PROVISIONAL PATENT APPLICATION

SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF

Inventor(s): Bruce D. FORREST,
Citizen of USA, Residing at
135 Piermont Avenue
South Nyack, NY 10960

Jack D. LOVE,
Citizen of USA, Residing at
4111 W Inman Avenue
Tampa, FL 33609

Assignee: Liffey Biotech LLC
15 Cedarwood Dr.
Greenwich, CT 068830

a Delaware Corporation

Entity: large business concern

WSGR

Wilson Sonsini Goodrich & Rosati
PROFESSIONAL CORPORATION

650 Page Mill Road
Palo Alto, CA 94304
(650) 493-9300 (Main)
(650) 493-6811 (Facsimile)

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INCORPORATION BY REFERENCE

[0001] All publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application was specifically and individually indicated to be incorporated by reference.

DETAILED DESCRIPTION OF THE INVENTION

[0002] In some embodiments is provided a vaccine composition that reduces the induction of this hyporesponsive immunological state to a hapten while allowing the broadening of serotype coverage.

[0003] In some embodiments, is provided present a new composition of a *Streptococcus pneumoniae* saccharide-polypeptide conjugate vaccine comprising capsular saccharides of one or more distinct *S. pneumoniae* serotypes conjugated to a carrier polypeptide. The serotypes included in the vaccine can be selected from all possible *S. pneumoniae* serotypes, but excludes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F serotypes. Some embodiments are provided for temporal administration of conjugate vaccine compositions comprising similar or related carrier peptides. When one or more conjugate vaccines share a similar or related carrier protein, each conjugate vaccine can be administered at least four weeks after any other conjugate vaccine. In one embodiment, the current *S. pneumoniae* saccharide-polypeptide conjugates using a similar or related carrier polypeptide, broadens coverage against pneumococcal disease by complementing and expanding the coverage provided by any currently commercially available *Streptococcus pneumoniae* saccharide- polypeptide conjugate vaccine in a manner that does not impair the elicitation of the protective antibodies to the capsular saccharide component of the conjugate by reducing the risk of carrier hapten epitopic suppression. In some embodiments, separation of dosing of either additional conjugates or of any vaccine comprising free carrier polypeptide can also effectively raise the hapten:carrier polypeptide ratio at the cellular level and can abrogate the carrier suppression of the immune response induced to the hapten.

[0004] Significant clinical disease continues to emerge caused by serotypes not contained in any approved pneumococcal conjugatevaccine either through replacement of current disease by emerging pathogenic serotypes not covered by the vaccine [Weinberger *et al.* 2011], or through capsular-switching in which pathogenic serotypes switch the capsular saccharide from one targeted by the immune response elicited to it by the current PCV to a capsular saccharide not covered by a

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currently approved PCV (Golubchik *et al.* 2012; Wyres *et al.* 2013]. Despite the success of PCV introductions in substantially reducing the risk of invasive pneumococcal disease (IPD) caused by *S. pneumoniae* serotypes covered by those vaccines, in 2013 an estimated 13,500 cases of IPD occurred among adults aged ≥65 years in the United States [Tomcyk *et al.* 2014]. In Canada, across all age between 20% and 32% of *S. pneumoniae* non-PCV13 vaccine serotypes isolated between 2010-2013 were associated with clinical disease. In the US, as few as 20%–25% of IPD cases and 10% of community-acquired pneumonia cases in adults aged ≥65 years are caused by PCV13 serotypes that are potentially preventable with the use of PCV13 in this population [Tomcyk *et al.* 2014; Public Health Agency of Canada. 2013.], leaving a substantial amount of disease in adults caused by *S. pneumoniae* serotypes not covered by any commercially available vaccine.

[0005] There remains a substantial medical need for an expanded coverage against disease caused by *S. pneumoniae* for the serotypes of PPSV23 not included in PCV13 plus additional serotypes associated with emerging clinical disease. However, the current approach to address this problem by increasing coverage through additional *S. pneumoniae* saccharide-polypeptide conjugates, utilizing a common carrier polypeptide, co-formulated and given as a single injection or co-administered contemporaneously as separate injections, results in decreased immune responses to the saccharide components through a mechanism of hapten-carrier epitopic suppression that results in a long term, if not permanent, reduction in an effective immune response to these new serotype saccharides.

[0006] A saccharide-polypeptide conjugate composition can be a saccharide conjugated to a carrier protein. A saccharide-polypeptide carrier conjugate can comprise saccharide antigens coupled to one or more polypeptide carriers.

