%;  Score 2217;  DB 2;  Length 2217;
  Best Local Similarity   100.0%;
  Matches 2217;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps
0;

Qy          1 ATGGCTGCCGATGGTTATCTTCCAGATTGGCTCGAGGACAACCTCTCTGAGGGCATTCGC 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 ATGGCTGCCGATGGTTATCTTCCAGATTGGCTCGAGGACAACCTCTCTGAGGGCATTCGC 60

Qy         61 GAGTGGTGGGACCTGAAACCTGGAGCCCCGAAACCCAAAGCCAACCAGCAAAAGCAGGAC
120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 GAGTGGTGGGACCTGAAACCTGGAGCCCCGAAACCCAAAGCCAACCAGCAAAAGCAGGAC
120

Qy        121 GACGGCCGGGGTCTGGTGCTTCCTGGCTACAAGTACCTCGGACCCTTCAACGGACTCGAC
180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 GACGGCCGGGGTCTGGTGCTTCCTGGCTACAAGTACCTCGGACCCTTCAACGGACTCGAC
180

Qy        181 AAGGGGGAGCCCGTCAACGCGGCGGACGCAGCGGCCCTCGAGCACGACAAGGCCTACGAC
240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 AAGGGGGAGCCCGTCAACGCGGCGGACGCAGCGGCCCTCGAGCACGACAAGGCCTACGAC
240
```

```
Qy        241 CAGCAGCTCAAAGCGGGTGACAATCCGTACCTGCGGTATAATCACGCCGACGCCGAGTTT
300
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 CAGCAGCTCAAAGCGGGTGACAATCCGTACCTGCGGTATAATCACGCCGACGCCGAGTTT
300

Qy        301 CAGGAGCGTCTGCAAGAAGATACGTCTTTTGGGGGCAACCTCGGGCGAGCAGTCTTCCAG
360
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 CAGGAGCGTCTGCAAGAAGATACGTCTTTTGGGGGCAACCTCGGGCGAGCAGTCTTCCAG
360

Qy        361 GCCAAGAAGCGGGTTCTCGAACCTCTCGGTCTGGTTGAGGAAGGCGCTAAGACGGCTCCT
420
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 GCCAAGAAGCGGGTTCTCGAACCTCTCGGTCTGGTTGAGGAAGGCGCTAAGACGGCTCCT
420

Qy        421 GGAAAGAAGAGACCGGTAGAGCCGTCACCACAGCGTTCCCCCGACTCCTCCACGGGCATC
480
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 GGAAAGAAGAGACCGGTAGAGCCGTCACCACAGCGTTCCCCCGACTCCTCCACGGGCATC
480

Qy        481 GGCAAGAAAGGCCAGCAGCCCGCCAGAAAGAGACTCAATTTCGGTCAGACTGGCGACTCA
540
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 GGCAAGAAAGGCCAGCAGCCCGCCAGAAAGAGACTCAATTTCGGTCAGACTGGCGACTCA
540

Qy        541 GAGTCAGTCCCCGACCCTCAACCTATCGGAGAACCTCCAGCAGCGCCCTCTAGTGTGGGA
600
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 GAGTCAGTCCCCGACCCTCAACCTATCGGAGAACCTCCAGCAGCGCCCTCTAGTGTGGGA
600

Qy        601 TCTGGTACAATGGCTGCAGGCGGTGGCGCACCAATGGCAGACAATAACGAAGGTGCCGAC
660
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 TCTGGTACAATGGCTGCAGGCGGTGGCGCACCAATGGCAGACAATAACGAAGGTGCCGAC
660

Qy        661 GGAGTGGGTAGTTCCTCGGGAAATTGGCATTGCGATTCCACATGGCTGGGCGACAGAGTC
720
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        661 GGAGTGGGTAGTTCCTCGGGAAATTGGCATTGCGATTCCACATGGCTGGGCGACAGAGTC
720

Qy        721 ATCACCACCAGCACCCGAACCTGGGCCCTGCCCACCTACAACAACCACCTCTACAAGCAA
780
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        721 ATCACCACCAGCACCCGAACCTGGGCCCTGCCCACCTACAACAACCACCTCTACAAGCAA
780

Qy        781 ATCTCCAACGGGACCTCGGGAGGCAGCACCAACGACAACACCTACTTTGGCTACAGCACC
840
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
```

```
Db        781 ATCTCCAACGGGACCTCGGGAGGCAGCACCAACGACAACACCTACTTTGGCTACAGCACC
840

Qy        841 CCCTGGGGGTATTTTGACTTTAACAGATTCCACTGCCACTTCTCACCACGTGACTGGCAG
900
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        841 CCCTGGGGGTATTTTGACTTTAACAGATTCCACTGCCACTTCTCACCACGTGACTGGCAG
900

Qy        901 CGACTCATCAACAACAACTGGGGATTCCGGCCCAAGAGACTCAGCTTCAAGCTCTTCAAC
960
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        901 CGACTCATCAACAACAACTGGGGATTCCGGCCCAAGAGACTCAGCTTCAAGCTCTTCAAC
960

Qy        961 ATCCAGGTCAAAGAGGTCACGCAGAATGAAGGCACCAAGACCATCGCCAATAACCTCACC
1020
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        961 ATCCAGGTCAAAGAGGTCACGCAGAATGAAGGCACCAAGACCATCGCCAATAACCTCACC
1020

Qy       1021 AGCACCATCCAGGTGTTTACGGACTCGGAATACCAGCTGCCGTACGTCCTCGGCTCTGCC
1080
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1021 AGCACCATCCAGGTGTTTACGGACTCGGAATACCAGCTGCCGTACGTCCTCGGCTCTGCC
1080

Qy       1081 CACCAGGGCTGCCTGCCTCCGTTCCCGGCGGACGTCTTCATGATTCCTCAGTACGGCTAC
1140
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1081 CACCAGGGCTGCCTGCCTCCGTTCCCGGCGGACGTCTTCATGATTCCTCAGTACGGCTAC
1140

Qy       1141 CTGACTCTCAACAACGGTAGTCAGGCCGTGGGACGTTCCTCCTTCTACTGCCTGGAGTAC
1200
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1141 CTGACTCTCAACAACGGTAGTCAGGCCGTGGGACGTTCCTCCTTCTACTGCCTGGAGTAC
1200

Qy       1201 TTCCCCTCTCAGATGCTGAGAACGGGCAACAACTTTTCCTTCAGCTACACTTTCGAGGAC
1260
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1201 TTCCCCTCTCAGATGCTGAGAACGGGCAACAACTTTTCCTTCAGCTACACTTTCGAGGAC
1260

Qy       1261 GTGCCTTTCCACAGCAGCTACGCGCACAGCCAGAGTTTGGACAGGCTGATGAATCCTCTC
1320
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1261 GTGCCTTTCCACAGCAGCTACGCGCACAGCCAGAGTTTGGACAGGCTGATGAATCCTCTC
1320

Qy       1321 ATCGACCAGTACCTGTACTACCTGTCAAGAACCCAGTCTACGGGAGGCACAGCGGGAACC
1380
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1321 ATCGACCAGTACCTGTACTACCTGTCAAGAACCCAGTCTACGGGAGGCACAGCGGGAACC
1380
```

```
Qy       1381 CAGCAGTTGCTGTTTTCTCAGGCCGGGCCTAGCAACATGTCGGCTCAGGCCAGAAACTGG
1440
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1381 CAGCAGTTGCTGTTTTCTCAGGCCGGGCCTAGCAACATGTCGGCTCAGGCCAGAAACTGG
1440

Qy       1441 CTGCCTGGACCCTGCTACAGACAGCAGCGCGTCTCCACGACACTGTCGCAAAACAACAAC
1500
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1441 CTGCCTGGACCCTGCTACAGACAGCAGCGCGTCTCCACGACACTGTCGCAAAACAACAAC
1500

Qy       1501 AGCAACTTTGCCTGGACTGGTGCCACCAAGTATCATCTGAACGGCAGAGACTCTCTGGTG
1560
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1501 AGCAACTTTGCCTGGACTGGTGCCACCAAGTATCATCTGAACGGCAGAGACTCTCTGGTG
1560

Qy       1561 AATCCGGGCGTCGCCATGGCAACCAACAAGGACGACGAGGACCGCTTCTTCCCATCCAGC
1620
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1561 AATCCGGGCGTCGCCATGGCAACCAACAAGGACGACGAGGACCGCTTCTTCCCATCCAGC
1620

Qy       1621 GGCATCCTCATGTTTGGCAAGCAGGGAGCTGGAAAAGACAACGTGGACTATAGCAACGTG
1680
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1621 GGCATCCTCATGTTTGGCAAGCAGGGAGCTGGAAAAGACAACGTGGACTATAGCAACGTG
1680

Qy       1681 ATGCTAACCAGCGAGGAAGAAATCAAGGCCACCAACCCCGTGGCCACAGAACAGTATGGC
1740
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1681 ATGCTAACCAGCGAGGAAGAAATCAAGGCCACCAACCCCGTGGCCACAGAACAGTATGGC
1740

Qy       1741 GTGGTGGCTGATAACCTACAGCAGCAAAACACCGCTCCTATTGTGGGGGCCGTCAACAGC
1800
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1741 GTGGTGGCTGATAACCTACAGCAGCAAAACACCGCTCCTATTGTGGGGGCCGTCAACAGC
1800

Qy       1801 CAGGGAGCCTTACCTGGCATGGTCTGGCAGAACCGGGACGTGTACCTGCAGGGTCCTATT
1860
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1801 CAGGGAGCCTTACCTGGCATGGTCTGGCAGAACCGGGACGTGTACCTGCAGGGTCCTATT
1860

Qy       1861 TGGGCCAAGATTCCTCACACAGATGGCAACTTTCACCCGTCTCCTTTAATGGGCGGCTTT
1920
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1861 TGGGCCAAGATTCCTCACACAGATGGCAACTTTCACCCGTCTCCTTTAATGGGCGGCTTT
1920

Qy       1921 GGACTTAAACATCCGCCTCCTCAGATCCTCATCAAAAACACTCCTGTTCCTGCGGATCCT
1980
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
```

```
Db       1921 GGACTTAAACATCCGCCTCCTCAGATCCTCATCAAAAACACTCCTGTTCCTGCGGATCCT
1980

Qy       1981 CCAACAGCGTTCAACCAGGCCAAGCTGAATTCTTTCATCACGCAGTACAGCACCGGACAA
2040
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       1981 CCAACAGCGTTCAACCAGGCCAAGCTGAATTCTTTCATCACGCAGTACAGCACCGGACAA
2040

Qy       2041 GTCAGCGTGGAGATCGAGTGGGAGCTGCAGAAGGAGAACAGCAAGCGCTGGAACCCAGAG
2100
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       2041 GTCAGCGTGGAGATCGAGTGGGAGCTGCAGAAGGAGAACAGCAAGCGCTGGAACCCAGAG
2100

Qy       2101 ATTCAGTATACTTCCAACTACTACAAATCTACAAATGTGGACTTTGCTGTTAATACTGAG
2160
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       2101 ATTCAGTATACTTCCAACTACTACAAATCTACAAATGTGGACTTTGCTGTTAATACTGAG
2160

Qy       2161 GGTGTTTACTCTGAGCCTCGCCCCATTGGCACTCGTTACCTCACCCGTAATCTGTAA 2217
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db       2161 GGTGTTTACTCTGAGCCTCGCCCCATTGGCACTCGTTACCTCACCCGTAATCTGTAA 2217
```

Regarding claim **2**, it is noted that claim 1 is drawn to a product AAV. The instant specification discloses that instant nucleic acid SEQ ID NO: 22 encodes instant amino acid SEQ ID NO: 4. For purposes of applying prior art, prior art which anticipates or renders obvious claim 1 would also anticipate or render obvious claim 2. The process by which a product is made is not generally afforded patentable weight for purpose of applying prior art since the product of claim 2 is not distinguished from the product of claim 2. In addition, note that the Score report above for instant SEQ ID NO: 22 shows 100% identical sequence.

Regarding claim **3**, Wilson et al disclose the AAV vp1 capsid protein has an amino acid sequence which is at least 100% identical to the amino acids 1 to 738 of SEQ ID NO: 4. (See Score result #1 above).

Regarding claim **4,** Wilson et al disclose a method of generating a recombinant AAV comprising an AAV capsid comprising the steps of culturing a host cell (see para 0106, line 1) containing:

(a) a nucleic acid sequence encoding an AAV capsid protein selected from SEQ ID NO: 4 or a sequence sharing at least 95% identity therewith, wherein amino acid 665 is not S (see Sequence Listing and as evidenced by attached Score result for SEQ ID NO: 4 for Wilson et al showing 100% identical match;

(b) a functional rep gene (see para 0072, line 2);

(c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene (see para 0072, line 3); and

(d) sufficient helper functions to permit packaging of the minigene into the AAV capsid (see para 0105, line 3).

Regarding claim **6**, Wilson et al disclose that the AAV inverted terminal repeats can be from a different AAV than the AAV supplying the capsid proteins. (See para 0109, lines 1-4).

Regarding claim **7**, Wilson et al disclose a composition comprising an AAV and a physiologically compatible carrier (see para 0162, line 1).

Regarding claim **25,** Wilson et al discloses that the heterologous gene encodes a dystrophin gene product. (See para 0117, line 3; para 0124, line 2; para 0171; line 3).

Regarding claim **27**, Wilson et al discloses that the dystrophin gene product is a mini-dystrophin or micro-dystrophin. (See para para 0171; line 3).

Regarding claim **28**, Wilson et al discloses a cultured host cell (see para 0106, line 1) containing a recombinant nucleic acid molecule encoding an AAV vp1 capsid protein

having a sequence comprising amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), and wherein the recombinant nucleic acid molecule further comprises a heterologous non-AAV sequence. (See Sequence Listing and as evidenced by Score report result for SEQ ID NO: 4 and SEQ ID NO: 22 which is encoding SEQ ID NO: 4.

Regarding claim **29**, Wilson et al discloses an AAV a rep gene (See para 0131, lines 1-4).

Regarding claim **30**, Wilson et al discloses a rep gene from AAV2 (See para 0131, lines 1-4).

Regarding claim **31**, Wilson et al disclose the recombinant nucleic acid molecule is a plasmid. (See para 0133, line 1)

Regarding independent claims **36 and 37,** Wilson et al**,** as evidenced by the Score report result for Gao et al above, discloses a nucleic acid molecule comprising a nucleic acid molecule comprising a nucleotide sequence that is 100% identical to nucleotides 1 to 2217 of SEQ ID NO: 22. encoding an AAV capsid protein.

Regarding claim **46**, as noted above, Wilson et al discloses the instant SEQ ID NO: 4 and the amino acid 665 is N in the SEQ ID NO: 4 sequence.

Regarding claim **47**, as noted above, Wilson et al discloses the instant SEQ ID NO: 4 and the amino acid 665 is N in the SEQ ID NO: 4 sequence.

Regarding claim **48**, as noted above, Wilson et al discloses the instant SEQ ID NO: 4 and the amino acid 665 is N in the SEQ ID NO: 4 sequence.

However, while Wilson et al disclose all of the elements of the presently claimed invention, including the instant AAV rh.46 variant being a 100% match to instant SEQ ID

NO: 4, and encoded by a 100% match to instant SEQ ID NO: 22, they do not explicitly disclose the claimed embodiments.

The level of skill in the art was high before the time of the presently claimed invention.

It is considered that one of ordinary skill in the art having the Wilson et al reference would have been motivated to use the AAV capsid protein variant of being identical to instant SEQ ID NO: 4 for the rationale that they explicitly suggest making AAV vectors with their clade variants to test for improved properties for using such vectors in gene therapy experiments. It would have been obvious to use the variants listed in the Wilson specification because these were available and they disclose the methods to clone and make the AAV vectors using their clade variants.

In view of the high skill level in the art, it is considered that one of ordinary skill in the art having the Wilson et al reference before the time of the presently claimed invention would have had a reasonable expectation of success to combine the elements in their reference to arrive at the presently claimed invention.

Thus, the claims as a whole would have been rendered obvious over Wilson et al.

Claims **36-37** are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over **Gao et al** "Clades of Adeno-associated viruses are widely dissemination in human tissues" (J. Virol. June, 2004, Vol 78, No. 12: pages 6381-6388; as evidenced by the

attached Score result for Gao et al, J Virol), in view of **Gao et al** in "Novel adeno-associated viruses from rhesus monkeys as vectors for human gene therapy" (PNAS, 2002, Vol 99: pages 11854-11859).

Regarding independent claim **36, Gao et al,** as evidenced by the attached Score report result for Gao et al, discloses a nucleic acid molecule comprising a nucleic acid molecule comprising a nucleotide sequence at least 99% identical to nucleotides 1 to 2217 of SEQ ID NO: 22. encoding an AAV capsid protein. See attached Score report result for Gao et al showing a sequence that is 99.8% identical. Note that in Gao et al FIG 3, in the Clade E, the rh.64 is the AAV capsid referred to in the Score report.

Regarding claim **37**, Gao et al, as evidenced by the attached Score report result for Gao et al shows a sequence that is 99.8% identical with instant SEQ ID NO: 22 which meets the limitation of said nucleotide sequence being at least 99% identical to nucleotides 1 to 2217 of SEQ ID NO: 22.

Gao et al discloses cloning capsid variant sequences but differs from the present claims because it does not explicitly disclose a cultured host cell containing this specific sequence or that this specific sequence is a recombinant nucleic acid molecule further comprising a heterologous non-AAV sequence. However, In page 6382, left col., under heading "Evaluation of primate AAVs as gene transfer vectors", Gao refers to citation #10 which is the reference of **Gao et al** (PNAS, 2002) to describe how to produce primate AAV vectors using common cloning procedures for AAV clade variants. Such vectors comprise a heterologous non-AAV sequence and are present in a cultured host cell during the cloning methods. For example, Gao et al disclose directly amplifying and cloning full-length cap sequences (page 11855, para 2, lines 1-2). Gao et al disclose

under heading “Production of AAV Vectors” stating : “Recombinant AAV genomes equipped with AAV2 inverted terminal repeats (ITRs) were packaged by triple transfection of 293 cells with cis-plasmid, adenovirus helper plasmid and a chimeric packaging construct where the AAV2 rep gene is fused with cap genes of novel AAV serotypes”. (See page 11852, para 3).

The level of skill in the art of cloning AAV capsid variant sequences was high before the time of the presently claimed invention.

It would have been prima facie obvious for one of ordinary skill in the art to have cloned any known AAV capsid variant sequence because the techniques were shown by Gao et al (2002 and suggested by Gao et al (2004) for this purpose.

One of ordinary skill in the art would have been motivated to clone, including growing the clone in a cultured host cell, a known AAV capsid variant for the rationale of producing sufficient quantities, and of sufficient constancy and quality, of such variant to test and analyze.

In view of the high skill in the art it is considered that one of ordinary skill in the art having the clade sequences of Gao et al (2004) and the cloning methods of Gao et al (2002) would have had a reasonable expectation of success to combine these elements to arrive at the presently claimed invention. Thus the claims as a whole are considered rendered obvious over the cited references.

Conclusion

No claims allowed.

Related prior art *that is not being applied but which may be applied in a future office action* is WO 2005/033321 to Wilson et al (as evidenced by the Score result for WO 2005/033321 just below showing a 100% identical AAV sequence to the instant SEQ ID NO: 4). Note that this is the related WO-document to the USPGPub 2007/0036760 to Wilson et al applied in the prior art rejection above.

RESULT 1
ADZ26951
ID ADZ26951 standard; protein; 738 AA.
AC ADZ26951;
DT 30-JUN-2005 (first entry)
DE Adeno-associated virus protein SEQ ID NO 101.
XX
KW rheumatoid arthritis; multiple sclerosis; sarcoidosis; diabetes;
KW scleroderma; psoriasis; vasculitis; Crohn's disease; hemophilia; HIV;
KW bacterial infection; cancer; ulcerative colitis; antirheumatic;
KW antiarthritic; neuroprotective; antiinflammatory; antidiabetic;
KW antipsoriatic; vasotropic; gastrointestinal-gen.; hemostatic; anti-HIV;
KW virucide; antibacterial; cytostatic; antiulcer; dermatological.
OS Adeno-associated virus.
XX
CC PN WO2005033321-A2.
CC PD 14-APR-2005.
CC PF 30-SEP-2004; 2004WO-US028817.
PR 30-SEP-2003; 2003US-0508226P.
PR 29-APR-2004; 2004US-0566546P.
CC PA (UYPE-) UNIV PENNSYLVANIA.
CC PI Wilson JM, Gao G, Alvira MR, Vandenberghe LH;
DR WPI; 2005-285437/29.
CC PT New adeno-associated virus (AAV) clade comprising at least three AAV
CC PT members, useful for preventing and/or treating arthritis, multiple
CC PT sclerosis, diabetes, scleroderma, psoriasis, hemophilia, HIV,
bacterial
CC PT infection and cancer.
CC PS Disclosure; SEQ ID NO 101; 569pp; English.
CC The invention relates to an adeno-associated virus (AAV) clade
comprising
CC at least three AAV members, where each member of the AAV clade is
CC phylogenetically related as determined using a Neighbor-Joining
heuristic
CC by a bootstrap value of at least 75 % per 1000 isolates and a Poisson
CC correction distance measurement of no more than 0.05. The methods and
CC compositions of the present invention are useful for the prevention
CC and/or treatment of rheumatoid arthritis, multiple sclerosis,
CC sarcoidosis, diabetes, scleroderma, psoriasis, vasculitis, Crohn's
CC disease, hemophilia, HIV, bacterial infection, cancer and ulcerative
CC colitis. The present sequence represents the amino acid sequence of an
CC adeno-associated virus protein.
SQ Sequence 738 AA;

  Query Match 100.0%; Score 3993; DB 7; Length 738;

```
  Best Local Similarity   100.0%;
  Matches  738;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps
0;

Qy          1 MAADGYLPDWLEDNLSEGIREWWDLKPGAPKPKANQQKQDDGRGLVLPGYKYLGPFNGLD 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MAADGYLPDWLEDNLSEGIREWWDLKPGAPKPKANQQKQDDGRGLVLPGYKYLGPFNGLD 60

Qy         61 KGEPVNAADAAALEHDKAYDQQLKAGDNPYLRYNHADAEFQERLQEDTSFGGNLGRAVFQ
120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 KGEPVNAADAAALEHDKAYDQQLKAGDNPYLRYNHADAEFQERLQEDTSFGGNLGRAVFQ
120

Qy        121 AKKRVLEPLGLVEEGAKTAPGKKRPVEPSPQRSPDSSTGIGKKGQQPARKRLNFGQTGDS
180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 AKKRVLEPLGLVEEGAKTAPGKKRPVEPSPQRSPDSSTGIGKKGQQPARKRLNFGQTGDS
180

Qy        181 ESVPDPQPIGEPPAAPSSVGSGTMAAGGGAPMADNNEGADGVGSSSGNWHCDSTWLGDRV
240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 ESVPDPQPIGEPPAAPSSVGSGTMAAGGGAPMADNNEGADGVGSSSGNWHCDSTWLGDRV
240

Qy        241 ITTSTRTWALPTYNNHLYKQISNGTSGGSTNDNTYFGYSTPWGYFDFNRFHCHFSPRDWQ
300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 ITTSTRTWALPTYNNHLYKQISNGTSGGSTNDNTYFGYSTPWGYFDFNRFHCHFSPRDWQ
300

Qy        301 RLINNNWGFRPKRLSFKLFNIQVKEVTQNEGTKTIANNLTSTIQVFTDSEYQLPYVLGSA
360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 RLINNNWGFRPKRLSFKLFNIQVKEVTQNEGTKTIANNLTSTIQVFTDSEYQLPYVLGSA
360

Qy        361 HQGCLPPFPADVFMIPQYGYLTLNNGSQAVGRSSFYCLEYFPSQMLRTGNNFSFSYTFED
420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 HQGCLPPFPADVFMIPQYGYLTLNNGSQAVGRSSFYCLEYFPSQMLRTGNNFSFSYTFED
420

