UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BIONTECH SE AND PFIZER INC.
Petitioner

v.

MODERNATX, INC.
Patent Owner

Case IPR2023-01359
Patent No. 10,933,127

PETITIONER'S CURRENT LIST OF EXHIBITS

LIST OF EXHIBITS

Exhibit No.	Document	Previously Submitted
Ex. 1001	U.S. Patent No. 10,933,127	X
Ex. 1002	Declaration of Daniel O. Griffin, M.D., Ph.D.	X
Ex. 1003	Curriculum Vitae of Daniel O. Griffin, M.D., Ph.D.	X
Ex. 1004	Declaration of James J. Moon, Ph.D.	X
Ex. 1005	Curriculum Vitae of James J. Moon, Ph.D.	X
Ex. 1006	*Reserved*	
Ex. 1007	*Reserved*	
Ex. 1008	File History for U.S. Patent No. 10,933,127	X
Ex. 1009	U.S. Patent App. Publication 2013/0266640 ("Schrum")	X
Ex. 1010	International Patent App. Pub. No. WO 2012/006369 ("Geall")	X
Ex. 1011	Zhi-yong Yang et al., *A DNA vaccine induces SARS coronavirus neutralization and protective immunity in mice*, 428 NATURE 561 (2004) ("Yang")	X
Ex. 1012	International Patent App. Pub. No. WO 2005/118813 ("Altmeyer")	X
Ex. 1013	Jon A. Wolff et al., *Direct gene transfer into mouse muscle in vivo*, 247 SCIENCE 1465 (1990)	X
Ex. 1014	Frédéric Martinon et al., *Induction of virus-specific cytotoxic T lymphocytes in vivo by liposome-entrapped mRNA*, 23 EUR. J. IMMUNOL. 1719 (1993)	X

Exhibit No.	Document	Previously Submitted
Ex. 1015	Matthew Cobb, *Who discovered messenger RNA?*, 25 CURRENT BIOLOGY R523 (2015)	X
Ex. 1016	Andrew J. Geall et al., *RNA: The new revolution in nucleic acid vaccines*, 25 SEMIN. IMMUNOL. 152 (2013)	X
Ex. 1017	W. Michael McDonnell & Frederick K. Asari, *Molecular medicine – DNA vaccines,* 334 N. ENGL. J. MED. 42 (1996)	X
Ex. 1018	Suzanne Clancy & William Brown, *Translation: DNA to mRNA to Protein*, 1 NATURE EDUCATION 101 (2008) (https://www.nature.com/scitable/topicpage/translation-dna-to-mrna-to-protein-393/)	X
Ex. 1019	Thomas Schlake et al., *Developing mRNA-vaccine technologies*, 9 RNA BIOLOGY 1319 (2012)	X
Ex. 1020	Karl-Josef Kallen & Andreas Theß, *A development that may evolve into a revolution in medicine: mRNA as the basis for novel, nucleotide-based vaccines and drugs*, 2 THER. ADV. VACCINES 10 (2014)	X
Ex. 1021	Katalin Karikó et al., *Suppression of RNA recognition by Toll-like receptors: The impact of nucleoside modification and the evolutionary origin of RNA*, 23 IMMUNITY 165 (2005)	X
Ex. 1022	Katalin Karikó et al., *Incorporation of pseudouridine into mRNA yields superior nonimmunogenic vector with increased translational capacity and biological stability*, 16 MOLECULAR THERAPY 1833 (2008)	X
Ex. 1023	U.S. Patent No. 8,691,966	X

Exhibit No.	Document	Previously Submitted
Ex. 1024	Naomi Kresge, "The messenger RNA pioneers everyone ignored," Bloomberg, Nov. 23, 2021, (available at https://www.bloomberg.com/news/newsletters/2021-11-23/the-messenger-rna-pioneers-everyone-ignored)	X
Ex. 1025	"Katalin Karikó and Drew Weissman awarded Horwitz Prize for pioneering research on COVID-19 vaccines," *Columbia University Irving Medical Center*, Aug. 16, 2021, (available at https://www.cuimc.columbia.edu/news/horwitz-prize-2021)	X
Ex. 1026	Patent Sublicense Agreement Between Cellscript, LLC and ModernaTx, Inc.	X
Ex. 1027	*Reserved*	
Ex. 1028	Katalin Karikó et al., *Increased eythropoiesis in mice injected with submicrogram quantities of pseudouridine-containing mRNA encoding erythropoietin*, 20 MOLECULAR THERAPY 948 (2012)	X
Ex. 1029	R. J. deGroot et al., *Part II – The Positive Sense Single Stranded RNA Viruses, Family Coronaviridae*, in VIRUS TAXONOMY: NINTH REPORT OF THE INTERNATIONAL COMMITTEE ON TAXONOMY OF VIRUSES 806 (2012)	X
Ex. 1030	Alimuddin Zumla et al., *Middle East respiratory syndrome*, 368 LANCET 995 (2015)	X
Ex. 1031	Lanying Du et al., *The spike protein of SARS-CoV – a target for vaccine and therapeutic development*, 7 NATURE REV. MICROBIOLOGY 226 (2009)	X
Ex. 1032	Patrick Midoux & Chantal Pichon, *Lipid-based mRNA vaccine delivery systems*, 14 EXPERT REV. VACCINES 221 (2015)	X