[0007] A saccharide can be a capsular saccharide. A saccharide can be a polysaccharide. A saccharide can be an oligosaccharide. A saccharide can be a saccharide from *Streptococcus pneumoniae*, *Neisseria meningitides*, *Salmonella enterica*, or *Haemophilus influenzae*. A saccharide can be a saccharide from any serotype of *Streptococcus pneumoniae*, *Neisseria meningitides*, *Salmonella enterica*, or *Haemophilus influenzae*. A saccharide can be a saccharide any of the 90 serotypes of *Streptococcus pneumoniae*. The serotype can be *Streptococcus pneumoniae* serotype 1. The serotype can be *Streptococcus pneumoniae* serotype 2. The serotype can be *Streptococcus pneumoniae* serotype 3. The serotype can be *Streptococcus pneumoniae* serotype 4. The serotype can be *Streptococcus pneumoniae* serotype 5. The serotype can be *Streptococcus pneumoniae* serotype 6A. The serotype can be *Streptococcus pneumoniae* serotype 6B. The serotype can be *Streptococcus pneumoniae* serotype 7F. The serotype can be *Streptococcus pneumoniae* serotype 9V. The serotype can be *Streptococcus pneumoniae* serotype 14. The serotype can be *Streptococcus*

pneumoniae serotype 18C. The serotype can be *Streptococcus pneumoniae* serotype 19A. The serotype can be *Streptococcus pneumoniae* serotype 19F. The serotype can be *Streptococcus pneumoniae* serotype 23F. The serotype can be *Streptococcus pneumoniae* serotype 6C. The serotype can be *Streptococcus pneumoniae* serotype 8. The serotype can be *Streptococcus pneumoniae* serotype 9N. The serotype can be *Streptococcus pneumoniae* serotype 10A. The serotype can be *Streptococcus pneumoniae* serotype 12F. The serotype can be *Streptococcus pneumoniae* serotype 15B. The serotype can be *Streptococcus pneumoniae* serotype 16F. The serotype can be *Streptococcus pneumoniae* serotype 17F. The serotype can be *Streptococcous pneumoniae* serotype 20. The serotype can be *Streptococcus pneumoniae* serotype 20F. The serotype can be *Streptococcus pneumoniae* serotype 23A. The serotype can be *Streptococcus pneumoniae* serotype 23B. The serotype can be *Streptococcus pneumoniae* serotype 31. The serotype can be *Streptococcus pneumoniae* serotype 33F. The serotype can be *Streptococcus pneumoniae* serotype 35B. The serotype can be *Streptococcus pneumoniae* serotype 38. Although the above saccharides may be used in their full-length native form, any size reduced saccharides can also be used which are still immunogenic. In general, a variety of methods for preparing unconjugated saccharides suitable for use in the present invention are known in the art. Methods of purifying saccharides from *Streptococcus pneumoniae* are well known. For example, a purification process for the saccharides is described in US Patents 4,686,102; 4,242,501; 4,221,906; 5,623,057; and 5,847,112.

[0008] A carrier protein can be any polypeptide carrier that allows for coupling of saccharide antigens so that they are displayed in a way that induces a protective immune response. A carrier protein can be any polypeptide suitable for presenting saccharide antigens such that a protective immune response to the saccharide antigen is induced may be utilized in accordance with the present invention. Examples of suitable polypeptides for use as carrier polypeptides are described in US patent 8,808,707 and include: polylysine, polyglutamic acid, polyaspartic acid, co-polymers thereof, and mixed polymers of these amino acids and others, e.g., serines, to confer desirable solubility properties on the resultant loaded carrier and conjugate. Additionally, suitable polypeptide carriers include bacterial toxins, toxoids, or inactivated toxin. A toxoid is a bacterial toxin whose toxicity has been weakened or suppressed while other properties, typically immunogenicity, are maintained. As a class, bacterial toxins and derivatives thereof tend to be highly immunogenic. Polypeptide carriers derived from bacterial toxins have proven to be effective polypeptide carriers in vaccines. Generally, steps are taken (e.g., by chemical and/or genetic means) to render the toxins non-toxic and safe for administration to mammals. Examples of such bacterial toxin-derived polypeptide carriers which are currently commonly used in vaccine compositions, and may be used in conjugate antigens of

vaccines useful in the provided methods, include the diphtheria and tetanus toxoids, and variants thereof (e.g. DT, CRM_{197},TT), cholera toxoid, pertussis toxoid, inactivated or mutant pneumococcal pneumolysin, pneumococcal surface protein A or a derivative thereof, pneumococcal adhesion protein A or a derivative thereof, C5a peptidase group A or group B streptococcus or a derivative thereof, non-typable *H. influenzae* P4 protein or a derivative thereof, non-typable *H. influenzae* P6 protein or a derivative thereof, *M catarrhalis* uspA or a derivative thereof, keyhole limpet haemocyanin (KLH), OMPC from *N. meningitidis*, the purified protein derivative of tuberculin(PPD), and protein from *H. influenzae* (EP 594610-B), or fragments of any of the foregoing.

[0009] The nature and technique of conjugation can be achieved by any chemical or biological synthesis of any given saccharide to the carrier polypeptide.