Qy        421 VPFHSSYAHSQSLDRLMNPLIDQYLYYLSRTQSTGGTAGTQQLLFSQAGPSNMSAQARNW
480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VPFHSSYAHSQSLDRLMNPLIDQYLYYLSRTQSTGGTAGTQQLLFSQAGPSNMSAQARNW
480

Qy        481 LPGPCYRQQRVSTTLSQNNNSNFAWTGATKYHLNGRDSLVNPGVAMATNKDDEDRFFPSS
540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 LPGPCYRQQRVSTTLSQNNNSNFAWTGATKYHLNGRDSLVNPGVAMATNKDDEDRFFPSS
540
```

```
Qy        541 GILMFGKQGAGKDNVDYSNVMLTSEEEIKATNPVATEQYGVVADNLQQQNTAPIVGAVNS
600
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 GILMFGKQGAGKDNVDYSNVMLTSEEEIKATNPVATEQYGVVADNLQQQNTAPIVGAVNS
600

Qy        601 QGALPGMVWQNRDVYLQGPIWAKIPHTDGNFHPSPLMGGFGLKHPPPQILIKNTPVPADP
660
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 QGALPGMVWQNRDVYLQGPIWAKIPHTDGNFHPSPLMGGFGLKHPPPQILIKNTPVPADP
660

Qy        661 PTAFNQAKLNSFITQYSTGQVSVEIEWELQKENSKRWNPEIQYTSNYYKSTNVDFAVNTE
720
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        661 PTAFNQAKLNSFITQYSTGQVSVEIEWELQKENSKRWNPEIQYTSNYYKSTNVDFAVNTE
720