[0010] A saccharide-polypeptide conjugate composition can comprise a plurality of saccharide-polypeptide conjugates, wherein each saccharide-polypeptide conjugate comprises the same protein carrier. The same carrier protein can be any carrier protein previously described herein. For example, the same carrier protein can be CRM_{197}, tetanus toxoid, or diphtheria toxoid. The plurality of saccharide-polypeptide conjugates can comprise at least one serotype of *Streptococcus pneumoniae*. The plurality of saccharide-polypeptide conjugates can comprise at least one serotype of *Neisseria meningitides*. The plurality of saccharide-polypeptide conjugates can comprise at least one serotypes of *Salmonella enterica*. The plurality of saccharide-polypeptide conjugates can comprise at least one serotype of *Haemophilus influenzae*. The plurality of saccharide-polypeptide conjugates can comprise different saccharide-polypeptide conjugates wherein the saccharide-polypeptide conjugates comprise saccharides of different serotypes. The plurality of saccharide-polypeptide conjugates can comprise at least two serotypes of *Streptococcus pneumoniae*. The plurality of saccharide-polypeptide conjugates can comprise the *Streptococcus pneumoniae* serotypes 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, and 38. The plurality of saccharide-polypeptide conjugates can comprise at least one of serotype of *Streptococcus pneumoniae*, provided that the serotype is not 1, 3, 4, 5, 6A, 7F, 9V, 14, 18C, 19A, 19F, or 23F. The plurality of saccharide-polypeptide conjugates can comprise at least one of the *Streptococcus pneumoniae* serotypes 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, and 38. The plurality of saccharide-polypeptide conjugates can comprise the *Streptococcus pneumoniae* serotypes 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, and 33F. The plurality of saccharide-polypeptide conjugates can comprise at least one serotype of *Neisseria meningitides*. The plurality of saccharide-polypeptide

conjugates can comprise at least one serotypes of *Salmonella enterica*. The plurality of saccharide-polypeptide conjugates can comprise at least one serotype of *Haemophilus influenzae*.

[0011] The saccharide-polypeptide compositions described herein can be formulated for use as a vaccine. For example, the saccharide-polypeptide conjugate composition can comprise a plurality of saccharide-polypeptide conjugates and physiologically acceptable vehicle. A saccharide-polypeptide conjugate composition can comprise a plurality of saccharide-polypeptide conjugates, a physiologically acceptable vehicle, and an adjuvant. The adjuvant can comprise an aluminum cation. The adjuvant can be aluminum phosphate, aluminum sulfate, or aluminum hydroxide.

[0012] The saccharide-polypeptide composition can be administered by intramuscular injection. The saccharide-polypeptide composition can be administered via intramuscular, intraperitoneal, intradermal or subcutaneous routes, or via mucosal administration to the oral/alimentary, respiratory or genitourinary tracts. The saccharide-polypeptide composition can be administered intranasally.

[0013] The saccharide-polypeptide composition can be used to elicit an immune response. A method of eliciting an immune response, can comprise administering a first composition to a subject comprising a first plurality of saccharide-polypeptide conjugates and a physiologically acceptable vehicle, wherein a saccharide-polypeptide conjugate comprises a saccharide from a serotype of a first bacteria conjugated to a carrier protein, and wherein the first plurality of saccharide-polypeptide conjugates comprises saccharides from at least one serotype of the first bacteria; and administering a second composition to the subject comprising a second plurality of saccharide-polypeptide conjugates and a physiologically acceptable vehicle, wherein a saccharide-polypeptide conjugate comprises a saccharide from a serotype of a second bacteria conjugated to the carrier protein, and wherein the second plurality of saccharide-polypeptide conjugates comprises saccharides from at least one serotype of the second bacteria; wherein the first composition is administered at least four weeks before the second composition is administered; and wherein the at least one serotype from the first bacteria is different than the at least one serotype from the second bacteria. The first plurality of saccharide-polypeptide conjugates can be any saccharide-polypeptide conjugates described herein, and the second plurality of saccharide-polypeptide conjugates can be any saccharide polypeptide conjugates described herein, provided the serotypes of the second plurality are distinct from the serotypes of the first plurality. The first bacteria can be the same the second bacteria. Alternatively, the first bacteria can be different than the second bacteria. The first bacteria can be *Streptococcus pneumoniae*. The first bacteria can be *Neisseria meningitides*, *Salmonella enterica*, or *Haemophilus influenzae*. The second bacteria can be *Streptococcus pneumoniae*. The second bacteria can be *Neisseria meningitides*, *Salmonella enterica*, or *Haemophilus influenzae*. The at least one serotype

from the first bacteria can be 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, or 23F from *Streptococcus pneumoniae*, and the at least one serotype from the second bacteria can be 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, or 38 from *Streptococcous pneumoniae.* The at least one serotype from the first bacteria can be 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F from *Streptococcus pneumoniae*, and the at least one serotype from the second bacteria can be 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, or 38 from *Streptococcus pneumoniae.* The at least one serotype from the first bacteria can be 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F from *Streptococcus pneumoniae*, and the at least one serotype from the second bacteria can be 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, and 33F2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, and 33F from *Streptococcus pneumoniae.* The at least one serotype from the first bacteria can be 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, or 38 from *Streptococcus pneumoniae*, and the at least one serotype from the second bacteria can be 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, or 23F from *Streptococcus pneumoniae*. The at least one serotype from the first bacteria can be 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, or 38 from *Streptococcus pneumoniae*, and the at least one serotype from the second bacteria can be 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F from *Streptococcus pneumoniae*. The at least one serotype from the first bacteria can be 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, and 33F from *Streptococcus pneumoniae*, and the at least one serotype from the second bacteria can be 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F from *Streptococcus pneumoniae*. The carrier protein can be CRM_{197}. The carrier protein can be tetanus toxoid or diphtheria toxoid. The first composition can further comprise an adjuvant. The second composition can further comprise an adjuvant. The adjuvant in the first composition can be and aluminum-based adjuvant. The adjuvant in the first composition can be aluminum phosphate, aluminum sulfate, or aluminum hydroxide. The adjuvant in the second composition can be and aluminum-based adjuvant. The adjuvant in the second composition can be aluminum phosphate, aluminum sulfate, or aluminum hydroxide. The first composition can be administered by intramuscular injection. The second composition is administered by intramuscular injection.

[0014] In one embodiment, saccharide-polypeptide conjugate composition comprising at least one *S. pneumoniae* oligosaccharide conjugated to CRM_{197} carrier polypeptide is administered by an intramuscular injection at least one month before or after a dose of PCV7 (Prevnar®) or PCV13 (Prevnar 13®).

[0015] If multiple immunizations of a saccharide-polypeptide conjugate composition comprising at least one oligosaccharide-polypeptide conjugate using the same carrier polypeptide as used for at least one oligosaccharide-polypeptide conjugate, then multiple immunizations may be required, with at least 4 weeks separating the different doses.

[0016] In one embodiment, the saccharide-polypeptide conjugate composition comprises saccharide-polypeptide conjugates together with a physiologically acceptable vehicle, wherein each of the conjugates comprises a capsular saccharide (polysaccharide or oligosaccharide) from a different serotype of *S. pneumoniae* conjugated to a carrier polypeptide, and the capsular polysaccharides are prepared from serotypes 2, 6C, 8, 9N, 10A, 11A, 12F, 15A, 15B, 16F, 17F, 20, 22F, 23A, 23B, 31, 33F, 35B or 38.

[0017] In another embodiment of the saccharide-polypeptide conjugate composition, the capsular saccharides (polysaccharides or oligosaccharides) are selected from serotypes 2, 6C, 8, 9N, 10A, 11A, 12F, 15A, 15B, 16F, 17F, 20, 22F, 23A, 23B, 31, 33F, 35B or 38 of *S. pneumoniae*, the carrier polypeptide is CRM_{197}, and the adjuvant is an aluminum-based adjuvant, such as aluminum phosphate, aluminum sulfate and aluminum hydroxide. In one embodiment, the adjuvant is aluminum phosphate

[0018] In one embodiment, the saccharide-polypeptide conjugate composition is administered using a dosing schedule where there is at least four calendar weeks separating the saccharide-polypeptide composition administration and the administration of any other vaccine using the same carrier polypeptide as in the saccharide-polypeptide composition. In one embodiment, the saccharide-polypeptide conjugate composition comprising at least one *S. pneumoniae* oligosaccharide conjugated to CRM_{197} carrier polypeptide is administered by an intramuscular injection at least one month before or after a dose of PCV7 (i.e. Prevnar®) or PCV13 (i.e. Prevnar 13®).

[0019] In another embodiment, the saccharide-polypeptide conjugate composition comprising at least one *S. pneumoniae* oligosaccharide conjugated to CRM_{197} carrier polypeptide is administered by an intramuscular injection at least one month before or after a dose of Meningitec® (*Neisseria meningitidis* group C capsular saccharide-CRM_{197} conjugate vaccine). In yet another embodiment, the saccharide-polypeptide conjugate comprising at least one *S. pneumoniae* oligosaccharide conjugated to CRM_{197} carrier polypeptide is administered by an intramuscular injection at least one month before or after a dose of a *Salmonella enterica* subspecies *enterica* serovar Typhi Vi-capsular saccharide-CRM_{197} conjugate vaccine [Micoli *et al.* 2011).

[0020] In another embodiment the saccharide-polypeptide conjugate comprising at least one *S. pneumoniae* oligosaccharide conjugated to TT carrier polypeptide is administered by an

intramuscular injection at least one month before after a dose of another vaccine using TT as a carrier polypeptide (for example, MenHibrix® - combination *N. meningitidis* groups C and Y and *H. influenzae* type b oligosaccharides individually conjugated to TT).