Qy        721 GVYSEPRPIGTRYLTRNL 738
                ||||||||||||||||||
Db        721 GVYSEPRPIGTRYLTRNL 738
```

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CATHERINE S HIBBERT whose telephone number is (571)270-3053. The examiner can normally be reached M-F 8:00-5:00.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry D Riggs, II can be reached on 571-270-3062. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-

center for more information about Patent Center and

https://www.uspto.gov/patents/docx for information about filing in DOCX format. For

additional questions, contact the Electronic Business Center (EBC) at 866-217-9197

(toll-free). If you would like assistance from a USPTO Customer Service

Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CATHERINE S HIBBERT/
Primary Examiner, Art Unit 1658

Notice of References Cited	Application/Control No. 16/368,758	Applicant(s)/Patent Under Reexamination VANDENBERGHE et al.	
	Examiner CATHERINE S HIBBERT	Art Unit 1658	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20070036760-A1	02-2007	Wilson; James	A61K48/00	435/235.1
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N	WO-2005033321-A2	04-2005	WO	ALVIRA M	A61B5/02158
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Gao et al "Clades of Adeno-associated viruses are widely dissemination in human tissues" (J. Virol. 2004, Vol 78, No. 12: pages 6381-6388). (Year: 2004)
	V	Score report result for Gao et al "Clades of Adeno-associated viruses are widely dissemination in human tissues" (J. Virol. 2004, Vol 78, No. 12: pages 6381-6388) (Year: 2004)
	W	Gao et al in "Novel adeno-associated viruses from rhesus monkeys as vectors for human gene therapy" (PNAS, 2002, Vol 99: pages 11854-11859). (Year: 2002)
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	Art Unit
	CATHERINE S HIBBERT	1658

CPC - Searched*		
Symbol	Date	Examiner
C12N15/86.cpc. or A61K48/005.cpc. or A61K48/0091.cpc. or C07K14/005.cpc. or C12N7/00.cpc. or A61K48/00.cpc. or C12N2750/14122.cpc. or C12N2750/14142.cpc. or C12N2750/14143.cpc. or C12N2750/14152.cpc.	05/04/2022	CSH

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor; Assignee search, PALM; PE2E SEARCH	05/04/2022	CSH
PE2E SEARCH, history included	05/04/2022	CSH
Advanced PubMed, history included	05/04/2022	CSH
Proquest, history included	05/04/2022	CSH
Score report	05/04/2022	CSH

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	Art Unit
	CATHERINE S HIBBERT	1658

/CATHERINE S HIBBERT/
Primary Examiner, Art Unit 1658

Bibliographic Data

Application No: 16/368,758

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /CATHERINE S HIBBERT/ Examiner's Signature | Initials

Title: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/28/2019	514	1658	UPN-R3895D2US
RULE			

APPLICANTS

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA, UNITED STATES

INVENTORS

Luk VANDENBERGHE, Weston, MA, UNITED STATES

Guangping GAO, Westborough, MA, UNITED STATES

James M. WILSON, Philadelphia, PA, UNITED STATES

CONTINUING DATA

This application is a DIV of 14624671 02/18/2015 PAT 10301648

14624671 is a DIV of 11887679 10/02/2007 PAT 8999678

11887679 is a 371 of PCT/US2006/013375 04/07/2006

PCT/US2006/013375 has PRO of 60733497 11/04/2005

PCT/US2006/013375 has PRO of 60669083 04/07/2005

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/05/2019

STATE OR COUNTRY

UNITED STATES

ADDRESS

HOWSON & HOWSON LLP

325 Sentry Parkway East, Five Sentry East

Suite 160

Blue Bell, PA 19422

UNITED STATES

FILING FEE RECEIVED

$1,720

PTO/SB/08A (12-07)
Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	15

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636 1658
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1.	2003/0138772 A1	07-24-2003	Gao et al.	
	2.	2004/0170611 A1	09-02-2004	Morgan et al.	
	3.	2004/0180440	09-16-2004	Zolotukhin	
	4.	2007/0036760 A1	02-15-2007	Wilson et al.	
	5.	2008/0269149 A1	10-30-2008	Bowles et al.	
	6.	2009/0275107 A1	11-05-2009	Lock	
	7.	2009/0317417 A1	12-24-2009	Vandenberghe	
	8.	2010/0129405 A1	05-27-2010	Schmidt et al.	
	9.	6,156,303	12-05-2000	Russell et al.	
	10.	6,410,300	06-25-2002	Samulski et al.	
	11.	6,596,539	07-22-2003	Stemmer et al.	
	12.	6,703,237	03-09-2004	Samulski et al.	
	13.	6,733,757	05-11-2004	Patel et al.	
	14.	6,962,815	11-08-2005	Bartlett	
	15.	7,252,997	08-07-2007	Halleck et al.	
	16.	7,314,912	01-01-2008	Halleck et al.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. this collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Group Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	2	of	15	Attorney Docket Number	UPN-R3895D2US

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document: Country Code[3]- Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	17.	EP 1 359 217 A1	11-05-2003	The Trustees of the Univ. of Pennsylvania		
	18.	WO 1998/011244	03-19-1998	US Government		
	19.	WO 1999/061601	12-02-1999	US Government		
	20.	WO 2000/028004	05-18-2000	The University of North Carolina at Chapel Hill		
	21.	WO 2000/028061	05-18-2000	The Trustees of the Univ. of Pennsylvania		
	22.	WO 2003/023032	03-20-2003	Nautilus Biotech		
	23.	WO 2003/093460 A1	11-13-2003	The Trustees of the Univ. of Pennsylvania		
	24.	WO 2005/005610 A2	01-20-2005	The Reagents of the University of California		
	25.	WO 2005/033321	04-14-2005	The Trustees of the Univ. of Pennsylvania		
	26.	WO 2007/127264 A2	11-08-2007	The Trustees of the Univ. of Pennsylvania		
	27.	WO 2008/027084 A2	03-06-2008	The Trustees of the Univ. of Pennsylvania		
Examiner Signature		/CATHERINE S HIBBERT/		Date Considered	05/06/2022	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. this collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

PTO/SB/08B (12-07)
Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **3** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	~~1636~~
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	28.	AFIONE et al., In vivo model of adeno-associated virus vector persistence and rescue, Journal of Virology, Vol. 70(5):3235-3241, May 1996.	
	29.	BEVAN et al., Systemic Gene Delivery in Large Species for Targeting Spinal Cord, Brain, and Peripheral Tissues for Pediatric Disorders, Mol Ther. 2011 Nov;19(11):1971-80. doi: 10.1038/mt.2011.157. Epub 2011 Aug 2	
	30.	BLACK et al., Adeno-associated virus 8-mediated gene therapy for choroideremia: preclinical studies in in vitro and in vivo models, The Journal of Gene Medicine, Vol. 16:122-130, June 2014.	
	31.	BOWLES et al., Marker rescue of adeno-associated virus (AAV) capsid mutants: a novel approach for chimeric AAV production.Marker rescue of adeno-associated virus (AAV) capsid mutants: a novel approach for chimeric AAV production. J Virol. 2003 Jan;77(1):423-32.	
	32.	BROWN et al., Cloning and sequencing of the simial parvovirus genome, Virology, Vol. 210:314-322, May 1995.	
	33.	CHARAN et al., Adeno-associated Virus Serotype 8 (AAV8) Delivery of Recombinant A20 to Skeletal Muscle Reduces Pathological Activation of Nuclear Factor (NF)-kB in Muscle of mdx Mice, Molecular Medicine, Vol. 18:1527-1535, November 2012.	
	34.	CHEN et al., Epidemiology of hepatitis B virus infection in the Asia-Pacific region, J Gastroenterol Hepatol. 2000 May;15 Suppl:E3-6	
	35.	CHILDERS et al., Gene Therapy Prolongs Survival and Restores Function in Murine and Canine Models of Myotubular Myopathy, Sci Transl Med, Vol. 6(220):1-31, January 2014.	
	36.	CHIRMULE et al., Immune responses to adenovirus and adeno-associated virus in humans, Gene Therapy, 6:1574-1583, Sept 1999	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

PTO/SB/08B (12-07)
Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **4** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	37.	ClinicalTrials.org, "AAV8 Vector Trials", November 2017.	
	38.	DAI et al., "Long-term retinal cone rescue using a capsid mutant AAV8 vector in a mouse model of CNGA3-achromatopsia", PLOS One, Vol. 12(11):e0188032, November 2017.	
	39.	DAVIDSON et al., Recombinant adeno-associated virus type 2, 4, and 5 vectors: transduction of variant cell types and regions in the mammalian central nervous system. Proc Natl Acad Sci U S A. 2000 Mar 28;97(7):3428-32.	
	40.	DURIGON et al., Multiple primer pairs for polymerase chain reaction (PCR) amplification of human parvovirus B19 DNA, Journal of Virological Methods, Vol. 44:155-165, February 1993.	
	41.	ELLIS et al, Virology Journal, March 2013, A survey of ex vivo/in vitro transduction efficiency of mammalian primary cells and cell lines with Nine natural adeno-associated virus (AAV1-9) and one engineered adeno-associated virus serotype, 10:74	
	42.	FARIA et al., The early spread and epidemic ignition of HIV-1 in human populations, Science, Oct 2014, 346(6205):56-61	
	43.	FISCHER et al., Codon-Optimized RPGR Improves Stability and Efficacy of AAV8 Gene Therapy in Two Mouse Models of X-Linked Retinitis Pigmentosa, Molecular Therapy, Vol. 25(8):1854-1865, May 2017.	
	44.	GAO et al., "Novel adeno-associated viruses from rhesus monkeys as vectors for human gene therapy", PNAS, Vol. 99(18):11854-11859, September 2002.	
	45.	GAO et al., Adeno-Associated Viruses Undergo Substantial Evolution in Primates during Natural Infections, PNAS, Vol. 100, No. 10, pp. 6081-6086, (May 13, 2003)	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **5** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	46.	GAO et al., Biology of Adenovirus vectors with E1 and E4 deletions for liver-directed gene therapy, Journal of Viroloy, Vol. 70(12):8934-8943, December 1996.	
	47.	GAO et al., Clades of Adeno Associated Viruses Are Widely Disseminated in Human Tissues, J. Virol, June 2004, 78(12) :6381-8	
	48.	GAO et al., Origin of HIV-1 in the chimpanzee Pan troglodytes troglodytes, Nature, Feb 1999, 397 :436-440	
	49.	GenBank entry AF513851, September 2002.	
	50.	GenBank entry AF513852, September 2002.	
	51.	GILES et al., Deamidation of Amino Acids on the Surface of Adeno-Associated Virus Capsids Leads to Charge Heterogeneity and Altered Vector Function, Mol Ther, 26(12), Dec 2018.	
	52.	GILKES et al., Mucopolysaccharidosis IIIB confers enhanced neonatal intracranial transduction by AAV8 but not by 5, 9 or rh10, Gene Therapy, Vol. 23:263-271, January 2016.	
	53.	GIROD et al., The VP1 capsid protein of adeno-associated virus type 2 is carrying a phospholipase A2 domain required for virus infectivity, J. General Virol, 2002, 83:973-978	
	54.	GREEN et al., Rhesus and pig-tailed macaque parvoviruses: identification of two new members of the erythrovirus genus in monkeys, Virology, Vol. 269:105-112, January 2000.	
	55.	GRIEGER et al., Separate basic region motifs within the adeno-associated virus capsid proteins are essential for infectivity and assembly. J Virol. 2006 Jun;80(11):5199-210.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **6** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	56.	GRIEGER et al., Surface-Exposed Adeno-Associated Virus Vpl-NLS Capsid Fusion Protein Rescues Infectivity of Noninfectious Wild-Type Vp2/Vp3 and Vp3-Only Capsids but Not That of Fivefold Pore Mutant Virions, J. Virol, 81(15):7833-7483, Aug 2007	
	57.	GROSSE et al, Relevance of Assembly-Activating Protein for Adeno-associated Virus Vector Production and Capsid Protein Stability in Mammalian and Insect Cells, J Virol 91:e01198-17, Aug 2017	
	58.	HALBERT et al., Repeat Transduction in the Mouse Lung by Using Adeno-Associated Virus Vectors with Different Serotypes, J. Virol, 74(3):1524-1532, Feb 2000	
	59.	HAMILTON et al., Adenoviral-Mediated Gene Transfer to Murine Small Intestine Is More Efficient in Neonates Than Adults, J Pediatr Surg. 1997 Feb;32(2):373-7	
	60.	HAUCK et al., Characterization of Tissue Tropism Determinants of Adeno-Associated Virus Type 1, Journal of Virology, Vol. 77, No. 4, p. 2768-2774, (February 2003)	
	61.	HERNANDEZ et al., Latent Adeno-associated virus infection elicits humoral but no cell-mediated immune responses in a nonhuman primate model, Journal of Virology, Vol. 73(10):8549-8558, October 1999.	
	62.	HINDERER et al., Severe Toxicity in nonhuman primates and piglets following hi-dose intravenous administration of an adeno-associated virus vector expressing human SMN, Human Gene Therapy, 29(3):285-98 (Jan 29, 2018)	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **7** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	63.	HU et al., RH10 provides superior transgene expression in mice when compared with natural AAV serotypes for neonatal gene therapy, J. Gene Med, Sept 2010, 12(9): 766–778	
	64.	HUTTNER et al., Genetic Modifications of the Adeno-Associated Virus Type 2 Capsid Reduce the Affinity and the Neutralizing Effects of Human Serum Antibodies, Gene Therapy, 10, (26), pp. 2139-2147, (December 2003)	
	65.	KAWAMURA et al., Hiv-2 in West Africa in 1966, The Lancet, Feb 1989, 385.	
	66.	KWON and SCHAFFER, Designer gene delivery vectors: molecular engineering and evolution of adeno-associated viral vectors for enhanced gene transfer. Pharm Res. 2008 Mar;25(3):489-99. Epub 2007 Sep 1.	
	67.	LE GUENNO, HIV1 and HIV2: two ancient viruses for a new disease? Transactions of the Royal Society of Tropical Medicine and Hygiene, 1989, 83, 847.	
	68.	LI et al., 2015, Site-Directed Mutagenesis of Surface-Exposed Lysine Residues Leads to Improved Transduction by AAV2,But Not AAV8, Vectors in Murine Hepatocytes In Vivo, Hum Gene Ther Methods. 2015 Oct;26(6):211-20.	
	69.	LING et al., Human Hepatocyte Growth Factor Receptor is a Cellular Coreceptor for Adeno-Associated Virus Serotype 3, Human Gene Therapy, 21:1741-1747 (Dec 2010)	
	70.	LING et al., Selective In Vivo Targeting of Human Liver Tumors by Optimized AAV3 Vectors in a Murine Xenograft Model, Hum Gene Ther. 2014 Dec;25(12):1023-34	
	71.	LIU et al., Neutralizing antibodies against AAV2, AAV5 and AAV8 in healthy and HIV-1-infected subjects in China: implications for gene therapy using AAV vectors, Gene Therapy, 21:732-738, May 2014	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **8** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	72.	LOILER et al., Targeting recombinant adeno-associated virus vectors to enhance gene transfer to pancreatic islets and liver. Gene Ther. 2003 Sep;10(18):1551-8.	
	73.	LOOKER et al., An estimate of the global prevalence and incidence of herpes simplex virus type 2, Bull World Health Organ. 2008 Oct;86(10):805-12, A	
	74.	LYTLE et al., Effects of FVIII immunity on hepatocyte and hematopoietic stem cell-directed gene therapy of murine hemophilia A, Methods & Clinical Development, Vol. 3:15056, February 2016.	
	75.	MAO et al., Angiotensin 1-7 Overexpression Mediated by a Capsid-optimized AAV8 Vector Leads to Significant Growth Inhibition of Hepatocellular Carcinoma In vivo, Int. J. Biol. Sci, 14, Jan 2018.	
	76.	MESSINA et al., 2012, Repeat Transduction in the Mouse Lung by Using Adeno-Associated Virus Vectors with Different Serotypes	
	77.	MIMURO et al., The Prevalence of Neutralizing Antibodies Against Adeno-Associated Virus Capsids Is Reduced in Young Japanese Individuals, J. Med Virol, 86:1990-7 Oct 2013	
	78.	MOSKALENO et al., Epitope Mapping of Human Anti-Adeno-Associated Virus Type 2 Neutralizing Antibodies: Implications for Gene Therapy and Virus Structure, J Virol, Feb 2000, 74(4):1761-6	
	79.	MOUNTZ, Monkey see, monkey do, Vol. 10:194-196, Gene Therapy, Vol. 10:194, January 2003.	
	80.	NAM et al., Structure of Adeno-Associated Virus Serotype 8, a Gene Therapy Vector, J Virol, 81(22) :12260-71, Nov 2007	
	81.	NICKLIN et al., Efficient and selective AAV2-mediated gene transfer directed to human vascular endothelial cells. Mol Ther. 2001 Sep;4(3):174-81.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **9** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	82.	NZILAMBI et al., The prevalence of infection with human immunodeficiency virus over a 10-year period in rural zaire, NE J Med, 318(5):276-279, Feb 1988	
	83.	OPIE et al., Identification of Amino Acid Residues in the Capsid Proteins of Adeno-Associated Virus Type 2 that Contribute to Heparan Sulfate Proteoglycan Binding, Journal of Virology, Vol. 77, No. 12, pp. 6995-7006, (June 2003)	
	84.	PIGNATARO et al., Adeno-Associated Viral Vectors Serotype 8 for Cell-Specific Delivery of Therapeutic Genes in the Central Nervous System, Frontiers in Neuroanatomy, Vol. 11(2):1-13, February 2017.	
	85.	RIED et al., Adeno-associated virus capsids displaying immunoglobulin-binding domains permit antibody-mediated vector retargeting to specific cell surface receptors. J Virol. 2002 May;76(9):4559-66.	
	86.	RUTLEDGE et al., Infectious clones and vectors derived from Adeno-Associated Virus (AAV) serotypes other than AAV Type 2, Journal of Virology, Vol. 72(1):309-319, January 1998.	
	87.	SCHNELL et al., Activation of innate immunity in nonhuman primates following intraportal administration of adenoviral vectors, Molecular Therapy, Vol. 3(5):708-722, May 2001.	
	88.	SHEN et al., Characterization of the Relationship of AAV Capsid Domain Swapping to Liver Transduction Efficiency, Mol Ther, Aug 2007, 15(11):1955-62	
	89.	SHI and BARTLETT, RGD inclusion in VP3 provides adeno-associated virus type 2 (AAV2)-based vectors with a heparan sulfate-independent cell entry mechanism. Mol Ther. 2003 Apr;7(4):515-25.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.
This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **10** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	90.	SONNTAG et al., A viral assembly factor promotes AAV2 capsid formation in the nucleolus, PNAS, 107(22):10220-5, June 2010	
	91.	SUHY et al. Safe, Long-term Hepatic Expression of Anti-HCV shRNA in a Nonhuman Primate Model, Mol Ther. 2012 Sep;20(9):1737-49. doi: 10.1038/mt.2012.119. Epub 2012 Jun 26	
	92.	SUN et al., RGD inclusion in VP3 provides adeno-associated virus type 2 (AAV2)-based vectors with a heparan sulfate-independent cell entry mechanism. Mol Ther. 2003 Apr;7(4):515-25.	
	93.	TOMAR et al., Use of adeno-associated viral vector for delivery of small interfering RNA. Oncogene. 2003 Aug 28;22(36):5712-5.	
	94.	VANDENBERGHE et al., Mutational Strategy to Enhance or Rescue Functionality of Existing AAV Vectors, Molecular Therapy, Vol. 11, Supplement 1, 503. pg. 195, (August 15, 2005)	
	95.	VANDENBERGHE et al., Naturally Occurring Singleton Residues in AAV Capsid Impact Vector Performance and Illustrate Structural Constraints, Gene Therapy, 16(12):1416-1428, (December 2009), Supplementary Information, pp. 1-4	
	96.	VERCAUTEREN, Superior In vivo Transduction of Human Hepatocytes Using Engineered AAV3 Capsid, Mol Therapy, 24(6):1042-1049, June 2016	
	97.	WANG et al., Comparative Study of Liver Gene Transfer With AAV Vectors Based on Natural and Engineered AAV Capsids, Molecular Therapy, Dec 2015, 23(12):1877-87	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **11** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	98.	WANG et al., Enhancing Transgene Expression from Recombinant AAV8 Vectors in Different Tissues Using Woodchuck Hepatitis Virus Post-Transcriptional Regulatory Element, International Journal of Medical Sciences, Vol. 13(4):286-291, April 2016.	
	99.	WARRINGTON et al., Adeno-Associated Virus Type 2 VP2 Capsid Protein Is Nonessential and Can Tolerate Large Peptide Insertions at Its N Terminus, J Virol, 78(1):6595-6609, June 2004	
	100.	WEITZMAN et al., Adeno-associated virus (AAV) Rep proteins mediate complex formation between AAV DNA and its integration site in human DNA, PNAS, Vol. 91:5808-5812, June 1994.	
	101.	WHITE et al., Targeted gene delivery to vascular tissue in vivo by tropism-modified adeno-associated virus vectors. Circulation. 2004 Feb 3;109(4):513-9. Epub 2004 Jan 19.	
	102.	WOBUS et al., Monoclonal Antibodies against the Adeno-Associated Virus Type 2 (AAV-2) Capsid: Epitope Mapping and identification of Capsid Domains Involved in AAV-2-Cell Interaction and Neutralization of AAV-2 Infection, J Virol, Oct 2000, 74(19) :9281-93	
	103.	WU et al., Mutational Analysis of the Adeno-Associated Virus Type 2 (AAV2) Capsid Gene and Construction of AAV2 Vectors With Altered Tropism, J. Virol, Sept 2000, 74(18) :8635-47.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet **12** of **15**

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	1636
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

NONPATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	104.	WU, ASOKAN & SAMULSKI, Adeno-associated Virus Serotypes: Vector Toolkit for Human Gene Therapy, Molecular Therapy, 14(3):316-327, September 2006.	
	105.	XIAO et al., Gene therapy vectors based on Adeno-Associated Virus Type 1, Journal of Virology, Vol. 73(5):3994-4003, May 1999.	
	106.	ZADORI et al., A viral phospholipase A2 is required for parvovirus infectivity, Developmental Cell, Vol. 1:291-302, August 2001.	
	107.	ZHU et al., Sustained Whole-Body Functional Rescue by Systemic Delivery of AAV8 Vectors in Heart Failure and Muscular Dystrophy Hamsters, Molecular Therapy, Vol. 11(suppl 1):916, May 2005.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

Approved for use through 12/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	13	of	15	Attorney Docket Number	UPN-R3895D2US

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	108.	International Search Report and Written Opinion issued in PCT/US2006/013375, mailed December 13, 2006	
	109.	Restriction Requirement in US Patent Application No. 11/887,679, issued April 1, 2010	
	110.	Response to Restriction Requirement in US Patent Application No. 11/887,679, filed April 30, 2010	
	111.	Non-Final Office Action in US Patent Application No. 11/887,679, issued October 15, 2010	
	112.	Response to Non-Final Office Action in US Patent Application No. 11/887,679, filed January 18, 2011	
	113.	Response to Non-Final Office Action in US Patent Application No. 11/887,679, filed April 1, 2011	
	114.	Final Office Action in US Patent Application No. 11/887,679, issued June 10, 2011	
	115.	Response to Final Office Action in US Patent Application No. 11/887,679, filed August 10, 2011	
	116.	Advisory Action in US Patent Application No. 11/887,679, issued September 1, 2011	
	117.	Response and Request for Continued Examination in US Patent Application No. 11/887,679, filed October 3, 2011	
	118.	Non-Final Office Action in US Patent Application No. 11/887,679, issued August 12, 2013	
	119.	Response to Non-Final Office Action in US Patent Application No. 11/887,679, filed December 12, 2013	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	**14**	of	**15**	Attorney Docket Number	UPN-R3895D2US

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	120.	Non-Final Office Action in US Patent Application No. 11/887,679, issued April 7, 2014	
	121.	Response to Non-Final Office Action in US Patent Application No. 11/887,679, filed September 4, 2014	
	122.	Notice of Allowance in US Patent Application No. 11/887,679, mailed November 17, 2014	
	123.	Restriction Requirement in US Patent Application No. 14/624,671, issued February 13, 2017	
	124.	Response to Restriction Requirement in US Patent Application No. 14/624,671, issued August 14, 2017	
	125.	Non-Final Office Action in US Patent Application No. 14/624,671, issued November 16, 2017	
	126.	Response to Non-Final Office Action in US Patent Application No. 14/624,671, filed May 5, 2015	
	127.	Final Office Action in US Patent Application No. 14/624,671, issued June 25, 2018	
	128.	Response to Final Office Action in US Patent Application No. 14/624,671, filed December 18, 2019	
	129.	Notice of Allowance in US Patent Application No. 14/624,671, mailed January 9, 2019	
	130.	Non-Final Office Action in US Patent Application No. 15/408,567, issued June 30, 2017	
	131.	Response to Non-Final Office Action in US Patent Application No. 15/408,567, filed August 15, 2017	
	132.	Declaration of Oliver Danos, Ph.D. dated August 14, 2018, submitted in Opposition of EP Patent No. 1453547	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	15	of	15	Attorney Docket Number	UPN-R3895D2US

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	133.	Declaration of Prof Asokan, dated August 23, 2018, submitted in Opposition of EP Patent No. 1453547	
	134.	Declaration of Roberto Calcedo, PhD dated September 24, 2018, submitted in Opposition of EP Patent No. 1453547	
	135.	Second declaration of Olivier Danos, Ph.D. dated September 25, 2018, submitted in Opposition of EP Patent No. 1453547	
	136.	Proprietor's Submission pursuant to Rule 116 prior to oral proceedings dated August 24, 2018 submitted in Opposition of EP Patent No. 1453547	
	137.	Opposer's Submission pursuant to Rule 116 prior to oral proceedings dated August 24, 2018 submitted in Opposition of EP Patent No. 1453547	
	138.	Proprietor's Further Submission prior to oral proceedings dated September 26, 2018 submitted in Opposition of EP Patent No. 1453547	
	139.	Opposer's Further Submission prior to oral proceedings dated October 23, 2018 submitted in Opposition of EP Patent No. 1453547	
	140.	Summons to attend oral proceedings and Communication dated March 29, 2018, issued in related European Patent No. 1453547	
	141.	Interlocutory decision in Opposition proceedings issued in related European Patent No. 1453547 on November 30, 2018	
	142.	Statement of Opposition, dated June 20, 2017, filed on related European Patent No. 1453547.	
	143.	Proprietor's Response to the Opposition, dated December 5, 2017, filed on related European Patent No. 1453547.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	309339	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:25 PM
L2	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:28 PM
L3	2101	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2022/05/04 04:48 PM
L4	4142	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:49 PM
L5	3531	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:49 PM
L6	2737	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:49 PM

		("James"))).INV.					
L7	6543	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:50 PM
L8	1403	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:52 PM
L9	330	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:52 PM
L10	168	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 07:35 PM

		WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					

L11	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 07:35 PM

		A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L12	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 07:36 PM
L13	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 07:36 PM

		"11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L14	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:19 PM
L15	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:20 PM
L16	10	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:26 PM
L17	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:27 PM
L18	15018	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:29 PM
L19	1435	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:30 PM

		repeats" OR ITR OR "inverted terminal repeat").clm.					
L20	6482	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:31 PM
L21	166	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:31 PM
L22	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:04 PM

		US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L23	358	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 02:13 PM
L24	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:13 PM

L25	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:17 PM
L26	57	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:50 PM
L27	80	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:54 PM
L28	140	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:55 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	2

Complete if Known	
Application Number	16/368,758
Filing Date	March 28, 2019
First Named Inventor	Luk Vandenberghe
Group Art Unit	~~1636~~ 1658
Examiner Name	Catherine S. Hibbert
Attorney Docket Number	UPN-R3895D2US

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	144.	US-2015/0023924	01-22-2015	High et al.	
	145.	US-2012/0322861	12-20-2012	Byrne et al.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. this collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	2	of	2	Attorney Docket Number	UPN-R3895D2US

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	146.	Non-Final Office Action issued on US Patent Application No. 15/796,115, dated August 21, 2019.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	05/06/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETE FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

PubMed Advanced Search Builder

PubMed.gov

Add terms to the query box

All Fields

Enter a search term

ADD

Show Index

Query box

Enter / edit your search query here

Search

History and Search Details

Search	Actions	Details	Query	Results	Time
#9	•••		Search: **#7 AND #8** ("adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields]) AND ("capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid s"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields]) AND (("minigene"[All Fields] OR "minigenes"[All Fields] OR "expression cassette"[All Fields]) AND ("ITRs"[All Fields] OR "inverted terminal repeats"[All Fields])) AND 2002/01/01:2007/12/31[Date - Publication] AND ("amino acid"[All Fields] AND "665"[All Fields]) **Translations** **capsid:** "capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid's"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields] **minigene:** "minigene"[All Fields] OR "minigenes"[All Fields]	0	12:00:55
#8	•••		Search: **("amino acid" AND "665")** "amino acid"[All Fields] AND "665"[All Fields]	765	12:00:44

#7	•••	Search: **#3 AND #4** Filters: **from 2002 - 2007** (("adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields]) AND ("capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid s"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields]) AND (("minigene"[All Fields] OR "minigenes"[All Fields] OR "expression cassette"[All Fields]) AND ("ITRs"[All Fields] OR "inverted terminal repeats"[All Fields]))) AND (2002:2007[pdat]) **Translations** **capsid:** "capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid's"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields] **minigene:** "minigene"[All Fields] OR "minigenes"[All Fields]	2	11:58:52
#6	•••	Search: **#3 AND #4** Filters: **from 2002 - 2008** (("adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields]) AND ("capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid s"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields]) AND (("minigene"[All Fields] OR "minigenes"[All Fields] OR "expression cassette"[All Fields]) AND ("ITRs"[All Fields] OR "inverted terminal repeats"[All Fields]))) AND (2002:2008[pdat]) **Translations** **capsid:** "capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid's"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields] **minigene:** "minigene"[All Fields] OR "minigenes"[All Fields]	3	11:58:28
#5	•••	Search: **#3 AND #4** ("adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields]) AND ("capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid s"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields]) AND (("minigene"[All Fields] OR "minigenes"[All Fields] OR "expression cassette"[All Fields]) AND ("ITRs"[All Fields] OR "inverted terminal repeats"[All Fields])) **Translations** **capsid:** "capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid's"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields] **minigene:** "minigene"[All Fields] OR "minigenes"[All Fields]	6	11:58:04

#4	•••	Search: **(minigene or "expression cassette") AND (ITRs OR "inverted terminal repeats")** ("minigene"[All Fields] OR "minigenes"[All Fields] OR "expression cassette"[All Fields]) AND ("ITRs"[All Fields] OR "inverted terminal repeats"[All Fields]) **Translations** **minigene:** "minigene"[All Fields] OR "minigenes"[All Fields]	25	11:57:53
#3	•••	Search: **(("adenoassociated virus" OR "adeno-associated virus" OR AAV) AND capsid)** ("adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields]) AND ("capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid s"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields]) **Translations** **capsid:** "capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid's"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields]	1,596	11:57:17

Showing 1 to 7 of 7 entries

FOLLOW NCBI

Connect with NLM

National Library of Medicine
8600 Rockville Pike
Bethesda, MD 20894

Web Policies
FOIA
HHS Vulnerability Disclosure

Help
Accessibility
Careers

NLM NIH HHS USA.gov

Dialog®

STIC
Scientific and Technical Information Center

Search Strategy from Dialog

May 06 2022 12:13

Search Strategy

Databases: ABI/INFORM® Professional Advanced, Abstracts in New Technology & Engineering, AdisInsight: Drugs, AdisInsight: Trials, Adis Pharmacoeconomics & Outcomes News, AGRICOLA, AGRIS, Allied & Complementary Medicine™, Analytical Abstracts, APA PsycInfo®, Aqualine, Aquatic Science & Fisheries Abstracts (ASFA), Australian Education Index, BIOSIS® Toxicology, BIOSIS Previews®, British Library Inside Conferences, British Nursing Index, Business & Industry, CAB ABSTRACTS, Chemical Business Newsbase, Chemical Engineering & Biotechnology Abstracts, Chemical Safety Newsbase, Civil Engineering Abstracts, ClinicalTrials.gov, Current Contents® Search, Derwent Drug File, Derwent Drug Registry, DH-DATA: Health Administration, Medical Toxicology & Environmental Health, DIOGENES® FDA Regulatory Updates, Drug Information Fulltext, Earthquake Engineering Abstracts, EconLit, Ei Compendex®, Ei EnCompassLIT, Embase®, EMCare®, ERIC, ESPICOM Pharmaceutical & Medical Device News, FDAnews, FLUIDEX (Fluid Engineering Abstracts), Foodline®: MARKET, Foodline®: PRODUCT, Foodline®: SCIENCE, FSTA®, Gale Group Computer Database™, Gale Group Health Periodicals Database, Gale Group New Product Announcements / Plus®, Gale Group Newsletter Database™, Gale Group PharmaBiomed Business Journals, Gale Group PROMT®, Gale Group Trade & Industry Database™, GEOBASE, GeoRef, Global Health, HSELINE: Health and Safety, ICONDA - International Construction Database, IMS Company Profiles, IMS New Product Focus, IMS Pharma Trademarks, IMS R&D Focus, IMS R&D Focus Drug News, Inspec®, International Pharmaceutical Abstracts, Jane's Defense & Aerospace News, King's Fund, KOSMET: Cosmetic Science, Lancet Titles, Material Safety Datasheets - OHS™, Mechanical & Transportation Engineering Abstracts, MEDLINE®, Meteorological & Geoastrophysical Abstracts, Morressier Life Science Conference Abstracts and Posters, New England Journal of Medicine, Northern Light Life Sciences Conference Abstracts, NTIS: National Technical Information Service, Oceanic Abstracts, PAIS International, Paperbase, PAPERCHEM, ProQuest Advanced Tech & Aerospace Professional, ProQuest Biological & Health Science Professional, ProQuest Dissertations and Theses Professional, ProQuest Environmental Science Professional, ProQuest Materials Research Professional, ProQuest Newsstand Professional, ProQuest Technology Research Professional, Prous Science Daily Essentials, Prous Science Drug Data Report, Prous Science Drugs Of The Future™, Publicly Available Content, Registry of Toxic Effects of Chemical Substances (RTECS®), SciSearch®: a Cited Reference Science Database, Social SciSearch®, ToxFile®, Transport Research International Documentation, TULSA™ (Petroleum Abstracts), UBM Computer Full Text, Weldasearch®, Zoological Record