[0021] In one embodiment, the saccharide-polypeptide conjugate comprising at least one *S. pneumoniae* oligosaccharide conjugated to CRM_{197} carrier polypeptide is administered by an intramuscular injection at least one month before or after a dose of a diphtheria toxoid containing vaccine.

[0022] In another embodiment, the saccharide-polypeptide conjugate comprising at least one *S. pneumoniae* oligosaccharide conjugated to TT carrier polypeptide is administered by an intramuscular injection at least one month before or after a dose of a tetanus toxoid containing vaccine.

[0023] While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.

EXAMPLE 1

Method of vaccination for adults 50 years old or older

[0024] This example shows vaccine compositions and a dosing schedule for the vaccine compositions for adults 50 years old or older. A first vaccine composition is composed of a saccharide-polypeptide conjugate containing the serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F. A second vaccine composition is composed of a saccharide-polypeptide conjugate containing 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, and 33F. Each vaccine is formulated to contain from 2-5 microgram of each serotype and aluminum phosphate as an adjuvant.

[0025] A single 0.5 mL dose of the first vaccine is given to an adult subject age 50 or older. Four weeks later a single 0.5 mL dose of the second vaccine is given to an adult age 50 or older. Alternatively to four weeks later, one year later a single 0.5 of the second vaccine is given to an adult age 50 or older.

EXAMPLE 2

Method of vaccination for children ages 2 to 17 years old

[0026] This example shows vaccine compositions and a dosing schedule for the vaccine compositions for children ages 2 to 17 years old. A first vaccine composition is composed of a saccharide-polypeptide conjugate containing the serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F. A second vaccine composition is composed of a saccharide-polypeptide conjugate containing 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, and 33F. Each vaccine is formulated to contain from 2-5 microgram of each serotype and aluminum phosphate as an adjuvant.

[0027] A single 0.5 mL dose of the first vaccine is given to a child who is 2-17 years old. Four weeks later a single 0.5 mL dose of the second vaccine is given to a child who is 2-17 years old. Alternatively to four weeks later, one year later a single 0.5 of the second vaccine is given to a child who is 2-17 years old.

CLAIMS

WHAT IS CLAIMED IS:

1. A composition comprising a saccharide-polypeptide conjugate, wherein the saccharide-polypeptide conjugate comprises a saccharide from a serotype of *Streptococcus pneumoniae* conjugated to a polypeptide, and wherein:

the serotype is not one of 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, or 23F;

wherein the serotype is one of 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, or 38; or

a combination thereof.

2. The composition of claim 1, wherein the saccharide is a polysaccharide or a capsular saccharide.

3. The composition of claim 1, wherein the polypeptide is an oligopeptide.

4. The composition of claim 1, wherein the polypeptide is CRM_{197}, tetanus toxoid , a diphtheria toxoid, or any fragment thereof.

5. The composition of claim 1, comprising a plurality of saccharide-polypeptide conjugates comprising at least two serotypes selected from the group consisting of 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, and 38.

6. The composition of claim 1, further comprising an adjuvant.

7. The composition of claim 6, wherein the adjuvant is an aluminum-cation adjuvant.

8. The composition of claim 6, wherein the adjuvant is aluminum phosphate, aluminum sulfate, or aluminum hydroxide.

9. The composition of claim 1, wherein the composition is in the form of an intramuscularly injected composition.

10. A method comprising:

administering a first saccharide-polypeptide conjugate composition to a subject;

administering a second saccharide-polypeptide conjugate composition to the subject at least four weeks after administering the first saccharide-polypeptide conjugate composition;

wherein the first saccharide-polypeptide conjugate composition comprises a polypeptide that has at least 70% length homology, 70% sequence homology, or a combination thereof to a polypeptide of the second saccharide-polypeptide conjugate composition;

and wherein the first saccharide-polypeptide conjugate composition comprises a first serotype;

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wherein the second saccharide-polypeptide conjugate composition comprises a second serotype, and wherein the first serotype and the second serotype are different.

11. The method of claim 10, wherein the saccharide is a polysaccharide or a capsular peptide.

12. The method of claim 10, wherein the polypeptide is an oligopeptide.

13. The method of claim 10, wherein the first serotype is from a same bacteria as the second serotype.

14. The method of claim 10, wherein the first serotype is from a different bacteria than the second serotype.

15. The method of claim 10, wherein the first serotype is from *Streptococcus pneumoniae*.

16. The method of claim 10, wherein the first serotype is from *Neisseria meningitides*, *Salmonella enterica*, or *Haemophilus influenzae*.

17. The method of claim 10, wherein the second serotype is from *Streptococcus pneumoniae*.

18. The method of claim 10, wherein the second bacteria is from *Neisseria meningitides*, *Salmonella enterica*, or *Haemophilus influenzae*.

19. The method of claim 10, wherein the first serotype comprises at least one of 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, or 23F from *Streptococcus pneumoniae*, and the second serotype comprises at least one of 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, and 38 from *Streptococcus pneumoniae*.