Set#	Searched for	Results
S1	(("AAV" OR "adenoassociated virus" or "adeno-associated virus"))	512733*
S2	(("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV"))	518408*
S3	(("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid)	13639*
S4	(("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette"))	1117°
S5	(("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats"))	556°

S6	((("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats"))) and (pd(1995-2008))	149°
S7	((("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats"))) and (pd(1995-2007))	132°
S8	(("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats")) AND "rh46"	0°
S9	(("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats")) AND "*rh46"	0°
S10	(("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats")) AND (("amino acid" AND "665"))	56°
S11	((("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats")) AND (("amino acid" AND "665"))) and (pd(1999-2008))	17°
S12	((("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats")) AND (("amino acid" AND "665"))) and (pd(1999-2007))	16°
S13	((("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats")) AND (("amino acid" AND "665"))) and (pd(1999-2006))	14°
S14	((("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or	9°

	"inverted terminal repeats")) AND (("amino acid" AND "665"))) and (pd(1999-2005))	
S15	(("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV")) AND (("AAV" OR "adenoassociated virus" or "adeno-associated virus" OR "rAAV") NEAR/6 capsid) AND ((minigene or "expression cassette")) AND ((ITRs or "inverted terminal repeats")) AND (("amino acid" AND "665")) AND (("amino acid" NEAR/5 "665"))	1°

* Duplicates are removed from the search, but included in the result count.

° Duplicates are removed from the search and from the result count.

Contact ProQuest
Copyright © 2022 ProQuest LLC. All rights reserved. - Terms and Conditions

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	309339	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:25 PM
L2	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:28 PM
L3	2101	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2022/05/04 04:48 PM
L4	4142	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:49 PM
L5	3531	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:49 PM
L6	2737	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:49 PM

		("James"))).INV.					
L7	6543	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:50 PM
L8	1403	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:52 PM
L9	330	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:52 PM
L10	168	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 07:35 PM

		WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					

L11	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 07:35 PM

		A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L12	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 07:36 PM
L13	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 07:36 PM

		"11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L14	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:19 PM
L15	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:20 PM
L16	10	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:26 PM
L17	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:27 PM
L18	15018	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:29 PM
L19	1435	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:30 PM

		repeats" OR ITR OR "inverted terminal repeat").clm.					
L20	6482	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:31 PM
L21	166	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:31 PM
L22	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:04 PM

		US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L23	358	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 02:13 PM
L24	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:13 PM

L25	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:17 PM
L26	57	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:50 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/368,758	Filing Date 03/28/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	11/11/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 27	Minus	** 43	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 13	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/DEIDRE C KING-WOODWARD/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/368,758	Confirmation No.:	7840
Applicant	:	The Trustees of the University of Pennsylvania		
Filed	:	March 28, 2019		
TC/A.U.	:	1636		
Examiner	:	Catherine S Hibbert		
Customer No.	:	00270		
Title	:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE AND AMENDMENT

Sir:

This paper is in response to the Office Action dated May 12, 2022, setting a three-month period for response. Kindly extend the period for response for three (3) months from August 12, 2022 to November 12, 2022. The fee due for the extension is being filed herewith.

Kindly enter the following:

Amendments to the Specification begin on page 2.

Amendments to the Claims begin on page 3.

Remarks/Arguments begin on page 9.

AMENDMENTS TO THE SPECIFICATION

In the specification:

On page 1, lines 21-25, please replace the existing paragraph with the following paragraph:

INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED IN ELECTRONIC FORM

Applicant hereby incorporates by reference the Sequence Listing material filed in electronic form herewith. This file is labeled "R3895D2US_Seq-Listing_ST25.txt", was created on March 27, 2019, and has a size of 259,545 bytes.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1(Currently Amended). An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have i) the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), or ii) an amino acid sequence having at least 95% identity to the full length of amino acids 1 to 738 of SEQ ID NO:4, wherein the amino acid residue corresponding to position 665 in SEQ ID NO: 4 is not S when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4.

2 (Currently Amended). The AAV according to claim 1, wherein the AAV vp1 capsid proteins are ~~is~~ encoded by the nucleic acid sequence of SEQ ID NO: 22.

3 (Currently Amended). The AAV according to claim 1, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 4, wherein the amino acid residue corresponding to position 665 is not S when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4.

4 (Currently Amended). A method of generating a recombinant AAV comprising an AAV capsid comprising the steps of culturing a host cell containing: (a) a nucleic acid sequence encoding an AAV capsid protein selected from SEQ ID NO: 4 or a sequence sharing at least 95% identity therewith, wherein the amino acid residue

corresponding to position 665 in SEQ ID NO: 4 is not S when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid.

5 (Cancelled).

6 (Previously Presented). The AAV according to claim 1, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

7 (Previously Presented). A composition comprising the AAV according to claim 1 and a physiologically compatible carrier.

8-24 (Canceled).

25 (Previously Presented). The AAV according to claim 1, wherein the heterologous gene encodes an ornithine transcarbamylase, arginosuccinate synthetase, arginosuccinate lyase, arginase, fumarylacetacetate hydrolase, carbamoyl phosphate synthetase I, phenylalanine hydroxylase, alpha-1 antitrypsin, glucose-6-phosphatase, porphobilinogen deaminase, cystathione beta-synthase, branched chain ketoacid decarboxylase, isovaleryl-coA dehydrogenase, propionyl-CoA carboxylase, methylmalonyl-CoA mutase, glutaryl-CoA dehydrogenase (GCDH), betaglucosidase, pyruvate carboxylate, hepatic phosphorylase, phosphorylase kinase, β-glucuronidase (GUSB), or glycine decarboxylase, a low density lipoprotein (LDL) receptor, high density lipoprotein (HDL) receptor, very low density lipoprotein (VLDL) receptor, scavenger receptor, glucocorticoid receptor, estrogen receptor, Vitamin D receptor, nuclear receptor, cystic fibrosis transmembrane regulator (CFTR) sequence, Factor IX or variants thereof, Factor VIII or variants thereof, a dystrophin gene product, or an immunoglobulin.

26 (Withdrawn). The AAV according to claim 25, wherein the immunoglobulin comprises IgG, IgM, IgA, IgD, IgE, a chimeric immunoglobulin, a humanized antibody, and/or a single chain antibody.

27 (Previously Presented). The AAV according to claim 25, wherein the dystrophin gene product is a mini-dystrophin or micro-dystrophin.

28 – 45 (Canceled).

46 (Currently Amended). The AAV according to claim 1, wherein the amino acid residue corresponding to position 665 is N.

47 (Currently Amended). The method according to claim 4, wherein the amino acid residue corresponding to position 665 is N.

48 (Canceled).

49 (New). An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp2 proteins have i) the sequence of amino acids 138 to 738 of SEQ ID NO: 4 (AAVrh46), or ii) an amino acid sequence having at least 95% identity to the full length of amino acids 138 to 738 of SEQ ID NO:4, wherein the amino acid residue corresponding to position 665 in SEQ ID NO: 4 is not S when aligned along the full length of amino acids 138 to 738 of SEQ ID NO: 4.

50 (New). The AAV according to claim 49, wherein the AAV vp2 capsid proteins are encoded by nucleotides 412 to 2217 of the nucleic acid sequence of SEQ ID NO: 22.

51 (New). The AAV according to claim 49, wherein the AAV vp2 capsid protein has an amino acid sequence which is at least 97% identical to the full length of amino acids 138 to 738 of SEQ ID NO: 4, wherein the amino acid residue corresponding to position 665 is not S when aligned along the full length of amino acids 138 to 738 of SEQ ID NO: 4.

52 (New). The AAV according to claim 49, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

53 (New). A composition comprising the AAV according to claim 49 and a physiologically compatible carrier.

54 (New). The AAV according to claim 49, wherein the heterologous gene encodes an ornithine transcarbamylase, arginosuccinate synthetase, arginosuccinate lyase, arginase, fumarylacetacetate hydrolase, carbamoyl phosphate synthetase I, phenylalanine hydroxylase, alpha-1 antitrypsin, glucose-6-phosphatase, porphobilinogen deaminase, cystathione beta-synthase, branched chain ketoacid decarboxylase, isovaleryl-coA dehydrogenase, propionyl-CoA carboxylase, methylmalonyl-CoA mutase, glutaryl-CoA dehydrogenase (GCDH), betaglucosidase, pyruvate carboxylate, hepatic phosphorylase, phosphorylase kinase, β-glucuronidase (GUSB), or glycine decarboxylase, a low density lipoprotein (LDL) receptor, high density lipoprotein (HDL) receptor, very low density lipoprotein (VLDL) receptor, scavenger receptor, glucocorticoid receptor, estrogen receptor, Vitamin D receptor, nuclear receptor, cystic fibrosis transmembrane regulator (CFTR) sequence, Factor IX or variants thereof, Factor VIII or variants thereof, a dystrophin gene product, or an immunoglobulin.

55 (New). The AAV according to claim 54, wherein the dystrophin gene product is a mini-dystrophin or micro-dystrophin.

56 (New). The AAV according to claim 49, wherein the amino acid residue corresponding to position 665 is N.

57 (New). An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp3 proteins have i) the sequence of amino acids 204 to 738 of SEQ ID NO: 4 (AAVrh46), or ii) an amino acid sequence having at least 95% identity to the full length of amino acids 204 to 738 of SEQ ID NO:4, wherein the amino acid residue corresponding to position 665 in SEQ ID NO: 4 is not S when aligned along the full length of amino acids 204 to 738 of SEQ ID NO: 4.

58 (New). The AAV according to claim 57, wherein the AAV vp3 capsid proteins are encoded by nucleotides 610 to 2217 of the nucleic acid sequence of SEQ ID NO: 22.

59 (New). The AAV according to claim 57, wherein the AAV vp3 capsid protein has an amino acid sequence which is at least 97% identical to the full length of amino acids 204 to 738 of SEQ ID NO: 4, wherein the amino acid residue corresponding to position 665 is not S when aligned along the full length of amino acids 204 to 738 of SEQ ID NO: 4.

60 (New). The AAV according to claim 57, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

61 (New). A composition comprising the AAV according to claim 57 and a physiologically compatible carrier.

62 (New). The AAV according to claim 57, wherein the heterologous gene encodes an ornithine transcarbamylase, arginosuccinate synthetase, arginosuccinate lyase, arginase, fumarylacetacetate hydrolase, carbamoyl phosphate synthetase I, phenylalanine hydroxylase, alpha-1 antitrypsin, glucose-6-phosphatase, porphobilinogen deaminase, cystathione beta-synthase, branched chain ketoacid decarboxylase, isovaleryl-coA dehydrogenase, propionyl-CoA carboxylase, methylmalonyl-CoA mutase, glutaryl-CoA dehydrogenase (GCDH), betaglucosidase, pyruvate carboxylate, hepatic phosphorylase, phosphorylase kinase, β-glucuronidase (GUSB), or glycine decarboxylase, a low density lipoprotein (LDL) receptor, high density lipoprotein (HDL) receptor, very low density lipoprotein (VLDL) receptor, scavenger receptor, glucocorticoid receptor, estrogen receptor, Vitamin D receptor, nuclear receptor, cystic fibrosis transmembrane regulator (CFTR) sequence, Factor IX or variants thereof, Factor VIII or variants thereof, a dystrophin gene product, or an immunoglobulin.

63 (New). The AAV according to claim 62, wherein the dystrophin gene product is a mini-dystrophin or micro-dystrophin.

64 (New). The AAV according to claim 57, wherein the amino acid residue corresponding to position 665 is N.

ARGUMENTS/REMARKS

After entry of this paper, claims 1-4, 6-7, and 25-27, 46-47, and 49-64 are pending. Claims 1-3, 4, 46, and 47 have been amended for clarity. New claims 49-64 have been added and claims 24, 28-31, 36-37, and 48 have been newly canceled without prejudice to refiling the same in one or more continuing applications.

Sequence Listing

The Examiner has indicated that the Sequence Listing filed on March 28, 2019 is deficient because the date of creation and the size of the ASCII text file in bytes is missing from the Incorporation by Reference Statement regarding the Sequence Listing.

In response, submitted herein is an amendment to the specification adding the date of creation and size of the text file to the Incorporation by Reference Statement. No other changes were made to the specification and no new matter has been introduced to this application by reason of any of the amendments presented herewith.

Claim Rejections under 35 USC §112

Claims 3 and 30 have been rejected under 35 U.S.C. §112 (pre-AIA), second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor, or a joint inventor, regards as the invention. With respect to claim 3, the Examiner contends that it is unclear because the claim does not include the proviso that amino acid 665 is not S.

Applicant respectfully disagrees with the Examiner. However solely in the interest of advancing prosecution, Applicant has amended claim 3 to recite that the amino acid residue corresponding to position 665 is not S. Applicant respectfully submits that claim 3 as amended is clear to the skilled artisan.

With respect to claim 30, Applicant respectfully disagrees with the Examiner, but solely in the interest of advancing prosecution, Applicant has canceled claim 30, thereby rendering this rejection moot.

Claim 24 has been rejected under pre-AIA 35 U.S.C. §112, 4th paragraph, as allegedly of improper dependent form.

Applicant respectfully disagrees with the Examiner, but solely in the interest of advancing prosecution, Applicant has canceled claim 24, thereby rendering this rejection moot.

The objections to claims 2, 3 and 24 are addressed by the foregoing amendments.

Claim Rejections under 35 USC §103

Claims 1-4, 6-7, 25, 27-31, 36-37, and 46-48 are rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over USPGPub 2007/0036760 to Wilson et al. (published 02/15/2007).

Applicant respectfully traverses this rejection as Wilson et al is disqualified as prior art under pre-AIA 35 U.S.C. §103(c). Section 103(c)(1) states that subject matter developed by another person, which qualifies as prior art under one or more of subsections (e), (f), and (g) of section 102, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person.

At the time the claimed invention was made, the named inventors of both applications were employees of the University of Pennsylvania, with obligations to assign to THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA. Therefore, the subject matter of Wilson et al and the claimed invention were both under an obligation of assignment to THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA at the time the claimed invention was made. Pursuant to those obligations each of the applications have been assigned to THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA (recorded assignments at Reel 017749, Frame 0058 and Reel 019980 Frame 0580, attached). Thus, Wilson et al. does not qualify as prior art per 35 U.S.C. §103(c). Therefore, withdrawal of this rejection is respectfully requested.

Claims 36-37 are further rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over Gao et al "Clades of Adeno-associated viruses are widely disseminated in human tissues" (J. Virol. June, 2004, Vol 78, No. 12: pages 6381-6388; as evidenced by the attached Score results for Gao et al, J Virol), in view of Gao et al in "Novel adeno-associated viruses from rhesus monkeys as vectors for human gene therapy" (PNAS, 2002, Vol 99: pages 11854-11859).

Applicant respectfully disagrees with the Examiner, but solely in the interest of advancing prosecution, Applicant has canceled claims 36-37, thereby rendering this rejection moot.

The Director is hereby authorized to charge any deficiency in any fee due with the filing of this paper, or credit any overpayment in this fee to our Deposit Account No. 08-3040.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: November 11, 2022

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
325 Sentry Parkway
Five Sentry East, Suite 160
Blue Bell, PA 19422
Telephone: 215-540-9200
Facsimile: 215-540-5818
cschaller@HowsonIPLaw.com

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	**11/11/2022 04:30:09 PM ET**	**UPN-R3895D2US**

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Erika Henry
PATENT CENTER #	61168908	FILING DATE	03/28/2019
CUSTOMER #	270	FIRST NAMED INVENTOR	Luk VANDENBERGHE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Colleen Schaller

Documents

TOTAL DOCUMENTS: 21

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
R3895USD2_20221111_Third-IDS.pdf		6	-	170 KB
R3895USD2_20221111_Third-IDS-TRAN.LET.pdf	(1-2)	2	Transmittal Letter	94 KB
R3895USD2_20221111_Third-IDS-IDS.pdf	(3-6)	4	Information Disclosure Statement (IDS) Form (SB08)	165 KB
EP1486567A1.pdf		22	Foreign Reference	1009 KB
2001068888.pdf		53	Foreign Reference	5425 KB
CA2453405.pdf		48	Foreign Reference	246 KB

moskalenko.pdf	6	Non Patent Literature	2875 KB
Q6JC56.pdf	1	Non Patent Literature	50 KB
CR3919482.pdf	48	Non Patent Literature	1790 KB
Score14338200.pdf	3	Non Patent Literature	159 KB
Score14429559.pdf	3	Non Patent Literature	158 KB
Score15255295.pdf	3	Non Patent Literature	159 KB
DMD.pdf	26	Non Patent Literature	1768 KB
CN-OA.pdf	7	Other reference-Patent/Application/Search Documents	318 KB
EESR.pdf	9	Other reference-Patent/Application/Search Documents	591 KB
NFOA.pdf	28	Other reference-Patent/Application/Search Documents	1590 KB
NFOA-2022.pdf	13	Other reference-Patent/Application/Search Documents	521 KB
CN-OA_translation.pdf	5	Other reference-Patent/Application/Search Documents	248 KB
R3895D2US_20221111_Response-NFOA_Final.pdf	11	-	150 KB
R3895D2US_20221111_Response-NFOA_Final-A....pdf (1-1)	1	Amendment/Request for Reconsideration-After Non-Final Rejection	83 KB

R3895D2US_20221111_Response-NFOA_Final-SPEC.pdf	(2-2)	1	Specification	82 KB
R3895D2US_20221111_Response-NFOA_Final-CLM.pdf	(3-8)	6	Claims	109 KB
R3895D2US_20221111_Response-NFOA_Final-REM.pdf	(9-11)	3	Applicant Arguments/Remarks Made in an Amendment	117 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
R3895USD2_20221111_Third-IDS.pdf	FEE422901057D1778BE1FBE27E3999EE6EB3D93DD4B878D11A0CCB4B974E9FF6569301FB56B01C76E67CC67548BD80201B984D7D3774BDEC6EF09B86F4B37845
R3895USD2_20221111_Third-IDS-TRAN.LET.pdf	0471CEFFCB374D007F5C76B85F9D1DDF709F65CFFDA0CB027590C3421A6711643B50297630E181405124F85588C848B410C2CA04620AF3425FFA0C53F29C4363
R3895USD2_20221111_Third-IDS-IDS.pdf	170A69684A1CE5366B08A3524284B22E9E2AD896F2CC507693728D50206D923BCB206D85447D3856E7775338A3FC8F687C08BDC02F0CB31D602C4BCF1400E95
EP1486567A1.pdf	58FC4317E2D84EC89C5BC7E3D1FB9F8CAC8A7C14D0498BED1116F3CBACC09754FA551B27C2E174F30F059A81B24FF3E8CEF502D8CFD4D80174FD559AD8EC9E67
2001068888.pdf	922D833793827C18A06ECF9C8F58B884E7270457C323E39B4648A32B1B196EF49F355980BAFDB7671F0E143A42AEDC794A8C8D589CD5A589AE4BF3ECFAF67671
CA2453405.pdf	36BCA91B3D9935945AEF129F9A7D652F9B0827BAA585C687F50835894A11579A8E2921704DF439DF287A6E8C436C78B693A

	B26A33F5E0DA3C873C3796A730285
moskalenko.pdf	255B63B2E66EABAAA3CB7DCA37C7C209621104E46850CFB040A7749FD24719E5819215C16F3E407848C551824409A09F7D5480C6A0303892F6EBB89DDA4BF3E7
Q6JC56.pdf	F1BDE40FC67302DABC99B385BB95B3C3255801E0A6B0CF08B8E8CF4D6D02ADCC42E8BCB342A38B4B01C57F58D6BC90238589738B80E77F0FC7A1FF11A2371B84
CR3919482.pdf	B5558CDF3996F03055F165754FFED091066D55E09F9901321747E23B226A01583DE99C99EB69AF610EC32AAB0246D0E42AE955A7521DB2F8100D765C40CE615B
Score14338200.pdf	6A7BE0C2155CF8F31BCF277129E8554F8BFFF6BD2C9E0D1986C65F1E0130418F4CD82C5DBE792432488528C7B365FCF93E6D7DB02EF1B577393D005EEB3D198A
Score14429559.pdf	698DD0584E5C8FF7DCF21432D0BC3A71DE3747E779AE6F01163068A79F268BA275EE1EE40D41805458D1A320BA65BA17094773E5282000AC215817F114A2BA58
Score15255295.pdf	FE2BB6F844EE0250A8F2CC13F5B5A0E8D5989E21C1133976DCC550B1844C7E7DA1021508DBA6F0849E22CAB8DDDF328EEB4087839920687AAF7F9A17A79EFD0B
DMD.pdf	878719EF565097F62E9A1D8A72C782BD51C9EE0374B3457DF7B6436C114AC4D9B9076D00EDA803FFC8BDA9EA62478F62F8C38DE257410DD3914B7D0890533259
CN-OA.pdf	878BCDFD96DD64CDC2BDFD99C3D72FEE0818757EBBB60DEB3DC4C3E88342CBA86D535A46262B5BA8FDB6296C2A34E2C9F5CAB32A279B9D2FE752392E56AFE256
EESR.pdf	8FAA7F00880CE32DA5695E8BC7FF595FD9AB268F1FC811DCDACABA598B797D38E5EB7D435F8638D7505AD6D5D35A425AF3C4E05FF65A285A612706692923E5E5
NFOA.pdf	B9D4835420867DBFBE781A3B23E940E94F6B546962C49C7D8D9F3715E44B1F665114F6A1FEE098B0B9DE0448AEF1D35A6E

	A3ECEB787EC1B63D82F9168BD41812
NFOA-2022.pdf	F486C9BA14978EA71462CF58499E7BA2D4A25491619CB7B2F F62C04E0CA56F51EBFBC154174A4000A42560072451702C85C 2342CC21D74FFFC9511F0AE4C06AC
CN-OA_translation.pdf	9FC5C065DDD052D2E085DA2C9D3EEF55469A1F1C1A3562C2 C0F0370AB919F1F3E439BB6FF26BA632EE14CEFC36EC5A774 D12D7F86201F093E23224C81D235F50
R3895D2US_20221111_Response-NFOA_Final.pdf	D15F2CC5C89BC2C13AC09884B5A01B70D82EC8DCEDA6DDF D5F4773A76DF0C451C401C7DF769321A546194E349A8DB24C 44F6983EF1DBB10A09422416E6FCF820
R3895D2US_20221111_Response-NFOA_Final-A....pdf	54CB7A8162D0D179156304B204D2B3A468D8FABC91E9AEBA B7715D905DD3461F8C30EE83B5F2C236D8820FE4F87538ADE 91229BD44A28BA27CC349591BB0DDC5
R3895D2US_20221111_Response-NFOA_Final-SPEC.pdf	2B59E1A55960A8DF685FB5A4D2AC7E2ACAF61164BC9EDE17 7CF1B58CF284C5EBF1ED67C30BA25D06F4EA282944607B4D D715CD4DF2E311FCF2950C9290169AE9
R3895D2US_20221111_Response-NFOA_Final-CLM.pdf	4BD77A75E54F9BF7432841A1259C7D764BBE6F8D5B416F2249 48F9172B4B3C565A9CB749CD324FE21009D3F4194501280039 84EDB3E13A158296E3E5CAE9FEB3
R3895D2US_20221111_Response-NFOA_Final-REM.pdf	D21F5E138D97D2309FD35078B31A5B23BAFE40EC79FF273C4 FA518AA726BE9ED4A206E834D2BF944AA16E1CC132517B7F9 8BF446D418ACFF9D0F8C7F4A8AFD42

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	11/11/2022 04:30:09 PM ET	UPN-R3895D2US

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Erika Henry
PATENT CENTER #	61168908	AUTHORIZED BY	Colleen Schaller
CUSTOMER #	270	FILING DATE	03/28/2019
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Luk VANDENBERGHE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 8412	E2022AAG31113074	Colleen Schaller

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
083040	37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1253	EXTENSION FOR RESPONSE WITHIN THIRD MONTH	1480.00	1	1480.00
1806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	260.00	1	260.00
			TOTAL AMOUNT:	$1,740.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized

by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/368,758 Confirmation No.: 7840
Applicant	:	The Trustees of the University of Pennsylvania
Filed	:	March 28, 2019
TC/A.U.	:	1636
Examiner	:	Catherine S. Hibbert
Customer No.	:	00270
Title	:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Mail Stop Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

THIRD INFORMATION DISCLOSURE STATEMENT

Sir:

Applicant submits to the Examiner the attached document listings and this paper pursuant to 37 CFR §§1.56 and 1.97-1.98. The forms and documents are attached.

This Information Disclosure Statement is submitted more than three months from the filing date of this application and after the receipt of a first Office Action on the merits. Therefore, the fee of $260 is believed due and the Director is hereby authorized to charge the fee of $260 to our Deposit Account Number 08-3040.

The Director is hereby authorized to charge any deficiency in any fees due with the filing of this paper or credit any overpayment in any fees to our Deposit Account Number 08-3040.

REMARKS

Pursuant to 37 CFR §1.98(a)(1), this/these item(s) is/are included on the attached form entitled "Other information submitted for consideration by the Office". The attached are/is submitted solely in an effort to ensure that the Examiner has an opportunity to consider information that was considered by a foreign patent office(s). However, Applicant(s) maintain(s) that the mere submission of this/these document(s) is not an admission that the same is material to patentability (See MPEP §609). Also provided is/are the official Response(s) thereto, where applicable.

The Examiner is respectfully requested to consider the document(s) identified in this paper and in the attached form(s) during the course of examination of this application.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: November 11, 2022

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
325 Sentry Parkway
Five Sentry East, Suite 160
Blue Bell, PA 19422
Telephone: 215-540-9200
Facsimile: 215-540-5818
cschaller@HowsonIPLaw.com

INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	1	of	4	Attorney Docket Number	UPN-R3895.US.D2

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	147.	US 2017/0209598 A1	07-27-2017	Mendell et al.	
	148.	US 2016/0375110 A1	12-29-2016	High et al.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(Use as many sheets as necessary)*				***Complete if Known***	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	**2**	of	**4**	Attorney Docket Number	UPN-R3895.US.D2

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]- Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	149.	EP-1486567A1	12-15-2004	Deutsches Krebsforsch		
	150.	WO-2001/068888	09-20-2001	Neurologix, Inc.		
	151.	CA-2453405A1	01-23-2003	University of Iowa Research Foundation		

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04.

[3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

[5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

[6] Applicant is to place a check mark here if English language Translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	3	of	4	Attorney Docket Number	UPN-R3895.US.D2

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	152.	Moskalenko et al., Epitope Mapping of Human Anti-Adeno-Associated Virus Type 2 Neutralizing Antibodies: Implications for Gene Therapy and Virus Structure, Journal of Virology, Vol. 74(4):1761-1766, February 2000.	
	153.	GenBank Accession No. CR391948.2, March 3, 2005.	
	154.	GenBank Entry Q6JC56, July 5, 2004.	
	155.	SCORE 14/338,200, Sequence 2, 2015.	
	156.	SCORE 14/429,559, Sequence 80, 2016.	
	157.	SCORE 15/255,295, Sequence 1, 2014.	
	158.	DMD GeneCards, GC0XM031047, 2020.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] Applicant is to place a check mark here if English language Translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636
				Examiner Name	Catherine S. Hibbert
Sheet	4	of	4	Attorney Docket Number	UPN-R3895.US.D2

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	159.	Office Action dated December 4, 2019, in Chinese Patent Application No. 201611102646.6	
	160.	Extended European Search Report, dated November 4, 2019, in corresponding Divisional Patent Application No. 19178288.7	
	161.	Non-Final Office Action issued on corresponding US Patent Application No. 16/818,130, dated September 18, 2020 and Response filed December 18, 2020.	
	162.	Non-Final Office Action dated January 20, 2022 issued in corresponding US Patent Application No. 16/818,130.	

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] Applicant is to place a check mark here if English language Translation is attached.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

270 7590 12/07/2022

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER
HIBBERT, CATHERINE S

ART UNIT	PAPER NUMBER
1658	

DATE MAILED: 12/07/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

TITLE OF INVENTION: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	03/07/2023

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

270 7590 12/07/2022

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

TITLE OF INVENTION: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	03/07/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
HIBBERT, CATHERINE S	1658	514-04400R

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

270 7590 12/07/2022

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER	
HIBBERT, CATHERINE S	
ART UNIT	PAPER NUMBER
1658	

DATE MAILED: 12/07/2022

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/368,758	Applicant(s) VANDENBERGHE et al.	
	Examiner CATHERINE S HIBBERT	Art Unit 1658	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 11/11/2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-4,6-7,25-27 and 46-47 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. 11/30/2022.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/CATHERINE S HIBBERT/
Primary Examiner, Art Unit 1658

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

The Applicants' Amendment to the Claims filed on 11/11/2022 is entered.

The Applicants' Amendment to the Specification filed on 11/11/2022 is entered.

Claims 49-64 are new.

Claims 5, 8-24, 28-45, and 48 are cancelled.

Newly added claims 49-64 are cancelled herein by examiner's amendment.

Claims 1-4, 6-7, 25-27, 46-47 are examined and allowed.

Election/Restrictions

Claim 25 is allowable. The restriction requirement for the species claim 26, as set forth in the Office action mailed on 07/28/2021, has been reconsidered in view of the allowability of claims to the elected invention pursuant to MPEP § 821.04(a). The restriction requirement is hereby withdrawn as to any claim that requires all the limitations of an allowable claim. Specifically, previously withdrawn claim 26 is REJOINED and examined in this office action.

In view of the above noted withdrawal of the restriction requirement, applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See In re Ziegler, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Information Disclosure Statement

The IDS filed on 11/11/2022 has been considered by the examiner.

EXAMINER'S AMENDMENT

Authorization for this examiner's amendment was given in an interview with Colleen Schaller on 11/30/2022.

The application has been amended as follows:

Cancel claims 49-64.

Amend claim 26 as follows:

The AAV according to claim 25, wherein the immunoglobulin is selected from the group consisting of ~~comprises~~ IgG, IgM, IgA, IgD, IgE, a chimeric immunoglobulin, a humanized antibody, and~~/or~~ a single chain antibody.

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:

All objections and rejections made in the previous office action are withdrawn in view of the Applicants' submission on 11/11/2022.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Claims 1-4, 6-7, 25-27, 46-47 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CATHERINE S HIBBERT whose telephone number is (571)270-3053. The examiner can normally be reached M-F 8:00-5:00.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry D Riggs, II can be reached on 571-270-3062. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197

(toll-free). If you would like assistance from a USPTO Customer Service

Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CATHERINE S HIBBERT/
Primary Examiner, Art Unit 1658

Examiner-Initiated Interview Summary	**Application No.** 16/368,758	**Applicant(s)** VANDENBERGHE et al.		
	Examiner CATHERINE S HIBBERT	**Art Unit** 1658	**AIA (First Inventor to File) Status** No	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
CATHERINE S HIBBERT	Primary Examiner	Telephonic
Colleen Schaller	Attorney of Record	

Date of Interview: 01 December 2022

Issues Discussed:

Other

Examiner proposed an Examiner's Amendment to put claims in condition for allowance as shown in the Office Action to which this Summary is attached. The applicants' representative agreed to the amendment.

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	**Art Unit**
	CATHERINE S HIBBERT	1658

CPC							
Symbol						**Type**	**Version**
C12N	/	15	/	86		F	2013-01-01
A61K	/	48	/	0091		I	2013-01-01
C07K	/	14	/	005		I	2013-01-01
C12N	/	7	/	00		I	2013-01-01
A61K	/	48	/	005		I	2013-01-01
C12N	/	2750	/	14122		A	2013-01-01
C12N	/	2750	/	14143		A	2013-01-01
A61K	/	48	/	00		A	2013-01-01
C12N	/	2750	/	14142		A	2013-01-01
C12N	/	2750	/	14152		A	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	11	
/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	01 December 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	none

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	**Art Unit**
	CATHERINE S HIBBERT	1658

INTERNATIONAL CLASSIFICATION					
CLAIMED					
C12N	/	15	/	00	
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
435	320.1

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 11	
/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658 (Primary Examiner)	01 December 2022 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure none

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	**Art Unit**
	CATHERINE S HIBBERT	1658

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	46												
2	2	11	47												
3	3														
4	4														
5	6														
6	7														
7	25														
8	26														
9	27														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	11	
/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	01 December 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	none

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	Art Unit
	CATHERINE S HIBBERT	1658

CPC - Searched*		
Symbol	**Date**	**Examiner**
C12N15/86.cpc. or A61K48/005.cpc. or A61K48/0091.cpc. or C07K14/005.cpc. or C12N7/00.cpc. or A61K48/00.cpc. or C12N2750/14122.cpc. or C12N2750/14142.cpc. or C12N2750/14143.cpc. or C12N2750/14152.cpc.	12/01/2022	CSH

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
Inventor; Assignee search, PALM; PE2E SEARCH	12/01/2022	CSH
PE2E SEARCH, history included	12/01/2022	CSH
Advanced PubMed, history included	12/01/2022	CSH
Proquest, history included	12/01/2022	CSH
Score report	12/01/2022	CSH

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	Art Unit
	CATHERINE S HIBBERT	1658

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
PE2E SEARCH	Interference history included	12/01/2022	CSH
Score report	Interference database	12/01/2022	CSH

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

Bibliographic Data

Application No: 16/368,758

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /CATHERINE S HIBBERT/ Examiner's Signature | Initials

Title: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/28/2019	514	1658	UPN-R3895D2US
RULE			

APPLICANTS

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA, UNITED STATES

INVENTORS

Luk VANDENBERGHE, Weston, MA, UNITED STATES

Guangping GAO, Westborough, MA, UNITED STATES

James M. WILSON, Philadelphia, PA, UNITED STATES

CONTINUING DATA

This application is a DIV of 14624671 02/18/2015 PAT 10301648

14624671 is a DIV of 11887679 10/02/2007 PAT 8999678

11887679 is a 371 of PCT/US2006/013375 04/07/2006

PCT/US2006/013375 has PRO of 60733497 11/04/2005

PCT/US2006/013375 has PRO of 60669083 04/07/2005

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/05/2019

STATE OR COUNTRY

UNITED STATES

ADDRESS

HOWSON & HOWSON LLP

325 Sentry Parkway East, Five Sentry East

Suite 160

Blue Bell, PA 19422

UNITED STATES

FILING FEE RECEIVED

$1,720

An official website of the United States government
Here's how you know

PubMed Advanced Search Builder

PubMed.gov

Add terms to the query box

All Fields

Enter a search term

ADD Show Index

Query box

Enter / edit your search query here

Search

History and Search Details

Search	Actions	Details	Query	Results	Time
#10	•••		Search: **#1 AND #7** Filters: **from 2015 - 2015** (("adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields] OR "rAAV"[All Fields]) AND ("amino acid"[All Fields] AND "665"[All Fields])) AND (2015:2015[pdat])	1	12:00:21
#9	•••		Search: **#1 AND #7** ("adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields] OR "rAAV"[All Fields]) AND ("amino acid"[All Fields] AND "665"[All Fields])	2	12:00:00
#8	•••		Search: **#1 AND #6** ("adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields] OR "rAAV"[All Fields]) AND "rh46"[All Fields] **Warnings** (("adenoassociated virus" OR "adeno-associated virus" OR AAV OR rAAV)) AND (("AAVrh46" OR "rh46")) **Quoted phrase not found in** phrase index**:** AAVrh46	0	11:59:45
#7	•••		Search: **("amino acid" AND "665")** "amino acid"[All Fields] AND "665"[All Fields]	775	11:59:28

#6	•••	Search: **("AAVrh46" OR "rh46")** "rh46"[All Fields] **Warnings** ("AAVrh46" OR "rh46") **Quoted phrase not found in phrase index:** AAVrh46	12	11:58:41
#5	•••	Search: **#1 AND #2 AND #3 AND #4** ("adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields] OR "rAAV"[All Fields]) AND ("capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid s"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields]) AND ("minigene"[All Fields] OR "minigenes"[All Fields] OR "expression cassette"[All Fields]) AND ("ITRs"[All Fields] OR "inverted terminal repeats"[All Fields] OR "ITR"[All Fields] OR "inverted terminal repeat"[All Fields]) **Translations** **capsid:** "capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid's"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields] **minigene:** "minigene"[All Fields] OR "minigenes"[All Fields]	7	11:57:42
#4	•••	Search: **(ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")** "ITRs"[All Fields] OR "inverted terminal repeats"[All Fields] OR "ITR"[All Fields] OR "inverted terminal repeat"[All Fields]	2,387	11:57:19
#3	•••	Search: **(minigene OR "expression cassette")** "minigene"[All Fields] OR "minigenes"[All Fields] OR "expression cassette"[All Fields] **Translations** **minigene:** "minigene"[All Fields] OR "minigenes"[All Fields]	5,062	11:56:59
#2	•••	Search: **capsid** "capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid s"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields] **Translations** **capsid:** "capsid"[MeSH Terms] OR "capsid"[All Fields] OR "capsid proteins"[MeSH Terms] OR ("capsid"[All Fields] AND "proteins"[All Fields]) OR "capsid proteins"[All Fields] OR "capsids"[All Fields] OR "capsid's"[All Fields] OR "capside"[All Fields] OR "capsides"[All Fields]	38,322	11:56:41
#1	•••	Search: **("adenoassociated virus" OR "adeno-associated virus" OR AAV OR rAAV)** "adenoassociated virus"[All Fields] OR "adeno-associated virus"[All Fields] OR "AAV"[All Fields] OR "rAAV"[All Fields]	16,562	11:56:26

Showing 1 to 10 of 10 entries

FOLLOW NCBI







Connect with NLM

National Library of Medicine
8600 Rockville Pike
Bethesda, MD 20894

Web Policies
FOIA
HHS Vulnerability Disclosure

Help
Accessibility
Careers

NLM NIH HHS USA.gov

Dialog®

STIC
Scientific and Technical Information Center

Search Strategy from Dialog

December 01 2022 12:15

Search Strategy

Databases: ABI/INFORM® Professional Advanced, Abstracts in New Technology & Engineering, AdisInsight: Drugs, AdisInsight: Trials, Adis Pharmacoeconomics & Outcomes News, AGRICOLA, AGRIS, Allied & Complementary Medicine™, Analytical Abstracts, APA PsycInfo®, Aqualine, Aquatic Science & Fisheries Abstracts (ASFA), Australian Education Index, BIOSIS® Toxicology, BIOSIS Previews®, British Library Inside Conferences, British Nursing Index, Business & Industry, CAB ABSTRACTS, Chemical Business Newsbase, Chemical Engineering & Biotechnology Abstracts, Chemical Safety Newsbase, Civil Engineering Abstracts, ClinicalTrials.gov, Current Contents® Search, Derwent Drug File, Derwent Drug Registry, DH-DATA: Health Administration, Medical Toxicology & Environmental Health, DIOGENES® FDA Regulatory Updates, Drug Information Fulltext, Earthquake Engineering Abstracts, EconLit, Ei Compendex®, Ei EnCompassLIT, Embase®, Embase® French Local Literature, Embase Preprints, EMCare®, ERIC, ESPICOM Pharmaceutical & Medical Device News, FDAnews, FLUIDEX (Fluid Engineering Abstracts), Foodline®: MARKET, Foodline®: PRODUCT, Foodline®: SCIENCE, FSTA®, Gale Group Computer Database™, Gale Group Health Periodicals Database, Gale Group New Product Announcements / Plus®, Gale Group Newsletter Database™, Gale Group PharmaBiomed Business Journals, Gale Group PROMT®, Gale Group Trade & Industry Database™, GEOBASE, GeoRef, Global Health, HSELINE: Health and Safety, ICONDA - International Construction Database, IMS Company Profiles, IMS New Product Focus, IMS Pharma Trademarks, IMS R&D Focus, IMS R&D Focus Drug News, Inspec®, International Pharmaceutical Abstracts, Jane's Defense & Aerospace News, King's Fund, KOSMET: Cosmetic Science, Lancet Titles, Mechanical & Transportation Engineering Abstracts, MEDLINE®, Meteorological & Geoastrophysical Abstracts, Morressier Life Science Conference Abstracts and Posters, New England Journal of Medicine, Northern Light Life Sciences Conference Abstracts, NTIS: National Technical Information Service, Oceanic Abstracts, PAIS International, Paperbase, PAPERCHEM, ProQuest Advanced Tech & Aerospace Professional, ProQuest Biological & Health Science Professional, ProQuest Dissertations and Theses Professional, ProQuest Environmental Science Professional, ProQuest Materials Research Professional, ProQuest Newsstand Professional, ProQuest Technology Research Professional, Prous Science Daily Essentials, Prous Science Drug Data Report, Prous Science Drugs Of The Future™, Publicly Available Content, Registry of Toxic Effects of Chemical Substances (RTECS®), SciSearch®: a Cited Reference Science Database, Social SciSearch®, ToxFile®, Transport Research International Documentation, TULSA™ (Petroleum Abstracts), UBM Computer Full Text, Weldasearch®, Zoological Record

Set#	Searched for	Results
S1	(("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*))	1260011*
S2	(("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("rh46" or "AAVrh46"))	6°
S3	((("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("rh46" or "AAVrh46"))) and (pd(2003))	1°
S4	(("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("rh46" or "AAVrh46")) AND "665"	0°
S5	(("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665"))	4202°
S6	((("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665"))) and (pd(1920-2009))	1856°
S7	(("adenoassociated virus" OR "adeno-associated virus" OR	421°

	AAV OR AAV)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette"))	
S8	((("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette"))) and (pd(1990-2019))	256°
S9	((("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette"))) and (pd(1991-2006))	99°
S10	(("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat"))	114°
S11	(("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat"))	114°
S12	((("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat"))) and (pd(1993-2005))	28°
S13	(("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")) AND ((variant or mutant))	109°
S14	((("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")) AND ((variant or mutant))) and (pd(1993-2005))	28°
S15	(("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")) AND ((variant or mutant)) AND (("vp1" NEAR/10 capsid))	30°
S16	((("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")) AND ((variant or mutant)) AND (("vp1" NEAR/10 capsid))) and (pd(2003))	1°
S17	(("adenoassociated virus" OR "adeno-associated virus" OR	18°

	AAV OR AAV)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")) AND ((variant or mutant)) AND (("vp1" NEAR/10 capsid)) AND ((capsid NEAR/10 (variant or mutant)))	
S18	((("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")) AND ((variant or mutant)) AND (("vp1" NEAR/10 capsid)) AND ((capsid NEAR/10 (variant or mutant)))) and (pd(2003))	1°
S19	(("adenoassociated virus" OR "adeno-associated virus" OR *AAV OR AAV*)) AND (("amino acid" AND "665")) AND ((minigene OR "expression cassette")) AND ((ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")) AND ((variant or mutant)) AND (("vp1" NEAR/10 capsid)) AND ((capsid NEAR/10 (variant or mutant))) AND ((("vp1" or capside) NEAR/10 "665"))	0°

* Duplicates are removed from the search, but included in the result count.

° Duplicates are removed from the search and from the result count.

Contact ProQuest
Copyright © 2022 ProQuest LLC. All rights reserved. - Terms and Conditions

PE2E SEARCH - Search History (Prior Art)

There are no Prior Art searches to show.

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:27 PM
N2	1435	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:30 PM
N3	166	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:31 PM
N4	1408	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:32 PM
N5	564	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:32 PM
N6	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:33 PM

N7	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:13 PM
N8	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N9	1599	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N10	174	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N11	1620	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N12	647	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N13	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N14	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N15	34	N12 AND N14	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:36 AM
N16	243	(("amino acid" OR residue OR position)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:37 AM

		WITH "665").clm.					
N17	1	N15 AND N16	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:38 AM
N18	2	"AAVrh46".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:42 AM
N19	2	"(AAVrh46)".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N20	2	N18 OR N19	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N21	0	N20 AND N17	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N22	1	N15 AND N20	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:45 AM

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	~~1636~~ 1658
				Examiner Name	Catherine S. Hibbert
Sheet	1	of	4	Attorney Docket Number	UPN-R3895.US.D2

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	147.	US 2017/0209598 A1	07-27-2017	Mendell et al.	
	148.	US 2016/0375110 A1	12-29-2016	High et al.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	12/01/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	~~1636~~ 1658
				Examiner Name	Catherine S. Hibbert
Sheet	2	of	4	Attorney Docket Number	UPN-R3895.US.D2

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]- Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	149.	EP-1486567A1	12-15-2004	Deutsches Krebsforsch		
	150.	WO-2001/068888	09-20-2001	Neurologix, Inc.		
	151.	CA-2453405A1	01-23-2003	University of Iowa Research Foundation		

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	12/01/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04.

[3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

[5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

[6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	1636 1658
				Examiner Name	Catherine S. Hibbert
Sheet	3	of	4	Attorney Docket Number	UPN-R3895.US.D2

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include the name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item, (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	152.	Moskalenko et al., Epitope Mapping of Human Anti-Adeno-Associated Virus Type 2 Neutralizing Antibodies: Implications for Gene Therapy and Virus Structure, Journal of Virology, Vol. 74(4):1761-1766, February 2000.	
	153.	GenBank Accession No. CR391948.2, March 3, 2005.	
	154.	GenBank Entry Q6JC56, July 5, 2004.	
	155.	SCORE 14/338,200, Sequence 2, 2015.	
	156.	SCORE 14/429,559, Sequence 80, 2016.	
	157.	SCORE 15/255,295, Sequence 1, 2014.	
	158.	DMD GeneCards, GC0XM031047, 2020.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	12/01/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known	
				Application Number	16/368,758
				Filing Date	March 28, 2019
				First Named Inventor	Luk Vandenberghe
				Art Unit	~~1636~~ 1658
				Examiner Name	Catherine S. Hibbert
Sheet	4	of	4	Attorney Docket Number	UPN-R3895.US.D2

OTHER INFORMATION SUBMITTED FOR CONSIDERATION BY THE OFFICE (37 CFR §1.98(a)(1))

Examiner Initials*	Cite No.[1]	For unpublished applications, include the name of the inventor (in CAPITAL LETTERS), US serial number, and filing date.	T[2]
	159.	Office Action dated December 4, 2019, in Chinese Patent Application No. 201611102646.6	
	160.	Extended European Search Report, dated November 4, 2019, in corresponding Divisional Patent Application No. 19178288.7	
	161.	Non-Final Office Action issued on corresponding US Patent Application No. 16/818,130, dated September 18, 2020 and Response filed December 18, 2020.	
	162.	Non-Final Office Action dated January 20, 2022 issued in corresponding US Patent Application No. 16/818,130.	

Examiner Signature	/CATHERINE S HIBBERT/	Date Considered	12/01/2022

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S.H/

PE2E SEARCH - Search History (Prior Art)

There are no Prior Art searches to show.

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:27 PM
N2	1435	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:30 PM
N3	166	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:31 PM
N4	1408	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:32 PM
N5	564	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:32 PM
N6	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:33 PM

N7	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:13 PM
N8	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N9	1599	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N10	174	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N11	1620	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N12	647	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N13	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N14	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N15	34	N12 AND N14	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:36 AM
N16	243	(("amino acid" OR residue OR position)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:37 AM

		WITH "665").clm.					
N17	1	N15 AND N16	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:38 AM
N18	2	"AAVrh46".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:42 AM
N19	2	"(AAVrh46)".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N20	2	N18 OR N19	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N21	0	N20 AND N17	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N22	1	N15 AND N20	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:45 AM

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	**12/09/2022 12:04:21 PM ET**	**UPN-R3895D2US**

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	61278256	FILING DATE	03/28/2019
CUSTOMER #	270	FIRST NAMED INVENTOR	Luk VANDENBERGHE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
web85b.pdf	3	Issue Fee Payment (PTO-85B)	62 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
web85b.pdf	006DD295C382A5C4E918EB1509FE74CBDE9CA3D9517D751A 9694E7635C5E5B9AC265F3AADB99F2BF0C9F26D21E1E7B609 D07524FD32EC75677E2CA893F9D327B

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as

described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	12/09/2022 12:04:21 PM ET	UPN-R3895D2US

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	61278256	AUTHORIZED BY	-
CUSTOMER #	270	FILING DATE	03/28/2019
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Luk VANDENBERGHE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 8412	E2022B9C04390482	Colleen Schaller

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1501	UTILITY ISSUE FEE	1200.00	1	1200.00
			TOTAL AMOUNT:	$1,200.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage

submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ISSUE FEE TRANSMITTAL FORM

APPLICATION #	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET #
16368758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Nonprovisional Application under 35 USC 111(a)	DATE DUE	03/07/2023
CONFIRMATION #	7840	ISSUE FEE DUE	$ 1200
EXAMINER	CATHERINE HIBBERT	PUBLICATION DUE	$ 0
GROUP ART UNIT	1658	TOTAL FEES DUE	$1200
CLASS - SUBCLASS	514/04400R	PREV. PAID FEE	$ 0
ENTITY STATUS	Regular Undiscounted		

1. CHANGE OF CORRESPONDENCE ADDRESS AND/OR INDICATION OF FEE ADDRESS (37 CFR 1.33 & 1.363)

Correspondence Address

CURRENT ADDRESS

Maintenance Fee Address

CURRENT ADDRESS

☐ Change of correspondence address requested,system generated AIA/122-PC form attached

☐ Fee address indication requested, system generatedSB/47-PC form attached

2. ENTITY STATUS

Change in Entity Status

NEW STATUS

3. THE FOLLOWING FEES ARE SUBMITTED

- [x] Issue Fee
- [x] Publication Fee
- [ ] Advance Order - # of copies:

4. FEE AUTHORIZATION

- [ ] I authorize USPTO to apply my previously paid issue fee to the current fees due
- [ ] The Director is herby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number:
- [x] If in addition to the payment of the issue fee amount submitted with this form, there are any discrepencies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number: 83040

5. FIRM AND/OR ATTORNEY NAMES TO BE PRINTED

NOTE: If no name is listed, no name will be printed
For printing on the patent front page, list to be displayed as entered

Howson & Howson LLP
Colleen M. Schaller

6. ASSIGNEE NAME(S) AND RESIDENCE DATA TO BE PRINTED

NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a susbstitute for filing an assignment.

The Trustees of the University of Pennsylvania	Philadelphia, PA UNITED STATES	Organization

Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the

Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via Patent Center on the date indicated below.

Signature	Name	Registration #	Date
/Colleen M. Schaller/	Colleen Schaller	67751	12/09/2022

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

270 7590 12/13/2022

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER
HIBBERT, CATHERINE S

ART UNIT	PAPER NUMBER
1658	

NOTIFICATION DATE	DELIVERY MODE
12/13/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ckodroff@howsoniplaw.com
docketing@howsoniplaw.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 16368758
Applicant : Vandenberghe
Filing Date : 03/28/2019
Date Mailed : 12/13/2022

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Chris Harmon/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 16368758 **Drawings filed: 03/28/2019**

IDENTIFICATION OF DRAWING DEFICIENCIES

- [ ] There is a hole or the image thereof within the illustration. FIG(s)
- [ ] The illustration is penetrated or traversed by a solid or broken line that is not intended to be part of the drawing, such as a dark line caused by a flaw in the copying process. FIG(s)
- [ ] An ink stamp or the image thereof obscures part of the illustration. FIG(s)
- [ ] The drawing is marred by black smudges, obliterations, or fax/copier marks (for example, speckles or dots in a substantial portion of the drawing). FIG(s)
- [ ] Figure numbers are duplicated or missing. FIG(s)
- [ ] Drawing sheet or figure is missing. FIG(s)
- [ ] Numbers, letters, or reference characters in the drawing have been crossed out or are illegibly handwritten. FIG(s)
- [ ] The character of the lines, numbers, and letters is poor. FIG(s)
- [ ] The drawing's background shows that the original drawing was made on graph paper or other paper with a pattern or decoration. FIG(s)
- [ ] The FIG. number label is placed in a location that causes the drawing to be read upside down. FIG(s)
- [X] Data, a reference number, or part of the drawing is truncated or missing, or a lead line has no reference number. FIG(s) 1,2A-2C
- [ ] The drawing and/or the FIG. label contain(s) foreign language. FIG(s)
- [ ] This utility application contains a photograph of a view that is capable of being illustrated as a line drawing. FIG(s)
- [ ] A petition under 37 CFR 1.84(a)(2) to accept color drawings has been granted, but the brief description of the drawings in the specification does not contain (or has not been amended to contain) the paragraph required by 37 CFR 1.84(a)(2)(iii).
- [ ] This reissue application contains added and/or amended drawings that are not labeled as “New” or “Amended” or “Canceled” as required by 37 CFR 1.173(b)(3). FIG(s)
- [ ] This Design reissue application contains a drawing that is labeled as “Canceled” but is not surrounded by brackets, or a drawing that is surrounded by brackets but is not labeled as “Canceled.” See 37 CFR 1.173(b)(3). FIG(s)
- [ ] OTHER:
- [ ] COMMENTS:

FIG. 1

Singleton *In Vitro* lysate Transduction

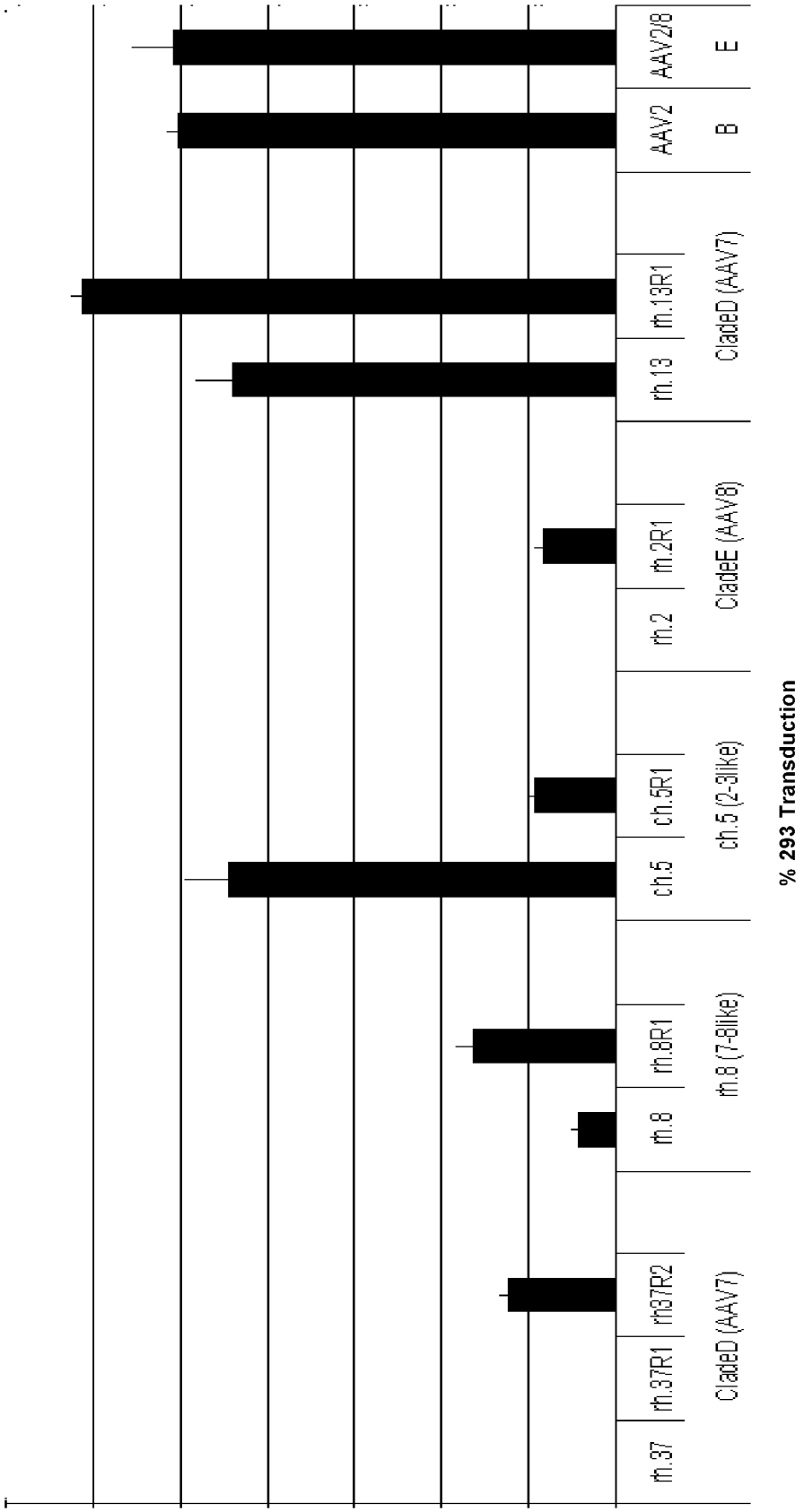


FIG 2A

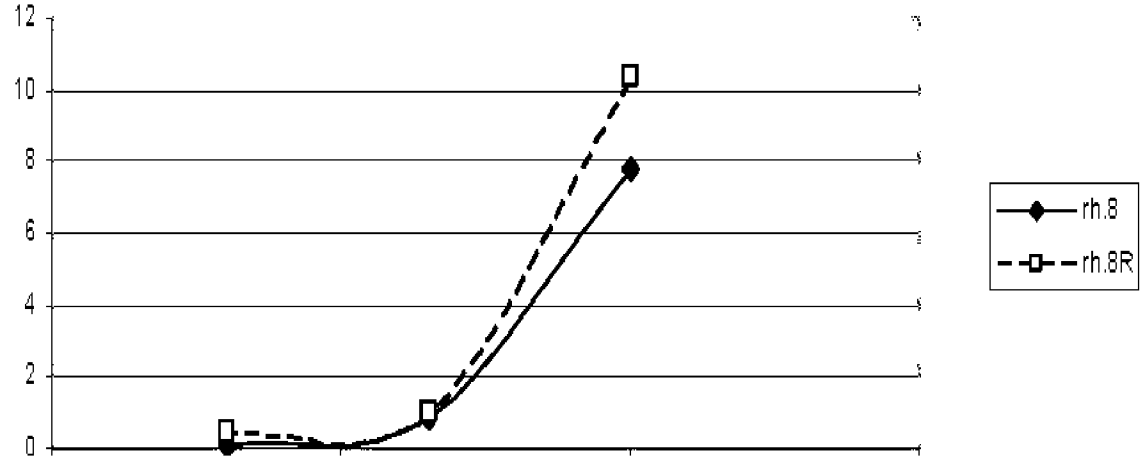


FIG 2B

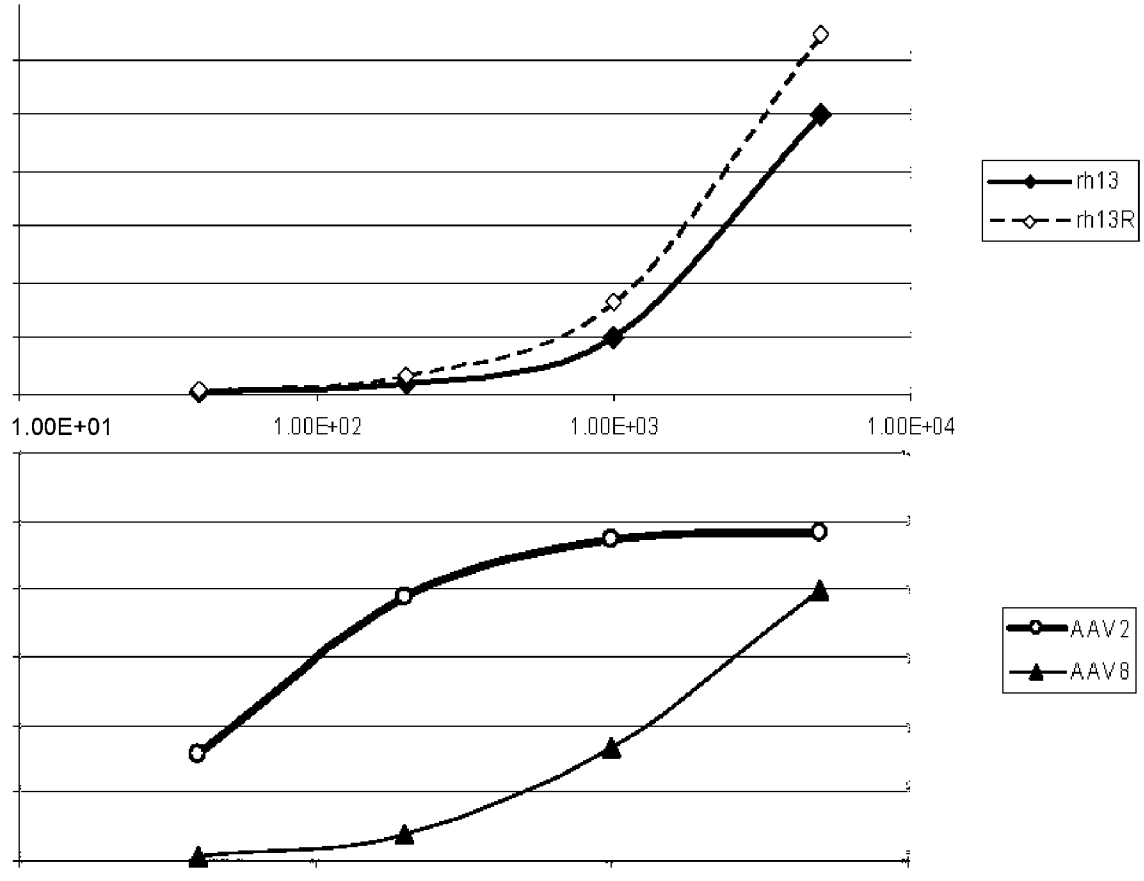


FIG 2C

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/368,758	Confirmation No.: 7840
Applicant	:	The Trustees of the University of Pennsylvania	
Filed	:	March 28, 2019	
Customer No.	:	270	
Title	:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR	

Mail Stop Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE NOTICE TO FILE CORRECTED PAPERS

Sir:

This paper is being filed in response to the Notice to File Corrected Application Papers dated December 13, 2022, for which a two-month response was set, in the above-identified patent application. The Notice alleges that Figures 1, 2A-C are non-compliant. In response, Applicant submits herewith replacement sheets correcting formalities as required. No new matter is contained in the replacement sheets being provided. Further, it is believed that this response fully complies with the Notice and that all defects indicated in the Notice have been addressed.

The director is hereby authorized to charge any deficiency in any fees due with the filing of this paper, or credit any overpayment in any fees, to our Deposit Account, Number 08-3040.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: December 13, 2022

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
325 Sentry Parkway
Five Sentry East, Suite 160
Blue Bell, PA 19422
Telephone: 215-540-9200
Facsimile: 215-540-5818
cschaller@HowsonIPLaw.com

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	**12/13/2022 03:34:53 PM ET**	**UPN-R3895D2US**

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Erika Henry
PATENT CENTER #	61293258	FILING DATE	03/28/2019
CUSTOMER #	270	FIRST NAMED INVENTOR	Luk VANDENBERGHE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Colleen Schaller

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
R3895D2US_ReplacementFigs.pdf	2	Drawings-only black and white line drawings	700 KB
R3895USD2_20221213_Response-NoticeCorrect.pdf	1	Post Allowance Communication - Incoming	70 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
R3895D2US_ReplacementFigs.pdf	DC46F0131B6180422590502 5DFF70629FCF3AE4567B1894A5DA4C5BEB091775B1BB6AF062990F407C78EC6D8030E11DCF57

3E9617A3A916AEBEA93DB9921D86D

R3895USD2_20221213_Response-NoticeCorrect.pdf	13770016A516CCC90648DDDAE263E549BF7054C15B134CCF173FF9A4DDBDC16CBA38104A7F32E266579FD1F4CF7C852ABE67C09E3EFF4F050FD2155E91AB3BD1

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

DocCode - SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 16368758 Document Date: 12/13/2022

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via DAV or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: March 1, 2019

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/368,758	Filing Date 03/28/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	12/19/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 9	Minus	** 43	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 13	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/ADRIENE D. SELLMAN/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Luk Vandenberghe	Nonprovisional Application Number (if known):	16/368,758
Title of Invention:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.

3. The applicable box is checked below:

I. ☐ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☑ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /Colleen M. Schaller/	Date 2022-12-19
Name (Print/Typed) Colleen M. Schaller	Practitioner Registration Number 67,751

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.**

☑ *Total of 1 forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	12/19/2022 04:54:08 PM ET	UPN-R3895D2US

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	61322190	AUTHORIZED BY	-
CUSTOMER #	270	FILING DATE	03/28/2019
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Luk VANDENBERGHE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 083040	E2022BIG54373124	Colleen Schaller

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
083040	37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1817	REQUEST FOR PRIORITIZED EXAMINATION	4200.00	1	4200.00
1830	PROCESSING FEE, EXCEPT IN PROVISIONAL APPLICATIONS	140.00	1	140.00
			TOTAL AMOUNT:	$4,340.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized

by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	**12/19/2022 04:54:08 PM ET**	**UPN-R3895D2US**

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	61322190	FILING DATE	03/28/2019
CUSTOMER #	270	FIRST NAMED INVENTOR	Luk VANDENBERGHE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
R3895USD2_20221219_Track-1-Request.pdf	2	Track One Request	144 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
R3895USD2_20221219_Track-1-Request.pdf	60981F112DCA30AE71AF573D0448AB02317479FFC3BD9C0F55FDC81FB6BC27B4DE3991650BCF7F4E4DC39123D9B44FC36918693A9F0D3F525A5CD796FDCD9496

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized

by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16/368,758	Filing Date	2019-03-28	Docket Number (if applicable)	UPN-R3895.D2.US	Art Unit	1658
First Named Inventor	Luk Vandenberghe			Examiner Name	HIBBERT, CATHERINE S		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☒ Other Track 1 Request

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 083040

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Colleen M. Schaller/	Date (YYYY-MM-DD)	2022-12-19
Name	Colleen M. Schaller	Registration Number	67751

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)(2)

APPLICATION #	ATTORNEY DOCKET #	FILING DATE
16368758	UPN-R3895D2US	03/28/2019

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

CONFIRMATION #	7840	FILING DATE	03/28/2019
ART UNIT	1658	FIRST NAMED INVENTOR	Luk VANDENBERGHE
EXAMINER	CATHERINE HIBBERT		

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:

(1) Petition fee; and
(2) One of the following reasons: A grantable petition requires the following items: (a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
(b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
(c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

Reason for withdrawal

Consideration of a request for continued examination - RCE request, submission, and fee are attached

Applicant claims the following entity status

Regular Undiscounted

Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:
An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application

Signature	Name	Registration #
/Colleen M. Schaller/	Colleen Schaller	67751

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	12/19/2022 04:45:43 PM ET	UPN-R3895D2US

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	61321972	AUTHORIZED BY	-
CUSTOMER #	270	FILING DATE	03/28/2019
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Luk VANDENBERGHE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 083040	E2022BIG46102925	Colleen Schaller

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
083040	37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1464	PETITIONS REQUIRING THE PETITION FEE SET FORTH IN 37 CFR 1.17(H) (GROUP III)	140.00	1	140.00
1801	REQUEST FOR CONTINUED EXAMINATION (RCE) - 1ST REQUEST (SEE 37 CFR 1.114)	1360.00	1	1360.00
			TOTAL AMOUNT:	$1,500.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

GRANT LETTER

APPLICATION #	DECISION DATE	DECISION ON PETITION #	ATTORNEY DOCKET NUMBER
16/368,758	12/19/2022	37 CFR 1.313(c)(2)	UPN-R3895D2US

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

In re Application of Luk VANDENBERGHE

This is an electronic decision on the petition under 37 CFR 1.313(c)(2), filed December 19, 2022 to withdraw the above-identified application from issue after payment of the issue fee.

The request is **GRANTED.**

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.

The application is being referred to Technology Center AU for processing of the request for continuing examination under 37 CFR 1.114 .

Telephone inquired concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

Office of Petitions

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	**12/19/2022 04:45:43 PM ET**	**UPN-R3895D2US**

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	61321972	FILING DATE	03/28/2019
CUSTOMER #	270	FIRST NAMED INVENTOR	Luk VANDENBERGHE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
petition-request.pdf	2	ePetition Request Form	31 KB
R3895USD2_20221219_RCE.pdf	3	Request for Continued Examination (RCE)	681 KB
R3895D2US_20221219_RCE_Amend_final.pdf	5	Amendment Submitted/Entered with Filing of Continued Prosecution Application (CPA)/Request for Continued Examination(RCE)	104 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
petition-request.pdf	7D8DDE8F4F0D7CE64B38B54D54031F41B92F316031A99FE5A9C2F4052B89F440B74EFCBA285B589670EDB5D531D6D74230E44804A207500C090E60FC2DCFA193
R3895USD2_20221219_RCE.pdf	44E51BC6F6286379AEDC9AE478E7A9DBE4E6AC96E439D454615A4F4FD891B5B1476947C827A8FC9F320BD1DF10242363F0DEE922D9271FC441E60A2BD04E3ED0
R3895D2US_20221219_RCE_Amend_final.pdf	0E0764C41ADB88A8CF8A3EDAF034571D8C21287399CCE03AC8886B4855EF09DC1C7F5768728C6815D607633A585FDF45D64F47AA23F426A78C42206A0CB5D9B0

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/368,758	Confirmation No.:	7840
Applicant	:	The Trustees of the University of Pennsylvania		
Filed	:	March 28, 2019		
TC/A.U.	:	1636		
Examiner	:	Catherine S Hibbert		
Customer No.	:	00270		
Title	:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT FILED WITH REQUEST FOR CONTINUED EXAMINATION

Sir:

This paper is filed with a Request for Continued Examination, pursuant to 37 CFR 1.114. In addition, this paper is filed with a Petition to Withdraw under 37 CFR 1.313(c)(2), and a Track 1 filing request.

Kindly enter the following:

Amendments to the Claims begin on page 2.

Remarks/Arguments begin on page 5.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1(Previously Presented). An adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have i) the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), or ii) an amino acid sequence having at least 95% identity to the full length of amino acids 1 to 738 of SEQ ID NO:4, wherein the amino acid residue corresponding to position 665 in SEQ ID NO: 4 is not S when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4.

2 (Previously Presented). The AAV according to claim 1, wherein the AAV vp1 capsid proteins are encoded by the nucleic acid sequence of SEQ ID NO: 22.

3 (Previously Presented). The AAV according to claim 1, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 4, wherein the amino acid residue corresponding to position 665 is not S when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4.

4-5 (Canceled).

6 (Previously Presented). The AAV according to claim 1, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

7 (Previously Presented). A composition comprising the AAV according to claim 1 and a physiologically compatible carrier.

8-24 (Canceled).

25 (Previously Presented). The AAV according to claim 1, wherein the heterologous gene encodes an ornithine transcarbamylase, arginosuccinate synthetase, arginosuccinate lyase, arginase, fumarylacetacetate hydrolase, carbamoyl phosphate synthetase I, phenylalanine hydroxylase, alpha-1 antitrypsin, glucose-6-phosphatase, porphobilinogen deaminase, cystathione beta-synthase, branched chain ketoacid decarboxylase, isovaleryl-coA dehydrogenase, propionyl-CoA carboxylase, methylmalonyl-CoA mutase, glutaryl-CoA dehydrogenase (GCDH), betaglucosidase, pyruvate carboxylate, hepatic phosphorylase, phosphorylase kinase, β-glucuronidase (GUSB), or glycine decarboxylase, a low density lipoprotein (LDL) receptor, high density lipoprotein (HDL) receptor, very low density lipoprotein (VLDL) receptor, scavenger receptor, glucocorticoid receptor, estrogen receptor, Vitamin D receptor, nuclear receptor, cystic fibrosis transmembrane regulator (CFTR) sequence, Factor IX or variants thereof, Factor VIII or variants thereof, a dystrophin gene product, or an immunoglobulin.

26 (Previously Presented). The AAV according to claim 25, wherein the immunoglobulin is selected from the group consisting of IgG, IgM, IgA, IgD, IgE, a chimeric immunoglobulin, a humanized antibody, and/or a single chain antibody.

27 (Previously Presented). The AAV according to claim 25, wherein the dystrophin gene product is a mini-dystrophin or micro-dystrophin.

28 – 45 (Canceled).

46 (Previously Presented). The AAV according to claim 1, wherein the amino acid residue corresponding to position 665 is N.

47-64 (Canceled).

ARGUMENTS/REMARKS

After entry of this paper, claims 1-3, 6-7, and 25-27, and 46 are pending. Claims 4 and 47 are newly canceled without prejudice to refiling the same in one or more continuing applications.

All pending claims were previously noted as allowable. No new matter is added, and allowance of the claims is earnestly requested.

The Director is hereby authorized to charge any deficiency in any fee due with the filing of this paper, or credit any overpayment in this fee to our Deposit Account No. 08-3040.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: December 19, 2022

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
325 Sentry Parkway
Five Sentry East, Suite 160
Blue Bell, PA 19422
Telephone: 215-540-9200
Facsimile: 215-540-5818
cschaller@HowsonIPLaw.com

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

270 7590 01/19/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER
HIBBERT, CATHERINE S

ART UNIT	PAPER NUMBER
1658	

DATE MAILED: 01/19/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

TITLE OF INVENTION: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$1200.00	$0	04/19/2023

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

270 7590 01/19/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

TITLE OF INVENTION: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$1200.00	$0	04/19/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
HIBBERT, CATHERINE S	1658	514-04400R

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

270 7590 01/19/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER	
HIBBERT, CATHERINE S	

ART UNIT	PAPER NUMBER
1658	

DATE MAILED: 01/19/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Supplemental ***Notice of Allowability***	**Application No.** 16/368,758	**Applicant(s)** VANDENBERGHE et al.	
	Examiner CATHERINE S HIBBERT	**Art Unit** 1658	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 12/19/2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-3,6-7,25-27 and 46 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. 12/19/2022.
5. ☑ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/CATHERINE S HIBBERT/
Primary Examiner, Art Unit 1658

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 12/19/2022 has been entered.

Examiner's Comment

Applicant's Amendment to the Claims filed on 12/19/2022 has been entered.

Claims 4-5, 8-24, 28-45, and 47-64 are cancelled.

Claims 1-3, 6-7, 25-27, and 46 are pending and examined.

Claims 1-3, 6-7, 25-27, and 46 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CATHERINE S HIBBERT whose telephone number is (571)270-3053. The examiner can normally be reached M-F 8:00-5:00.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an

interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry D Riggs, II can be reached on 571-270-3062. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CATHERINE S HIBBERT/
Primary Examiner, Art Unit 1658

Applicant-Initiated Interview Summary	**Application No.** 16/368,758	**Applicant(s)** VANDENBERGHE et al.		
	Examiner CATHERINE S HIBBERT	**Art Unit** 1658	**AIA (First Inventor to File) Status** No	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
CATHERINE S HIBBERT	Primary Examiner	Telephonic
Colleen M. Schaller	Attorney of Record	

Date of Interview: 19 December 2022

Issues Discussed:

Other

The applicants' representative discussed the proper procedure to cancel two claims after issue fee was paid. Examiner discussed that according to the PEP, this would require a Petition and a filing of an RCE. Attorney Schaller filed such petition and RCE the same day.

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	Art Unit
	CATHERINE S HIBBERT	1658

CPC - Searched*		
Symbol	**Date**	**Examiner**
C12N15/86.cpc. or A61K48/005.cpc. or A61K48/0091.cpc. or C07K14/005.cpc. or C12N7/00.cpc. or A61K48/00.cpc. or C12N2750/14122.cpc. or C12N2750/14142.cpc. or C12N2750/14143.cpc. or C12N2750/14152.cpc.	12/01/2022	CSH
C12N15/86.cpc. or A61K48/005.cpc. or A61K48/0091.cpc. or C07K14/005.cpc. or C12N7/00.cpc. or A61K48/00.cpc. or C12N2750/14122.cpc. or C12N2750/14142.cpc. or C12N2750/14143.cpc. or C12N2750/14152.cpc.	01/03/2023	CSH

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	Art Unit
	CATHERINE S HIBBERT	1658

Search Notes		
Search Notes	**Date**	**Examiner**
Inventor; Assignee search, PALM; PE2E SEARCH	12/01/2022	CSH
PE2E SEARCH, history included	12/01/2022	CSH
Advanced PubMed, history included	12/01/2022	CSH
Proquest, history included	12/01/2022	CSH
Score report	12/01/2022	CSH
Updated Inventor; Assignee search, PALM; PE2E SEARCH	01/03/2023	CSH
Updated PE2E SEARCH, history included	01/03/2023	CSH

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
PE2E SEARCH	Interference history included	12/01/2022	CSH
Score report	Interference database	12/01/2022	CSH
PE2E SEARCH	Updated interference history included	01/03/2023	

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	**Art Unit**
	CATHERINE S HIBBERT	1658

CPC						
Symbol					**Type**	**Version**
C12N	/	15	/	86	F	2013-01-01
A61K	/	48	/	0091	I	2013-01-01
C07K	/	14	/	005	I	2013-01-01
C12N	/	7	/	00	I	2013-01-01
A61K	/	48	/	005	I	2013-01-01
C12N	/	2750	/	14122	A	2013-01-01
C12N	/	2750	/	14143	A	2013-01-01
A61K	/	48	/	00	A	2013-01-01
C12N	/	2750	/	14142	A	2013-01-01
C12N	/	2750	/	14152	A	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	9	
/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	03 January 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	none

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	**Art Unit**
	CATHERINE S HIBBERT	1658

INTERNATIONAL CLASSIFICATION					
CLAIMED					
C12N	/	15	/	00	
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
435	320.1

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 9	
/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658 (Primary Examiner)	03 January 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure none

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	**Art Unit**
	CATHERINE S HIBBERT	1658

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1														
2	2														
3	3														
4	6														
5	7														
6	25														
7	26														
8	27														
9	46														

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 9	
/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658 (Primary Examiner)	03 January 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure none

Bibliographic Data

Application No: 16/368,758

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /CATHERINE S HIBBERT/ Examiner's Signature | Initials

Title: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/28/2019	514	1658	UPN-R3895D2US
RULE			

APPLICANTS

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA, UNITED STATES

INVENTORS

Luk VANDENBERGHE, Weston, MA, UNITED STATES

Guangping GAO, Westborough, MA, UNITED STATES

James M. WILSON, Philadelphia, PA, UNITED STATES

CONTINUING DATA

This application is a DIV of 14624671 02/18/2015 PAT 10301648

14624671 is a DIV of 11887679 10/02/2007 PAT 8999678

11887679 is a 371 of PCT/US2006/013375 04/07/2006

PCT/US2006/013375 has PRO of 60733497 11/04/2005

PCT/US2006/013375 has PRO of 60669083 04/07/2005

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/05/2019

STATE OR COUNTRY

UNITED STATES

ADDRESS

HOWSON & HOWSON LLP

325 Sentry Parkway East, Five Sentry East

Suite 160

Blue Bell, PA 19422

UNITED STATES

FILING FEE RECEIVED

$1,720

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	309339	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:25 PM
L2	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:28 PM
L3	2101	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2022/05/04 04:48 PM
L4	4142	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:49 PM
L5	3531	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:49 PM
L6	2737	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:49 PM

		("James"))).INV.					
L7	6543	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:50 PM
L8	1403	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:52 PM
L9	330	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:52 PM
L10	168	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 07:35 PM

		WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					

L11	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 07:35 PM

		A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L12	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 07:36 PM
L13	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 07:36 PM

		"11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L14	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:19 PM
L15	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:20 PM
L16	10	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:26 PM
L17	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:27 PM
L18	15018	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:29 PM
L19	1435	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:30 PM

		repeats" OR ITR OR "inverted terminal repeat").clm.					
L20	6482	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:31 PM
L21	166	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:31 PM
L22	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:04 PM

		US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L23	358	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 02:13 PM
L24	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:13 PM

L25	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:17 PM
L26	57	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:50 PM
L27	80	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:54 PM
L28	140	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:55 PM
L29	334771	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L30	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM

L31	2165	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L32	4323	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L33	3632	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L34	2838	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L35	6798	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L36	1620	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L37	374	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM

		("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L38	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM

		WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L39	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM

		WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L40	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM

		"11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L41	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L42	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L43	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L44	12	((Rhesus OR Rh) WITH	(US-PGPUB; USPAT;	OR	ON	ON	2022/12/01

		("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)				11:33 AM
L45	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L46	16270	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L47	1599	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L48	6797	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L49	174	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L50	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM

		20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1						

		OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L51	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L52	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L53	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James")))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L54	69	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L55	92	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L56	201	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L57	8	"AAVrh46".clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR,	OR	ON	ON	2022/12/01 11:42 AM

			WO); FPRS; EPO; JPO; DERWENT)				
L58	0	("AAVrh46" SAME (("amino acid" OR position OR residue) WITH "665"))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:50 AM
L59	336701	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L60	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L61	2176	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L62	4343	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L63	3644	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L64	2850	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		(("WILSON") near3 ("James"))).INV.					
L65	6826	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L66	1652	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L67	381	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L68	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM

		2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-					

		A2).did.					
L69	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L70	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L71	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		"11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L72	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L73	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L74	12	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L75	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L76	16452	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L77	1622	(minigene OR "expression cassette") AND (ITRs OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		"inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.					
L78	6838	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L79	175	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L80	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L81	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L82	116	L10 OR L12 OR L14	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03

		OR L15 OR L22					04:09 PM
L83	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L84	69	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L85	95	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L86	201	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L87	336701	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L88	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM

		C12N2750/14152.cpc.					
L89	2176	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L90	4343	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L91	3644	(("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L92	2850	(("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L93	6826	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L94	1652	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L95	381	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		(("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L96	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM

		2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L97	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L98	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM

		"11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L99	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L100	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L101	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

L102	12	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L103	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L104	16452	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L105	1622	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L106	6838	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L107	175	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L108	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR					

		US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L109	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L110	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L111	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L112	69	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L113	95	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L114	201	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L115	8	"AAVrh46".clm.	(US-PGPUB; USPAT;	OR	ON	ON	2023/01/03

			USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)				04:09 PM
L116	0	("AAVrh46" SAME (("amino acid" OR position OR residue) WITH "665"))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

PE2E SEARCH - Search History (Prior Art)

There are no Prior Art searches to show.

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:27 PM
N2	1435	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:30 PM
N3	166	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:31 PM
N4	1408	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:32 PM
N5	564	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:32 PM
N6	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:33 PM

N7	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:13 PM
N8	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N9	1599	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N10	174	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N11	1620	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N12	647	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N13	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N14	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N15	34	N12 AND N14	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:36 AM
N16	243	(("amino acid" OR residue OR position)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:37 AM

		WITH "665").clm.					
N17	1	N15 AND N16	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:38 AM
N18	2	"AAVrh46".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:42 AM
N19	2	"(AAVrh46)".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N20	2	N18 OR N19	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N21	0	N20 AND N17	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N22	1	N15 AND N20	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:45 AM
N23	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N24	1622	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N25	175	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N26	1652	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N27	662	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N28	1	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM

		"inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)					
N29	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N30	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N31	1622	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N32	175	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N33	1652	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N34	662	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N35	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM

N36	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N37	34	N12 AND N14	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N38	244	(("amino acid" OR residue OR position) WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N39	1	N15 AND N16	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N40	2	"AAVrh46".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N41	2	"(AAVrh46)".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N42	2	N18 OR N19	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N43	0	N20 AND N17	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N44	1	N15 AND N20	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

270 7590 01/19/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER
HIBBERT, CATHERINE S

ART UNIT	PAPER NUMBER
1658	

NOTIFICATION DATE	DELIVERY MODE
01/19/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ckodroff@howsoniplaw.com
docketing@howsoniplaw.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 16/368,758	**Applicant(s)** VANDENBERGHE et al.	
	Examiner JoAnne L Burke	**Art Unit** OPET	**AIA (FITF) Status** No

1. THE REQUEST FILED 19 December 2022 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination

A. ☐ for an original nonprovisional application (Track I).
B. ☑ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;

C. filing a **request for continued examination** ;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to JoAnne Burke at (571)272-4584. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/JOANNE L BURKE/ Lead Paralegal Specialist, OPET	

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	**01/19/2023 02:16:29 PM ET**	**UPN-R3895D2US**

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	61461117	FILING DATE	03/28/2019
CUSTOMER #	270	FIRST NAMED INVENTOR	Luk VANDENBERGHE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
R3895.US.D2_20230119_Issue-Fee.pdf	1	Issue Fee Payment (PTO-85B)	121 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
R3895.US.D2_20230119_Issue-Fee.pdf	034D22ED8F96AB905FBFEC42AB02A7BD1E3E4A5495AB8B26909F6B4C52EFC51DDF22AEC3DD0D0BCC74DF207853DE81C13096A406CF74277C578F2E68D7558F3C

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized

by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

270 7590 01/19/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

TITLE OF INVENTION: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$1200.00	$0	04/19/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
HIBBERT, CATHERINE S	1658	514-04400R

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Howson & Howson LLP
2 Colleen M. Schaller
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: The Trustees of the University of Pennsylvania

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Philadelphia, PA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 08-3040

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Colleen M. Schaller/ Date 2023-01-19

Typed or printed name Colleen M. Schaller Registration No. 67751

United States Patent and Trademark Office
Office of the Chief Financial Officer

Document Code:WFEE

User :Tyrone Perry-Williams

Sale Accounting Date:02/01/2023

Sale Item Reference Number	Effective Date
16368758	01/19/2023

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I202321A47081139	1501	UTILITY APPL ISSUE FEE	$1,200.00	Salea

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	04/04/2023	11618905	UPN-R3895D2US	7840

270 7590 03/15/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 571 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Luk VANDENBERGHE, Weston, MA;
Guangping GAO, Westborough, MA;
James M. WILSON, Philadelphia, PA;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/368,758	Filing Date 03/28/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	03/29/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 9	Minus	** 43	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 13	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/YOLANDA CHADWICK/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16/368,758	Filing Date	2019-03-28	Docket Number (if applicable)	UPN-R3895.D2.US	Art Unit	1658
First Named Inventor	Luk Vandenberghe			Examiner Name	HIBBERT, CATHERINE S		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☒ Other Petition to Withdraw

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 083040

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Colleen M. Schaller/	Date (YYYY-MM-DD)	2023-03-29
Name	Colleen M. Schaller	Registration Number	67751

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)(2) with Assigned Patent Number)

APPLICATION #	ATTORNEY DOCKET #	FILING DATE
16368758	UPN-R3895D2US	03/28/2019

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

CONFIRMATION #	7840	FILING DATE	03/28/2019
ART UNIT	1658	FIRST NAMED INVENTOR	Luk VANDENBERGHE
EXAMINER	CATHERINE HIBBERT		

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:

(1) Petition fee; and
(2) One of the following reasons: A grantable petition requires the following items: (a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
(b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
(c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

Reason for withdrawal

Consideration of a request for continued examination - RCE request, submission, and fee are attached

Applicant claims the following entity status

Regular Undiscounted

Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:
An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application

Signature	Name	Registration #
/Colleen M. Schaller/	Colleen Schaller	67751

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	**03/29/2023 12:26:42 PM ET**	**UPN-R3895D2US**

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	11618905
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	61831372	FILING DATE	03/28/2019
CUSTOMER #	270	FIRST NAMED INVENTOR	Luk VANDENBERGHE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
petition-request.pdf	2	ePetition Request Form	31 KB
R3895USD2_20230329_Second-RCE.pdf	3	Request for Continued Examination (RCE)	697 KB
R3895D2US_20230329_Second-RCE_submission-PTO.pdf	5	Amendment Submitted/Entered with Filing of Continued Prosecution Application (CPA)/Request for Continued Examination(RCE)	127 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
petition-request.pdf	A6CE790EB446A94ABBF2F20C23F22E546D3B703752B60F18C BFCD31E5BF6CBB8E1C9180DAFB8D1057A173AB0E42D8E69D 2E24020A75D8F340E937CFE0C84E3C6
R3895USD2_20230329_Second-RCE.pdf	7BB65315ED816BAC09B26A3FBB3F9EEF90EB5BC02A49717A0 CC9569A86627FF0C8BD92D94DD52812D63929935EE63B4D4B 00E04AAC7FCF2836A1A0BE8C9E1DC6
R3895D2US_20230329_Second-RCE_submission-PTO.pdf	E0976601F8BB31C63E2C920A8FBAFF2A1DFE2080B7F56394A 7C6B248175F8C884D86978405E7111D051D8AC85F18F7B5720 46AE6275F97565177180A60F78CFF

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

GRANT LETTER

APPLICATION #	DECISION DATE	DECISION ON PETITION #	ATTORNEY DOCKET NUMBER
16/368,758	03/29/2023	37 CFR 1.313(c)(2)	UPN-R3895D2US

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

In re Application of Luk VANDENBERGHE

This is an electronic decision on the petition under 37 CFR 1.313(c)(2), filed March 29, 2023 to withdraw the above-identified application from issue after payment of the issue fee.

The request is **GRANTED.**

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.

The application is being referred to Technology Center AU for processing of the request for continuing examination under 37 CFR 1.114 .

Telephone inquired concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

Office of Petitions

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	03/29/2023 12:26:42 PM ET	UPN-R3895D2US

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	11618905
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	61831372	AUTHORIZED BY	-
CUSTOMER #	270	FILING DATE	03/28/2019
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Luk VANDENBERGHE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 083040	E20233SC27155146	Colleen Schaller

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
083040	37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1464	PETITIONS REQUIRING THE PETITION FEE SET FORTH IN 37 CFR 1.17(H) (GROUP III)	140.00	1	140.00
1820	REQUEST FOR CONTINUED EXAMINATION (RCE)- 2ND AND SUBSEQUENT REQUEST (SEE 37 CFR 1.114)	2000.00	1	2000.00
			TOTAL AMOUNT:	$2,140.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized

by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/368,758	Confirmation No.:	7840
Applicant	:	The Trustees of the University of Pennsylvania		
Filed	:	March 28, 2019		
TC/A.U.	:	1636		
Examiner	:	Catherine S Hibbert		
Customer No.	:	00270		
Title	:	METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT FILED WITH REQUEST FOR CONTINUED EXAMINATION

Sir:

This paper is filed with a Request for Continued Examination, pursuant to 37 CFR 1.114. In addition, this paper is filed with a Petition to Withdraw under 37 CFR 1.313(c)(2).

Kindly enter the following:

Amendments to the Claims begin on page 2.

Remarks/Arguments begin on page 5.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 (Currently Amended). A~~n~~ recombinant adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have i) the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), or ii) an amino acid sequence having at least 95% identity to the full length of amino acids 1 to 738 of SEQ ID NO:4, wherein the amino acid residue corresponding to position 665 in SEQ ID NO: 4 is N ~~not S~~ when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4.

2 (Currently Amended). The recombinant AAV according to claim 1, wherein the AAV vp1 capsid proteins are encoded by the nucleic acid sequence of SEQ ID NO: 22.

3 (Currently Amended). The recombinant AAV according to claim 1, wherein the AAV vp1 capsid protein has an amino acid sequence which is at least 97% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 4, wherein the amino acid residue corresponding to position 665 is N ~~not S~~ when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4.

4-5 (Canceled).

6 (Currently Amended). The recombinant AAV according to claim 1, wherein the AAV inverted terminal repeats are from a different AAV than the AAV supplying the capsid proteins.

7 (Currently Amended). A composition comprising the recombinant AAV according to claim 1 and a physiologically compatible carrier.

8-24 (Canceled).

25 (Currently Amended). The recombinant AAV according to claim 1, wherein the heterologous gene encodes an ornithine transcarbamylase, arginosuccinate synthetase, arginosuccinate lyase, arginase, fumarylacetacetate hydrolase, carbamoyl phosphate synthetase I, phenylalanine hydroxylase, alpha-I antitrypsin, glucose-6-phosphatase, porphobilinogen deaminase, cystathione beta-synthase, branched chain ketoacid decarboxylase, isovaleryl-coA dehydrogenase, propionyl-CoA carboxylase, methylmalonyl-CoA mutase, glutaryl-CoA dehydrogenase (GCDH), betaglucosidase, pyruvate carboxylate, hepatic phosphorylase, phosphorylase kinase, β-glucuronidase (GUSB), ~~or~~ glycine decarboxylase, a low density lipoprotein (LDL) receptor, high density lipoprotein (HDL) receptor, very low density lipoprotein (VLDL) receptor, scavenger receptor, glucocorticoid receptor, estrogen receptor, Vitamin D receptor, nuclear receptor, cystic fibrosis transmembrane regulator (CFTR) sequence, Factor IX or variants thereof, Factor VIII or variants thereof, a dystrophin gene product, or an immunoglobulin.