20. The method of claim 10, wherein the first serotype comprises 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F from *Streptococcus pneumoniae*, and second serotype comprises 2, 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, and 33F from *Streptococcus pneumoniae*.

21. The method of claim 10, wherein the first serotype comprises 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 16F, 17F, 20, 20F, 23A, 23B, 31, 33F, 35B, or 38 from *Streptococcus pneumoniae*, and the second serotype comprises 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, or 23F from *Streptococcus pneumoniae*.

22. The method of claim 10, wherein the first serotype comprises 2, 6C, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, and 33F from *Streptococcus pneumoniae*, and the second serotype comprises 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F from *Streptococcus pneumoniae*.

23. The method of claim 10, wherein the polypeptide is CRM_{197}.

24. The method of claim 10, wherein the polypeptide is tetanus toxoid , a diphtheria toxoid, or any fragment thereof.

25. The method of claim 10, wherein the first saccharide-polypeptide conjugate composition further comprises an adjuvant.

26. The method of claim 10, wherein the second saccharide-polypeptide conjugate composition further comprises an adjuvant.

27. The method of claim 25, wherein the adjuvant is an aluminum cation adjuvant.

28. The method of claim 25, wherein the adjuvant is aluminum phosphate, aluminum sulfate, or aluminum hydroxide.

29. The method of claim 10, wherein the first saccharide-polypeptide conjugate composition is administered by intramuscular injection.

30. The method of claim 25, wherein first saccharide-polypeptide conjugate composition is administered by intramuscular injection.

31. The method of claim 26, wherein the adjuvant is an aluminum cation adjuvant.

32. The method of claim 26, wherein the adjuvant is aluminum phosphate, aluminum sulfate, or aluminum hydroxide.

33. The method of claim 10, wherein the second saccharide-polypeptide conjugate composition is administered by intramuscular injection.

34. The method of claim 26, wherein the second saccharide-polypeptide conjugate composition is administered by intramuscular injection.

35. The method of claim 10, wherein the first saccharide-polypeptide conjugate composition is administered at about one year before the second saccharide-polypeptide conjugate composition is administered.

36. The method of claim 10, wherein the first saccharide-polypeptide conjugate composition and the second conjugate composition is administered to a human.

37. A method of making the composition of any claim, comprising contacting a saccharide-polypeptide conjugate with an excipient.

38. The method of claim 37, wherein the excipient is an adjuvant.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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.
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Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Bruce	D.	Forrest	

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

City	South Nyack	State/Province	NY	Country of Residence	US

Mailing Address of Inventor:

Address 1	15 Cedarwood Dr.		
Address 2			
City	Greenwich	State/Province	CT
Postal Code	06830	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jack	D.	Love	

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

City	Tampa	State/Province	FL	Country of Residence	US

Mailing Address of Inventor:

Address 1	15 Cedarwood Dr.		
Address 2			
City	Greenwich	State/Province	CT
Postal Code	06830	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).

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	
	Application Number	
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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

Customer Number	21971		
Email Address	uspatentdocket@wsgr.com	Add Email	Remove Email

Application Information:

Title of the Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF		
Attorney Docket Number		**Small Entity Status Claimed** ☐	
Application Type	Provisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		**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.

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	21971		

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	
	Application Number	
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim 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" field blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add**button.			

Foreign Priority Information:

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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(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[j] (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.

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	
	Application Number	
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO- Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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	
	Application Number	
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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	Liffey Biotech LLC		
Mailing Address Information For Applicant:			
Address 1	15 Cedarwood Dr.		
Address 2			
City	Greenwich	**State/Province**	CT
Country	US	Postal Code	06830
Phone Number		Fax Number	
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 substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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	
	Application Number	
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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 Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).** This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants. See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Keli Holzapfel/			Date (YYYY-MM-DD)	2016-03-31
First Name	Keli	Last Name	Holzapfel	Registration Number	65254

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

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	
	Application Number	
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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.**

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF
First Named Inventor/Applicant Name:	Bruce D. Forrest
Filer:	Keli Holzapfel/William Tronvig
Attorney Docket Number:	

Filed as Large Entity

Filing Fees for Provisional

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Provisional Application Filing	1005	1	260	260
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**260**

Electronic Acknowledgement Receipt

EFS ID:	25368149
Application Number:	62316555
International Application Number:	
Confirmation Number:	6609
Title of Invention:	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF
First Named Inventor/Applicant Name:	Bruce D. Forrest
Customer Number:	21971
Filer:	Keli Holzapfel/William Tronvig
Filer Authorized By:	Keli Holzapfel
Attorney Docket Number:	
Receipt Date:	31-MAR-2016
Filing Date:	
Time Stamp:	23:54:48
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$260
RAM confirmation Number	7241
Deposit Account	232415
Authorized User	HOLZAPFEL, KELI

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

Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.20 (Post Issuance fees)

Charge any Additional Fees required under 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		2016_03_31_PROV_APP_701_101.pdf	527625 3db5bde4f96f346bb479116536e52f6eaa5b0f79	yes	22