26 (Currently Amended). The recombinant AAV according to claim 25, wherein the immunoglobulin is selected from the group consisting of IgG, IgM, IgA, IgD, IgE, a chimeric immunoglobulin, a humanized antibody, and~~/or~~ a single chain antibody.

27 (Currently Amended). The recombinant AAV according to claim 25, wherein the dystrophin gene product is a mini-dystrophin or micro-dystrophin.

28 - 64 (Canceled).

65 (New). The recombinant AAV according to claim 1, wherein the AAV vp1 capsid protein has an amino acid sequence which is 100% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 4.

ARGUMENTS/REMARKS

After entry of this paper, claims 1-3, 6-7, and 25-27, and 65 pending. Claim 46 is newly canceled. Claim 1 has been amended to incorporate the subject matter of claim 46, which was previously allowed. Thus, the subject matter of all claims, as amended, was previously noted as allowable. Claim 65 is new and supported throughout the specification, and believed encompassed by the previously allowed subject matter.

The Director is hereby authorized to charge any deficiency in any fee due with the filing of this paper or credit any overpayment in this fee to our Deposit Account No. 08-3040.

Respectfully submitted,
HOWSON & HOWSON LLP

Dated: March 29, 2023

By: /Colleen M. Schaller/

Colleen M. Schaller
Registration No. 67,751
325 Sentry Parkway
Five Sentry East, Suite 160
Blue Bell, PA 19422
Telephone: 215-540-9200
Facsimile: 215-540-5818
cschaller@HowsonIPLaw.com

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

270 7590 05/01/2023
HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

OPAP LHDTSV-4 MAY 01 2023 PATENT & TRADEMARK OFFICE

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

TITLE OF INVENTION: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	~~$0~~ $1200	~~$1200~~ $0	08/01/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
HIBBERT, CATHERINE S	1658	514-04400R

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Colleen M. Schaller
2 Howson & Howson LLP
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: The Trustees of the University of Pennsylvania
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Philadelphia, Pennsylvania

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via Patent Center or EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 08-3040

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Colleen M. Schaller/ Date 2023-05-01

Typed or printed name Colleen M. Schaller Registration No. 67,751

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

270 7590 05/01/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER
HIBBERT, CATHERINE S

ART UNIT	PAPER NUMBER
1658	

DATE MAILED: 05/01/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

TITLE OF INVENTION: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0	$1200	08/01/2023

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

270 7590 05/01/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

TITLE OF INVENTION: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0	$1200	08/01/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
HIBBERT, CATHERINE S	1658	514-04400R

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via Patent Center or EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

270 7590 05/01/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

EXAMINER	
HIBBERT, CATHERINE S	
ART UNIT	PAPER NUMBER
1658	

DATE MAILED: 05/01/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Supplemental ***Notice of Allowability***	**Application No.** 16/368,758	**Applicant(s)** VANDENBERGHE et al.	
	Examiner CATHERINE S HIBBERT	**Art Unit** 1658	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 03/29/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-3,6-7,25-27 and 65 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. 04/20/2023.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/CATHERINE S HIBBERT/
Primary Examiner, Art Unit 1658

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on March 29, 2023 has been entered.

The Applicants' Amendment to the Claims filed on March 29, 2023 is entered.

Claim 65 is new.

Claims 1-3, 6-7, 25-27, and 65 are pending and under examination.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in an interview with Attorney Colleen M. Schaller on April 22, 2023.

The application has been amended as follows:

Amend claim 1:

A recombinant adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have i) the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), or ii) an amino acid sequence ~~having~~ at least 95% ~~identity~~ identical to the full length of amino acids 1 to 738 of SEQ ID NO:4, wherein the amino acid residue corresponding to position 665 in SEQ ID NO: 4 is N when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4.

Amend claim 3:

The recombinant AAV according to claim 1, wherein the AAV vp1 capsid ~~protein has~~ proteins have an amino acid sequence which is at least 97% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 4, wherein the amino acid residue corresponding to position 665 is N when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4.

Amend claim 65:

The recombinant AAV according to claim 1, wherein the AAV vp1 capsid ~~protein has~~ proteins have an amino acid sequence which is 100% identical to the full length of amino acids 1 to 738 of SEQ ID NO: 4.

Reasons for Allowance

The following is an examiner's statement of reasons for allowance:

The prior art does not teach or fairly suggest a recombinant adeno-associated virus (AAV) comprising an AAV capsid and a minigene having AAV inverted terminal repeats and a heterologous gene operably linked to regulatory sequences which direct expression of the heterologous gene in a host cell, wherein the AAV capsid comprises AAV vp1 proteins, AAV vp2 proteins, and AAV vp3 proteins, wherein the AAV vp1 proteins have i) the sequence of amino acids 1 to 738 of SEQ ID NO: 4 (AAVrh46), or ii) an amino acid sequence having at least 95% identity to the full length of amino acids 1 to 738 of SEQ ID NO:4, wherein the amino acid residue corresponding to position 665 in SEQ ID NO: 4 is N when aligned along the full length of amino acids 1 to 738 of SEQ ID NO: 4.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Claims 1-3, 6-7, 25-27, and 65 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CATHERINE S HIBBERT whose telephone number is (571)270-3053. The examiner can normally be reached M-F 8:00-5:00.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an

interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melissa Fisher can be reached on 571-270-7430. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CATHERINE S HIBBERT/
Primary Examiner, Art Unit 1658

Examiner-Initiated Interview Summary	**Application No.** 16/368,758	**Applicant(s)** VANDENBERGHE et al.		
	Examiner CATHERINE S HIBBERT	**Art Unit** 1658	**AIA (First Inventor to File) Status** No	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
CATHERINE S HIBBERT	Primary Examiner	Telephonic
Colleen M. Schaller	Attorney of Record	

Date of Interview: 21 April 2023

Issues Discussed:

Other

Examiner proposed an Examiner's Amendment as shown in the office action to which this Summary is attached which was agreed to by the applicant's representative in a follow-up phone call on 04/21/2023.

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	**Art Unit**
	CATHERINE S HIBBERT	1658

CPC						
Symbol					**Type**	**Version**
C12N	/	15	/	86	F	2013-01-01
A61K	/	48	/	0091	I	2013-01-01
C07K	/	14	/	005	I	2013-01-01
C12N	/	7	/	00	I	2013-01-01
A61K	/	48	/	005	I	2013-01-01
C12N	/	2750	/	14122	A	2013-01-01
C12N	/	2750	/	14143	A	2013-01-01
A61K	/	48	/	00	A	2013-01-01
C12N	/	2750	/	14142	A	2013-01-01
C12N	/	2750	/	14152	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	9	
/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	21 April 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	none

U.S. Patent and Trademark Office — Part of Paper No.: 20230420

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	**Art Unit**
	CATHERINE S HIBBERT	1658

INTERNATIONAL CLASSIFICATION					
CLAIMED					
C12N	/	15	/	00	
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
435	320.1

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 9	
/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658 (Primary Examiner) 21 April 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure none

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	**Art Unit**
	CATHERINE S HIBBERT	1658

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1														
2	2														
3	3														
4	6														
5	7														
6	25														
7	26														
8	27														
9	65														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	9	
/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	21 April 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	none

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	Art Unit
	CATHERINE S HIBBERT	1658

CPC - Searched*		
Symbol	**Date**	**Examiner**
C12N15/86.cpc. or A61K48/005.cpc. or A61K48/0091.cpc. or C07K14/005.cpc. or C12N7/00.cpc. or A61K48/00.cpc. or C12N2750/14122.cpc. or C12N2750/14142.cpc. or C12N2750/14143.cpc. or C12N2750/14152.cpc.	12/01/2022	CSH
C12N15/86.cpc. or A61K48/005.cpc. or A61K48/0091.cpc. or C07K14/005.cpc. or C12N7/00.cpc. or A61K48/00.cpc. or C12N2750/14122.cpc. or C12N2750/14142.cpc. or C12N2750/14143.cpc. or C12N2750/14152.cpc.	01/03/2023	CSH
C12N15/86.cpc. or A61K48/005.cpc. or A61K48/0091.cpc. or C07K14/005.cpc. or C12N7/00.cpc. or A61K48/00.cpc. or C12N2750/14122.cpc. or C12N2750/14142.cpc. or C12N2750/14143.cpc. or C12N2750/14152.cpc.	04/21/2023	CSH

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/368,758	VANDENBERGHE et al.
	Examiner	Art Unit
	CATHERINE S HIBBERT	1658

Search Notes		
Search Notes	**Date**	**Examiner**
Inventor; Assignee search, PALM; PE2E SEARCH	12/01/2022	CSH
PE2E SEARCH, history included	12/01/2022	CSH
Advanced PubMed, history included	12/01/2022	CSH
Proquest, history included	12/01/2022	CSH
Score report	12/01/2022	CSH
Updated Inventor; Assignee search, PALM; PE2E SEARCH	01/03/2023	CSH
Updated PE2E SEARCH, history included	01/03/2023	CSH
Updated Inventor; Assignee search, PALM; PE2E SEARCH	04/21/2023	CSH
Updated PE2E SEARCH, history included	04/21/2023	CSH
Score report	04/13/2023	CSH

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
PE2E SEARCH	Interference history included	12/01/2022	CSH
Score report	Interference database	12/01/2022	CSH
PE2E SEARCH	Updated interference history included	01/03/2023	CSH
PE2E SEARCH	Updated interference history included	04/21/2023	CSH
Score report	interference database	04/13/2023	CSH

/CATHERINE S HIBBERT/ Primary Examiner, Art Unit 1658	

PE2E SEARCH - Search History (Prior Art)

There are no Prior Art searches to show.

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:27 PM
N2	1435	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:30 PM
N3	166	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:31 PM
N4	1408	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:32 PM
N5	564	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:32 PM
N6	1	((((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:33 PM

N7	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:13 PM
N8	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N9	1599	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N10	174	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N11	1620	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N12	647	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N13	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N14	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
N15	34	N12 AND N14	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:36 AM
N16	243	(("amino acid" OR residue OR position)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:37 AM

		WITH "665").clm.					
N17	1	N15 AND N16	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:38 AM
N18	2	"AAVrh46".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:42 AM
N19	2	"(AAVrh46)".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N20	2	N18 OR N19	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N21	0	N20 AND N17	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:43 AM
N22	1	N15 AND N20	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:45 AM
N23	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N24	1622	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N25	175	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N26	1652	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N27	662	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N28	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM

		"inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)					
N29	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N30	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N31	1622	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N32	175	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N33	1652	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N34	662	((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N35	1	(((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM

N36	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N37	34	N12 AND N14	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N38	244	(("amino acid" OR residue OR position) WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N39	1	N15 AND N16	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N40	2	"AAVrh46".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N41	2	"(AAVrh46)".clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N42	2	N18 OR N19	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N43	0	N20 AND N17	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N44	1	N15 AND N20	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:10 PM
N46	3	((((((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.) AND ((minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.)) AND (((WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:40 PM

		WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.) OR (("10265417" OR "10301648" OR "10485883" OR "10584337" OR					

		"10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.) OR L14 OR L15 OR ((US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-					

		20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1					

		OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.))) AND ("AAVrh46" OR "(AAVrh46)" OR "*rh46" OR "rh.46" OR (*rh* WITH "46")).clm.)					

Bibliographic Data

Application No: 16/368,758

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /CATHERINE S HIBBERT/ Examiner's Signature | Initials

Title: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/28/2019	514	1658	UPN-R3895D2US
RULE			

APPLICANTS

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA, UNITED STATES

INVENTORS

Luk VANDENBERGHE, Weston, MA, UNITED STATES

Guangping GAO, Westborough, MA, UNITED STATES

James M. WILSON, Philadelphia, PA, UNITED STATES

CONTINUING DATA

This application is a DIV of 14624671 02/18/2015 PAT 10301648

14624671 is a DIV of 11887679 10/02/2007 PAT 8999678

11887679 is a 371 of PCT/US2006/013375 04/07/2006

PCT/US2006/013375 has PRO of 60733497 11/04/2005

PCT/US2006/013375 has PRO of 60669083 04/07/2005

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/05/2019

STATE OR COUNTRY

UNITED STATES

ADDRESS

HOWSON & HOWSON LLP

325 Sentry Parkway East, Five Sentry East

Suite 160

Blue Bell, PA 19422

UNITED STATES

FILING FEE RECEIVED

$1,720

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	309339	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:25 PM
L2	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:28 PM
L3	2101	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2022/05/04 04:48 PM
L4	4142	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:49 PM
L5	3531	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 04:49 PM
L6	2737	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:49 PM

		("James"))).INV.					
L7	6543	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:50 PM
L8	1403	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:52 PM
L9	330	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 04:52 PM
L10	168	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 07:35 PM

		WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					

L11	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 07:35 PM

		A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L12	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/04 07:36 PM
L13	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/04 07:36 PM

		"11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L14	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:19 PM
L15	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:20 PM
L16	10	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:26 PM
L17	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:27 PM
L18	15018	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:29 PM
L19	1435	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:30 PM

		repeats" OR ITR OR "inverted terminal repeat").clm.					
L20	6482	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 12:31 PM
L21	166	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 12:31 PM
L22	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:04 PM

		US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L23	358	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 02:13 PM
L24	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:13 PM

L25	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2022/05/06 02:17 PM
L26	57	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:50 PM
L27	80	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:54 PM
L28	140	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/05/06 05:55 PM
L29	334771	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L30	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM

L31	2165	(((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L32	4323	(((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L33	3632	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L34	2838	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L35	6798	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L36	1620	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L37	374	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM

		("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L38	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM

		WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L39	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM

		WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L40	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM

		"11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L41	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L42	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L43	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L44	12	((Rhesus OR Rh) WITH	(US-PGPUB; USPAT;	OR	ON	ON	2022/12/01

		("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)				11:33 AM
L45	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L46	16270	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L47	1599	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L48	6797	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L49	174	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L50	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM

		20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1					

		OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L51	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L52	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L53	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James")))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2022/12/01 11:33 AM
L54	69	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L55	92	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L56	201	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:33 AM
L57	8	"AAVrh46".clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR,	OR	ON	ON	2022/12/01 11:42 AM

			WO); FPRS; EPO; JPO; DERWENT)				
L58	0	("AAVrh46" SAME (("amino acid" OR position OR residue) WITH "665"))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2022/12/01 11:50 AM
L59	336701	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L60	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L61	2176	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L62	4343	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L63	3644	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L64	2850	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		(("WILSON") near3 ("James"))).INV.					
L65	6826	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L66	1652	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L67	381	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L68	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM

		2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-					

		A2).did.					
L69	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L70	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L71	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		"11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L72	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L73	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L74	12	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L75	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L76	16452	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L77	1622	(minigene OR "expression cassette") AND (ITRs OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		"inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.					
L78	6838	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L79	175	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L80	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L81	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L82	116	L10 OR L12 OR L14	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03

		OR L15 OR L22					04:09 PM
L83	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L84	69	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L85	95	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L86	201	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L87	336701	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L88	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM

		C12N2750/14152.cpc.					
L89	2176	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L90	4343	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L91	3644	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L92	2850	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L93	6826	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L94	1652	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L95	381	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		(("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L96	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM

		2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L97	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L98	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM

		"11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L99	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L100	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L101	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

L102	12	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L103	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L104	16452	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L105	1622	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L106	6838	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L107	175	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L108	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM

		A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR					

		US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L109	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L110	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L111	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/03 04:09 PM
L112	69	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L113	95	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L114	201	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L115	8	"AAVrh46".clm.	(US-PGPUB; USPAT;	OR	ON	ON	2023/01/03

			USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)				04:09 PM
L116	0	("AAVrh46" SAME (("amino acid" OR position OR residue) WITH "665"))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/03 04:09 PM
L117	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L118	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L119	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L120	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L121	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L122	2892	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		("Guangping")) OR (("WILSON") near3 ("James"))).INV.					
L123	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L124	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L125	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L126	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

		A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR					

		WO-2017019994-A2).did.					
L127	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L128	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L129	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		"10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L130	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L131	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L132	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L133	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L134	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L135	1691	(minigene OR "expression cassette")	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.					
L136	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L137	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L138	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L139	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

L140	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L141	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L142	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L143	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L144	206	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L145	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L146	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

		AND C12N2750/14152.cpc.					
L147	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L148	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L149	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L150	2892	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L151	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L152	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L153	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L154	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

		A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L155	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L156	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

		"10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L157	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L158	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L159	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		"7314912").pn.					
L160	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L161	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L162	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L163	1691	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L164	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L165	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L166	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-					

		20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L167	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L168	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L169	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L170	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L171	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L172	206	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

L173	8	"AAVrh46".clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L174	0	("AAVrh46" SAME (("amino acid" OR position OR residue) WITH "665"))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L175	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L176	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L177	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L178	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L179	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L180	2892	((("VANDENBERGHE") near3 ("Luk")) OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		(("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.					
L181	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L182	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L183	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L184	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

		OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-					

		2016144892-A1 OR WO-2017019994-A2).did.					
L185	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L186	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L187	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		"10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L188	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L189	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L190	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L191	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L192	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L193	1691	(minigene OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21

		"expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.					01:46 PM
L194	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L195	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L196	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L197	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

L198	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L199	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L200	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L201	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L202	206	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L203	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L204	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

		AND C12N2750/14152.cpc.					
L205	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L206	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L207	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L208	2892	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L209	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L210	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L211	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L212	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

		A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L213	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L214	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM

		"10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L215	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L216	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L217	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		"7314912").pn.					
L218	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L219	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L220	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L221	1691	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L222	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L223	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L224	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM

		OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-					

		20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L225	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L226	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L227	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:46 PM
L228	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:46 PM
L233	47	((((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE"	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:48 PM

		) near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND (((WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1					

		OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.) OR (("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.) OR (("20120322861" OR "20150023924").pn.) OR (("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR						

		"20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.) OR ((US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR					

		US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.)))					
L234	181	(("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:49 PM
L235	3	((((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY")	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:49 PM

		near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND (((WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1					

		OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.) OR (("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.) OR (("20120322861" OR "20150023924").pn.) OR (("20030138772" OR "20040170611" OR						

		"20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.) OR ((US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR					

		US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.))) AND (("amino acid" WITH "665").clm.)					
L236	2	("VP1" AND "738" AND	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21

		"665").clm.					01:55 PM