Multipart Description/PDF files in .zip description

Document Description	Start	End
Provisional Cover Sheet (SB16)	1	2
Miscellaneous Incoming Letter	3	3
Specification	4	12
Claims	13	15
Application Data Sheet	16	22

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30020 f9225aed83abe998ce0ce225a0a8ae43673834a3	no	2

Warnings:

Information:

Total Files Size (in bytes):	557645

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/16 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PROVISIONAL APPLICATION FOR PATENT COVER SHEET – Page 1 of 2

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. VIA EFS WEB

INVENTOR(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Bruce D.	Forrest	South Nyack, NY
Jack D.	Love	Tampa, FL

Additional inventors are being named on the _____ separately numbered sheets attached hereto.

TITLE OF THE INVENTION (500 characters max):

SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

☑ The address corresponding to Customer Number: 21971

OR

☐ Firm or Individual Name

Address

City	State	Zip
Country	Telephone	Email

ENCLOSED APPLICATION PARTS (*check all that apply*)

☑ Application Data Sheet. See 37 CFR 1.76.

☐ CD(s), Number of CDs _____

☐ Drawing(s) *Number of Sheets* _____

☑ Other (specify) Specification Cover Sheet

☑ Specification (e.g., description of the invention) *Number of Pages* 9

Fees Due: Filing Fee of $260 ($130 for small entity) ($65 for micro entity). If the specification and drawings exceed 100 sheets of paper, an application size fee is also due, which is $400 ($200 for small entity) ($100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

METHOD OF PAYMENT OF THE FILING FEE AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Applicant must attach form PTO/SB/15A or B or equivalent.

☐ A check or money order made payable to the *Director of the United States Patent and Trademark Office* is enclosed to cover the filing fee and application size fee (if applicable).

☐ Payment by credit card. Form PTO-2038 is attached.

☑ The Director is hereby authorized to charge the filing fee and application size fee (if applicable) or credit any overpayment to Deposit Account Number: 21971.

260.00

TOTAL FEE AMOUNT ($)

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. 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 10 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, 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.

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

PROVISIONAL APPLICATION FOR PATENT COVER SHEET – Page 2 of 2

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

- [x] No.
- [ ] Yes, the invention was made by an agency of the U.S. Government. The U.S. Government agency name is: _____
- [ ] Yes, the invention was made under a contract with an agency of the U.S. Government. The name of the U.S. Government agency and Government contract number are: _____

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.

SIGNATURE /Keli Holzapfel/ DATE March 31, 2016

TYPED OR PRINTED NAME Keli Holzapfel, Ph.D. REGISTRATION NO. 65,254 (*if appropriate*)

TELEPHONE 206-883-2500 DOCKET NUMBER _____

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
62/316,555	03/31/2016		260			

CONFIRMATION NO. 6609

FILING RECEIPT

21971
WILSON, SONSINI, GOODRICH & ROSATI
650 PAGE MILL ROAD
PALO ALTO, CA 94304-1050

OC000000082288190

Date Mailed: 04/19/2016

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. 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)

Bruce D. Forrest, South Nyack, NY;
Jack D. Love, Tampa, FL;

Applicant(s)

Liffey Biotech LLC, Greenwich, CT;

Power of Attorney:
Keli Holzapfel--65254

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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: 04/18/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 62/316,555**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF

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	REQUEST ID
62/316,555	03/31/2016	Liffey Biotech LLC	50308-701.101	34361

Acknowledgement of Change to Small Entity Status

The entity status change request below filed through Private PAIR on 02/17/2017 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

X 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.

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Keli Holzapfel/
Name:	Keli Holzapfel
Registration Number:	65254

I hereby certify that this correspondence is being filed via EFS-Web with the United States Patent and Trademark Office on February 17, 2017

WILSON SONSINI GOODRICH & ROSATI

By: /William D. Tronvig/

Attorney Docket No.: 50308-701.101

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Confirmation No. 6609
Bruce D. Forrest et al.	
Application No.: 62/316,555	Examiner: N/A
Filed: March 31, 2016	Art Unit: N/A
For: SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	REQUEST FOR CORRECTED FILING RECEIPT
Customer No. 21971	

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

Commissioner:

Attached is a copy of the official Filing Receipt received from the U.S. Patent and Trademark Office in the above-referenced application for which issuance of a Corrected Filing Receipt is respectfully requested.

This Request for Corrected Filing Receipt is being made to correct the Applicant's name as follows:

Incorrect

~~Liffey Biotech LLC, Greenwich, CT;~~

Correct

LIFFEY BIOTECH LIMITED, Dublin, IRELAND;

Applicants additionally submit herewith properly marked up Application Data Sheet, in which the inventor address information has also been updated.

The Commissioner is hereby authorized to charge any additional fees associated with this paper or during the pendency of this application, or credit any overpayment, to Deposit Account No. 23-2415.