L237	1	L235 AND ("VP1" AND "738" AND "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 01:57 PM
L238	4	("VP1" WITH "738" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 01:58 PM
L239	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L240	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L241	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L242	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L243	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L244	2892	((("VANDENBERGHE") near3 ("Luk")) OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		(("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.					
L245	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L246	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L247	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L248	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-					

		2016144892-A1 OR WO-2017019994-A2).did.					
L249	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L250	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L251	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		"10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L252	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L253	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L254	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L255	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L256	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L257	1691	(minigene OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21

		"expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.					02:01 PM
L258	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L259	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L260	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L261	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

L262	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L263	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L264	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L265	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L266	206	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L267	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L268	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		AND C12N2750/14152.cpc.					
L269	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L270	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L271	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L272	2892	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L273	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L274	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L275	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L276	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L277	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L278	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		"10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L279	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L280	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L281	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		"7314912").pn.					
L282	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L283	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L284	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L285	1691	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L286	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L287	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L288	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-					

		20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L289	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L290	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L291	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L292	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L293	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L294	206	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

L295	8	"AAVrh46".clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L296	0	("AAVrh46" SAME (("amino acid" OR position OR residue) WITH "665"))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L297	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L298	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L299	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L300	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L301	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L302	2892	((("VANDENBERGHE") near3 ("Luk")) OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		(("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.					
L303	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L304	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L305	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L306	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-					

		A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L307	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L308	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L309	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		"10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L310	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L311	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L312	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L313	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L314	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

L315	1691	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L316	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L317	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L318	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L319	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO;	OR	ON	ON	2023/04/21 02:01 PM

			JPO; DERWENT)				
L320	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L321	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L322	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L323	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L324	206	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L325	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L326	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		C12N2750/14143.cpc. AND C12N2750/14152.cpc.					
L327	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L328	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L329	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L330	2892	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L331	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L332	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L333	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		(("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L334	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L335	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L336	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		"10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L337	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L338	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L339	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		"7252997" OR "7314912").pn.					
L340	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L341	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L342	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L343	1691	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L344	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L345	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L346	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-					

		A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L347	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L348	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L349	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L350	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L351	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L352	206	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO;	OR	ON	ON	2023/04/21 02:01 PM

			JPO; DERWENT)				
L353	8	"AAVrh46".clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L354	0	("AAVrh46" SAME (("amino acid" OR position OR residue) WITH "665"))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L355	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L356	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L357	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L358	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L359	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

L360	2892	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L361	6957	(((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L362	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L363	400	(((((THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L364	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1					

		OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L365	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L366	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L367	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		"10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L368	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L369	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L370	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L371	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L372	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		repeat")					
L373	1691	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L374	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L375	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L376	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L377	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR,	OR	ON	ON	2023/04/21 02:01 PM

			WO); FPRS; EPO; JPO; DERWENT)				
L378	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L379	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L380	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L381	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L382	206	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L383	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L384	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.					
L385	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L386	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L387	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L388	2892	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L389	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L390	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L391	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE"	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		) near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L392	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L393	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L394	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		"10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L395	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L396	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L397	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		"6962815" OR "7252997" OR "7314912").pn.					
L398	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L399	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L400	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L401	1691	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L402	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L403	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L404	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR					

		US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L405	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L406	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L407	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR (((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L408	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L409	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L410	206	"WO 2005033321"	(US-PGPUB; USPAT;	OR	ON	ON	2023/04/21

			USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)				02:01 PM
L411	8	"AAVrh46".clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L412	0	("AAVrh46" SAME (("amino acid" OR position OR residue) WITH "665"))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L413	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L414	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc. AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L415	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L416	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L417	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		("James"))).INV.					
L418	2892	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L419	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L420	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L421	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L422	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-					

		2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L423	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L424	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L425	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		"10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L426	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L427	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L428	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L429	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L430	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		repeats" OR ITR OR "inverted terminal repeat")					
L431	1691	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L432	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L433	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L434	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					

L435	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L436	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L437	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L438	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L439	97	WO2005033321	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L440	206	"WO 2005033321"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L441	345064	C12N15/86.cpc. OR A61K48/005.cpc. OR A61K48/0091.cpc. OR C07K14/005.cpc. OR C12N7/00.cpc. OR A61K48/00.cpc. OR C12N2750/14122.cpc. OR C12N2750/14142.cpc. OR C12N2750/14143.cpc. OR C12N2750/14152.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L442	66	C12N15/86.cpc. AND A61K48/005.cpc. AND A61K48/0091.cpc. AND C07K14/005.cpc. AND C12N7/00.cpc. AND A61K48/00.cpc. AND C12N2750/14122.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		AND C12N2750/14142.cpc. AND C12N2750/14143.cpc. AND C12N2750/14152.cpc.					
L443	2211	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L444	4440	((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L445	3686	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L446	2892	((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L447	6957	((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L448	1739	(("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L449	400	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).A	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		S,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND ((("adenoassociated virus" OR "adeno-associated virus" OR AAV) WITH capsid).clm.)					
L450	172	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L451	3	(WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.					
L452	74	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

		"10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.					
L453	25	("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L454	2	("20120322861" OR "20150023924").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L455	16	("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		"6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.					
L456	13	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L457	0	((Rhesus OR Rh) WITH ("adeno-associated virus" OR AAV OR "adenoassociated virus") WITH ("46" OR "clone 46") WITH capsid).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L458	17000	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L459	1691	(minigene OR "expression cassette") AND (ITRs OR "inverted terminal repeats" OR ITR OR "inverted terminal repeat").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L460	6983	("amino acid" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L461	181	("amino acid" WITH "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L462	74	(US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-					

		20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.					
L463	363	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L464	116	L10 OR L12 OR L14 OR L15 OR L22	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L465	47	(((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND L24	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L466	71	((Rhesus OR Rh*) WITH ("adeno-associated virus" OR AAV OR AAV* OR "adenoassociated virus" OR rAAV) WITH ("46" OR "rh.46" OR "clone 46") WITH capsid)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM
L467	47	((((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY")	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND (((WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1 OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1					

		OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.) OR (("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.) OR (("20120322861" OR "20150023924").pn.) OR (("20030138772" OR "20040170611" OR						

		"20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.) OR ((US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR					

		US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-A1).did.)))					
L468	181	(("amino acid" WITH "665").clm.)	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

L469	3	((((((("THE") near3 ("TRUSTEES") near3 ("OF") near3 ("THE") near3 ("UNIVERSITY") near3 ("OF") near3 ("PENNSYLVANIA"))).AS,AANM.) OR ((((("VANDENBERGHE") near3 ("Luk")) OR (("GAO") near3 ("Guangping")) OR (("WILSON") near3 ("James"))).INV.)) AND (((WO-2005033321-A2 OR WO-2006110689-A2 OR WO-2017023724-A1 OR WO-2017075338-A2 OR WO-2017075335-A1 OR WO-2017189959-A1 OR WO-2017189963-A1 OR WO-2017189964-A2 OR WO-2017201248-A1 OR WO-2017201258-A1 OR WO-2018002719-A1 OR WO-2018007980-A1 OR WO-2018002783-A1 OR WO-2018002886-A1 OR WO-2018002812-A1 OR WO-2018002762-A1 OR WO-2018002730-A1 OR WO-2018007976-A1 OR WO-2018058064-A1 OR WO-2018154418-A1 OR WO-2018154380-A1 OR WO-2018154413-A1 OR WO-2018154459-A1 OR WO-2018154387-A1 OR WO-2018154462-A2 OR WO-2018204797-A1 OR WO-2018204803-A1 OR WO-2018204786-A1 OR WO-2018232055-A1 OR WO-2019028306-A2 OR US-20190153441-A1 OR US-20190153440-A1 OR WO-2019116349-A1 OR WO-2019123430-A1	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM

		OR WO-2019123429-A1 OR WO-2019222328-A1 OR WO-2019222329-A1 OR WO-2019246480-A1 OR WO-2020069461-A1 OR WO-2020077165-A1 OR WO-2020142714-A1 OR WO-2020150556-A1 OR US-20200332288-A1 OR WO-2020223279-A1 OR WO-2020223276-A1 OR WO-2020227515-A1 OR WO-2021007382-A1 OR WO-2021016505-A1 OR WO-2021046155-A1 OR WO-2021154923-A2 OR WO-2021230987-A1 OR WO-2021247995-A2 OR WO-2022026409-A1 OR WO-2022026410-A2 OR WO-2015191508-A1 OR WO-2015054653-A2 OR WO-2016144892-A1 OR WO-2017019994-A2).did.) OR (("10265417" OR "10301648" OR "10485883" OR "10584337" OR "10626415" OR "10662425" OR "10695441" OR "10722598" OR "10947561" OR "10973928" OR "10995328" OR "11072792" OR "11118177" OR "11174469" OR "11193129" OR "7906111" OR "8999678" OR "9737618" OR "10577627" OR "10119125" OR "10526584" OR "11104885" OR "9695220" OR "9719070" OR "10738087").did.) OR					

		(("20120322861" OR "20150023924").pn.) OR (("20030138772" OR "20040170611" OR "20040180440" OR "20070036760" OR "20080269149" OR "20090275107" OR "20090317417" OR "20100129405" OR "6156303" OR "6410300" OR "6596539" OR "6703237" OR "6733757" OR "6962815" OR "7252997" OR "7314912").pn.) OR ((US-20070036760-A1 OR US-20090197338-A1 OR US-20110236353-A1 OR US-20150159173-A1 OR US-20150315612-A1 OR US-20170028082-A1 OR US-20170159027-A1 OR US-20170191079-A1 OR US-20180057841-A1 OR US-20180127786-A1 OR US-20180230489-A1 OR US-20190000940-A1 OR US-20190055578-A1 OR US-20190015527-A1 OR US-20190022249-A1 OR US-20190054158-A1 OR US-20190054188-A1 OR US-20190060425-A1 OR US-20190153440-A1 OR US-20190153441-A1 OR US-20190153471-A1 OR US-20190153477-A1 OR US-20190160091-A1 OR US-20190160186-A1 OR US-20190169616-A1 OR US-20190185849-A1 OR US-20190211362-A1 OR US-20190218574-A1 OR US-20190224339-A1 OR US-20190224340-A1 OR					

		US-20190330604-A1 OR US-20190343937-A1 OR US-20190365929-A1 OR US-20200040061-A1 OR US-20200080082-A1 OR US-20200095579-A1 OR US-20200123570-A1 OR US-20200123574-A1 OR US-20200149045-A1 OR US-20200155624-A1 OR US-20200155704-A1 OR US-20200157565-A1 OR US-20200165630-A1 OR US-20200208176-A1 OR US-20200216857-A1 OR US-20200248168-A1 OR US-20200270635-A1 OR US-20200318108-A1 OR US-20200325491-A1 OR US-20200332288-A1 OR US-20200354717-A1 OR US-20200385696-A1 OR US-20210163985-A1 OR US-20210040504-A1 OR US-20210170050-A1 OR US-20210198691-A1 OR US-20210230632-A1 OR US-20210261962-A1 OR US-20210299274-A1 OR US-20210371470-A1 OR US-20210395776-A1 OR US-20210403905-A1 OR US-20170130245-A1 OR US-20200149068-A1 OR US-20160215024-A1 OR US-20170051257-A1 OR US-20170298323-A1 OR US-20180043034-A1 OR US-20190055524-A1 OR US-20200123504-A1 OR US-20200318082-A1 OR US-20210069347-A1 OR US-20190100560-A1 OR US-20210017235-					

		A1).did.))) AND (("amino acid" WITH "665").clm.)					
L470	2	("VP1" AND "738" AND "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L471	1	L235 AND ("VP1" AND "738" AND "665").clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/21 02:01 PM
L472	4	("VP1" WITH "738" WITH "665")	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/21 02:01 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/368,758	**05/01/2023 05:42:45 PM ET**	**UPN-R3895D2US**

Title of Invention

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7840	FILED BY	Colleen Schaller
PATENT CENTER #	62017728	FILING DATE	03/28/2019
CUSTOMER #	270	FIRST NAMED INVENTOR	Luk VANDENBERGHE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
R3895USD2_20230501_IssueFeeTransmittal.pdf	1	Issue Fee Payment (PTO-85B)	162 KB
R3895USD2_Declarations_Signed_ALL.pdf	9	Oath or Declaration filed	385 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
R3895USD2_20230501_IssueFeeTransmittal.pdf	2A39892A6F1936902CEB421731CFC5EBEA1A6AEAF4DCC86AB48B76ADCE78F5D551FAFD1F84A45FF46761BA0389222AADA

401F94A92605A61E92AE37A4107FEBF

R3895USD2_Declarations_Signed_ALL.pdf	96E877C70EBDC743CB58281CA035098BA81EF8B4CD84F5A3A8E0FBF9F75A777A3AB6A45B98A2C45BE7AC9A056DEBA0F2E3895AB92938977B8A0AE57C71EFA3A2

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

270 7590 05/01/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	03/28/2019	Luk VANDENBERGHE	UPN-R3895D2US	7840

TITLE OF INVENTION: METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	~~$0~~ $1200	~~$1200~~ $0	08/01/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
HIBBERT, CATHERINE S	1658	514-04400R

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Colleen M. Schaller
2 Howson & Howson LLP
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: The Trustees of the University of Pennsylvania

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Philadelphia, Pennsylvania

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via Patent Center or EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 08-3040

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Colleen M. Schaller/ Date 2023-05-01

Typed or printed name Colleen M. Schaller Registration No. 67,751

DocuSign Envelope ID: 7801C548-0066-4047-B360-4B7B1EC0AB2B

Document Description: Oath or declaration filed

PTO/SB/01 (04-19)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration Submitted With Initial Filing OR ☒ Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(f)) required)

Attorney Docket Number	UPN-R3895.US.D2
First Named Inventor	Luk H. Vandenberghe
COMPLETE IF KNOWN	
Application Number	16/368,758
Filing Date	March 28, 2019
Art Unit	1658
Examiner Name	CATHERINE S HIBBERT

I hereby declare that: (1) Each inventor's residence, mailing address, and citizenship are as stated below next to their name; and (2) I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention titled:

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

(Title of the Invention)

the application of which was made or was authorized to be made by me and

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 03/28/2019 as United States Application Number or PCT International Application Number 16/368,758 and was amended on (MM/DD/YYYY) 03/29/2023 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above.

I hereby acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Claim of Foreign Priority Benefits

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Priority Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application number(s) are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0032. Public burden for this form is estimated to average 21 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **If filing this completed form by mail, send to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Sarepta Exhibit 1002, page 691

DocuSign Envelope ID: 7801C548-0066-4047-B360-4B7B1EC0AB2B

PTO/SB/01 (04-19)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION – Utility or Design Patent Application

Direct all correspondence to: ☑ The address associated with Customer Number: 270 **OR** ☐ Correspondence address below

Name		
Address		
City	State	Zip
Country	Telephone	Email

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issue thereon.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

NAME OF SOLE OR FIRST INVENTOR ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])	Family Name or Surname
Guangping	Gao

Inventor's Signature	Date
/Guangping Gao /	

Residence: City	State	Country	Citizenship
Westborough	MA	US	US

Mailing Address
14 Indian Hill Road

City	State	Zip	Country
Westborough	MA	01581	US

☐ Additional inventors or a legal representative are being named on the _____ supplemental sheet(s) PTO/SB/02A or 02LR attached hereto

DocuSign Envelope ID: 7801C548-0066-4047-B360-4B7B1EC0AB2B

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections, or an issued patent, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

DocuSign Envelope ID: 7801C548-0066-4047-B360-4B7B1EC0AB2B

Document Description: Oath or declaration filed

PTO/SB/01 (04-19)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration Submitted With Initial Filing OR ☒ Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(f)) required)

Attorney Docket Number	UPN-R3895.US.D2
First Named Inventor	Luk H. Vandenberghe
COMPLETE IF KNOWN	
Application Number	16/368,758
Filing Date	March 28, 2019
Art Unit	1658
Examiner Name	CATHERINE S HIBBERT

I hereby declare that: (1) Each inventor's residence, mailing address, and citizenship are as stated below next to their name; and (2) I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention titled:

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

(Title of the Invention)

the application of which was made or was authorized to be made by me and

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 03/28/2019 as United States Application Number or PCT International Application Number 16/368,758 and was amended on (MM/DD/YYYY) 03/29/2023 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above.

I hereby acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Claim of Foreign Priority Benefits

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Priority Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application number(s) are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0032. Public burden for this form is estimated to average 21 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **If filing this completed form by mail, send to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Sarepta Exhibit 1002, page 694

DocuSign Envelope ID: 7801C548-0066-4047-B360-4B7B1EC0AB2B

PTO/SB/01 (04-19)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION – Utility or Design Patent Application

Direct all correspondence to:	☑ The address associated with Customer Number:	270	OR ☐	Correspondence address below

Name		
Address		
City	State	Zip
Country	Telephone	Email

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issue thereon.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

NAME OF SOLE OR FIRST INVENTOR	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Luk H.	Vandenberghe		
Inventor's Signature / Luk Vandenberghe /			Date
Residence: City	State	Country	Citizenship
Weston	MA	US	BE
Mailing Address			
14 Indian Hill Road			
City	State	Zip	Country
Weston	MA	02493	US

☐ Additional inventors or a legal representative are being named on the _____ supplemental sheet(s) PTO/SB/02A or 02LR attached hereto

DocuSign Envelope ID: 7801C548-0066-4047-B360-4B7B1EC0AB2B

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections, or an issued patent, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.

DocuSign Envelope ID: 7801C548-0066-4047-B360-4B7B1EC0AB2B

Document Description: Oath or declaration filed

PTO/SB/01 (04-19)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration Submitted With Initial Filing OR ☒ Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(f)) required)

Attorney Docket Number	UPN-R3895.US.D2
First Named Inventor	Luk H. Vandenberghe
COMPLETE IF KNOWN	
Application Number	16/368,758
Filing Date	March 28, 2019
Art Unit	1658
Examiner Name	CATHERINE S HIBBERT

I hereby declare that: (1) Each inventor's residence, mailing address, and citizenship are as stated below next to their name; and (2) I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention titled:

METHOD OF INCREASING THE FUNCTION OF AN AAV VECTOR

(Title of the Invention)

the application of which was made or was authorized to be made by me and

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 03/28/2019 as United States Application Number or PCT International Application Number 16/368,758 and was amended on (MM/DD/YYYY) 03/29/2023 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above.

I hereby acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Claim of Foreign Priority Benefits

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Priority Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application number(s) are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0032. Public burden for this form is estimated to average 21 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **If filing this completed form by mail, send to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Sarepta Exhibit 1002, page 697

DocuSign Envelope ID: 7801C548-0066-4047-B360-4B7B1EC0AB2B

PTO/SB/01 (04-19)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION – Utility or Design Patent Application

Direct all correspondence to:	☑ The address associated with Customer Number:	270	OR ☐	Correspondence address below

Name		
Address		
City	State	Zip
Country	Telephone	Email

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issue thereon.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

NAME OF SOLE OR FIRST INVENTOR	☐ A petition has been filed for this unsigned inventor
Given Name (first and middle [if any]): James M.	Family Name or Surname: Wilson
Inventor's Signature: / James M. Wilson /	Date:

Residence: City	State	Country	Citizenship
Philadelphia	PA	US	US

Mailing Address: 1831 Delancey Street

City	State	Zip	Country
Philadelphia	PA	19103	US

☐ Additional inventors or a legal representative are being named on the _____ supplemental sheet(s) PTO/SB/02A or 02LR attached hereto

DocuSign Envelope ID: 7801C548-0066-4047-B360-4B7B1EC0AB2B

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013). https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a Federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 9) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Additional Uses

Additional USPTO uses of the information in this record may include disclosure to: 1) the International Bureau of the World Intellectual Property Organization, if the record is related to an international application filed under the Patent Cooperation Treaty; 2) the public i) after publication of the application pursuant to 35 U.S.C. 122(b), ii) after issuance of a patent pursuant to 35 U.S.C. 151, iii) if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections, or an issued patent, or iv) without publication of the application or patent under the specific circumstances provided for by 37 CFR 1.14(a)(1)(v)-(vii); and/or 3) the National Archives and Records Administration, for inspection of records.



United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :Simret Direta

Sale Accounting Date:05/05/2023

Sale Item Reference Number	Effective Date
16368758	05/01/2023

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I202355I07409031	1501	UTILITY APPL ISSUE FEE	$1,200.00	Salea

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/368,758	06/20/2023	11680274	UPN-R3895D2US	7840

270 7590 05/31/2023

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East
Suite 160
Blue Bell, PA 19422

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 545 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Luk VANDENBERGHE, Weston, MA;
Guangping GAO, Westborough, MA;
James M. WILSON, Philadelphia, PA;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address : COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.
16/368,758	20-JUN-23	11680274

HOWSON & HOWSON LLP
325 Sentry Parkway East, Five Sentry East Suite 160
Blue Bell, PA 19422

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at https://patentcenter.uspto.gov

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit https://www.uspto.gov/electronicgrants