Respectfully submitted,

WILSON SONSINI GOODRICH & ROSATI
Professional Corporation

Dated: February 17, 2017

/Keli Holzapfel/

Keli Holzapfel
Registration No. 65,254

WILSON SONSINI GOODRICH & ROSATI
650 Page Mill Road
Palo Alto, CA 94304-1050
Tel: 650-493-9300
Fax 650-493-6811

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	50308-701.101
	Application Number	62/316,555
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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
	Bruce	D.	Forrest	

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

City	South Nyack	State/Province	NY	Country of Residence	US

Mailing Address of Inventor:

Address 1	~~15 Cedarwood Dr.~~ 135 Piermont Avenue		
Address 2			
City	~~Greenwich~~ South Nyack	State/Province	~~CT~~ NY
Postal Code	~~06830~~ 10960	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jack	D.	Love	

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

City	Tampa	State/Province	FL	Country of Residence	US

Mailing Address of Inventor:

Address 1	~~15 Cedarwood Dr.~~ 4111 W. Inman Avenue		
Address 2			
City	~~Greenwich~~ Tampa	State/Province	~~CT~~ FL
Postal Code	~~06830~~ 33609	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).

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	50308-701.101
	Application Number	62/316,555
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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

Customer Number	21971		
Email Address	uspatentdocket@wsgr.com	Add Email	Remove Email

Application Information:

Title of the Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF		
Attorney Docket Number		**Small Entity Status Claimed** ☒	
Application Type	Provisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		**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.

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	21971		

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	50308-701.101
	Application Number	62/316,555
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim 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" field blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)

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

Foreign Priority Information:

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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(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[j] (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.

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	50308-701.101
	Application Number	62/316,555
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO- Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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	50308-701.101
	Application Number	62/316,555
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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. [x]

Organization Name	~~Liffey Biotech LLC~~ LIFFEY BIOTECH LIMITED		
Mailing Address Information For Applicant:			
Address 1	~~15 Cedarwood Dr.~~ c/o Mathesons		
Address 2	70 Sir John Rogerson's Quay		
City	~~Greenwich~~ Dublin 2	**State/Province**	~~CT~~
Country	~~US~~ IE	Postal Code	~~06830~~
Phone Number		Fax Number	
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 substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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	50308-701.101
	Application Number	62/316,555
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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 Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).** This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants. See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Keli Holzapfel/			Date (YYYY-MM-DD)	2017-02-17
First Name	Keli	Last Name	Holzapfel	Registration Number	65254

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

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	50308-701.101
	Application Number	62/316,555
Title of Invention	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF	

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.**

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
62/316,555	03/31/2016		260	50308-701.101		

CONFIRMATION NO. 6609

FILING RECEIPT

21971
WILSON, SONSINI, GOODRICH & ROSATI
650 PAGE MILL ROAD
PALO ALTO, CA 94304-1050

OC000000082288190

Date Mailed: 04/19/2016

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. 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)

Bruce D. Forrest, South Nyack, NY;
Jack D. Love, Tampa, FL;

Applicant(s)

~~Liffey Biotech LLC, Greenwich, CT;~~ LIFFEY BIOTECH LIMITED, Dublin, IRELAND;

Power of Attorney:
Keli Holzapfel--65254

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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: 04/18/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 62/316,555**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF

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.

Electronic Acknowledgement Receipt

EFS ID:	28398360
Application Number:	62316555
International Application Number:	
Confirmation Number:	6609
Title of Invention:	SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF
First Named Inventor/Applicant Name:	Bruce D. Forrest
Customer Number:	21971
Filer:	Keli Holzapfel/William Tronvig
Filer Authorized By:	Keli Holzapfel
Attorney Docket Number:	50308-701.101
Receipt Date:	17-FEB-2017
Filing Date:	31-MAR-2016
Time Stamp:	18:46:59
Application Type:	Provisional

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	2017_02_17_REQ_CFR_50308_701_101.pdf	851337 f7286ef0825292789017e5f3ff621dcda599a1d1	no	12

Warnings:

Information:	
Total Files Size (in bytes):	851337

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
62/316,555	03/31/2016		260	50308-701.101		

CONFIRMATION NO. 6609
CORRECTED FILING RECEIPT

21971
WILSON, SONSINI, GOODRICH & ROSATI
650 PAGE MILL ROAD
PALO ALTO, CA 94304-1050

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Date Mailed: 03/01/2017

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Inventor(s)

Bruce D. Forrest, South Nyack, NY;
Jack D. Love, Tampa, FL;

Applicant(s)

LIFFEY BIOTECH LIMITED, Dublin 2, IRELAND;

Power of Attorney:
Keli Holzapfel--65254

Permission to Access Application via Priority Document Exchange: Yes

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 62/316,555**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****

Title

SACCHARIDE-POLYPEPTIDE CONJUGATE COMPOSITIONS AND METHODS OF USE THEREOF

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

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