Exhibit No.	Document	Previously Submitted
Ex. 1033	*Reserved*	
Ex. 1034	*Reserved*	
Ex. 1035	*ModernaTX, Inc. et al v. Pfizer Inc. et al.* (D. Mass. 22-11378-RGS) D.I. 105 - District Court Memorandum and Order on Claim Construction, August 1, 2023	X
Ex. 1036	Notice of Allowance of U.S. Patent No. 10,933,127 (Application No. 16/880,829) (Sep. 18, 2020)	X
Ex. 1037	U.S. Provisional Patent App. titled "Measles Vaccine" (Moderna Measles Priority Application)	X
Ex. 1038	U.S. Provisional Patent App. No. 62/244,946 titled "Human Metapneumovirus Vaccine" (Moderna HMPV Priority Application)	X
Ex. 1039	Notice of Abandonment of U.S. Patent Application No. 13/917,720 (Aug. 12, 2015) (published as Ex. 1009)	X
Ex. 1040	Jesper Pallesen et al., *Immunogenicity and structures of a rationally designed prefusion MERS-CoV spike antigen*, 114 PROC NATL. ACAD. SCI. USA E7348 (2017)	X
Ex. 1041	*Reserved*	
Ex. 1042	*Reserved*	
Ex. 1043	*Excerpts from* Bruce Alberts et al., Chapters 1, 3, 5-7, 24, and 25 in MOLECULAR BIOLOGY OF THE CELL, 4th Ed. (2002)	X
Ex. 1044	*Excerpts from* Geoffrey M. Cooper & Robert E. Hausman, Chapters 1, 7, and 8 in THE CELL: A MOLECULAR APPROACH, 5th Ed. (2009)	X

Exhibit No.	Document	Previously Submitted
Ex. 1045	Ayako Yamamoto et al., *Current prospects for mRNA gene delivery*, 71 EUR. J. PHARM. BIOPHARM. 484 (2009)	X
Ex. 1046	Katalin Karikó & Drew Weissman, *Naturally occurring nucleoside modifications suppress the immunostimulatory activity of RNA: Implication for therapeutic RNA development*, 10 CURR. OPIN. DRUG DISCOV. DEVEL. 523 (2007)	X
Ex. 1047	Kathryn A. Whitehead et al., *Knocking down barriers: Advances in siRNA delivery*, 8 NATURE REVIEWS DRUG DISCOVERY 129 (2009)	X
Ex. 1048	Alison J. Lin et al., *Three-dimensional imaging of lipid gene-carriers: Membrane charge density controls universal transfection behavior in lamellar cationic liposome-DNA complexes*, 84 BIOPHYSICAL JOURNAL 3307 (2003)	X
Ex. 1049	Zhong Li et al. *Application of ultra-high performace liquid chromatography for chemical characterization of liposome-based therapeutic small-interfering RNA*, 13 AMERICAN PHARMACEUTICAL REVIEW 102 (2010)	X
Ex. 1050	S. S. Shidhaye et al., *Solid lipid nanoparticles and nanostructured lipid carriers – Innovative generations of solid lipid carriers*, 5 CURRENT DRUG DELIVERY 324 (2008)	X
Ex. 1051	Dhruba J. Bharali et al., *Nanoparticles and cancer therapy: A concise review with emphasis on dendrimers*, 4 INTERNATIONAL JOURNAL OF NANOMEDICINE 1 (2009)	X
Ex. 1052	*Reserved*	

Exhibit No.	Document	Previously Submitted
Ex. 1053	A. D. Bangham et al., *Diffusion of univalent ions across the lamellae of swollen phospholipids*, 13 J. MOL. BIOL. 238 (1965)	X
Ex. 1054	Marc J. Ostro et al., *Evidence for translation of rabbit globin mRNA after liposome-mediated insertion into a human cell line*, 274 NATURE 921 (1978)	X
Ex. 1055	Giorgos J. Dimitriadis, *Translation of rabbit globin mRNA introduced by liposomes into mouse lymphocytes*, 274 NATURE 923 (1978)	X
Ex. 1056	Laura J. Peek et al., *Nanotechnology in vaccine delivery*, 60 ADV. DRUG DELIV. REV. 915 (2008)	X
Ex. 1057	Center for Drug Evaluation and Research Approval Package for New Drug Application No. 50-718/S-50 for Doxil®	X
Ex. 1058	Jochen Probst et al., *Characterization of the ribonuclease activity on the skin surface*, 4 GENETIC VACCINES AND THERAPY (2006)	X
Ex. 1059	Xiang Gao et al., *Nonviral gene delivery: What we know and what is next*, 9 THE AAPS JOURNAL E92 (2007)	X
Ex. 1060	Ayesha Ahmad et al., *New multivalent cationic lipids reveal bell curve for transfection efficiency versus membrane charge density: lipid–DNA complexes for gene delivery*, 7 J. GENE MED. 739 (2005)	X
Ex. 1061	Theresa M. Allen & Pieter R. Cullis, *Liposomal drug delivery systems: From concept to clinical applications*, 65 ADV. DRUG DELIV. REV. 36 (2013)	X
Ex. 1062	International Patent App. Pub. No. WO 2011/140627	X
Ex. 1063	*Reserved*	

Exhibit No.	Document	Previously Submitted
Ex. 1064	Rumiana Tenchov et al., *Lipid nanoparticles—From liposomes to mRNA vaccine delivery, a landscape of research diversity and advancement*, 15 ACS NANO 16982 (2021)	X
Ex. 1065	Sean C. Semple et al., *Rational design of cationic lipids for siRNA delivery*, 28 NATURE BIOTECHNOLOGY 172 (2010)	X
Ex. 1066	Robert Langer, *New methods of drug delivery*, 249 SCIENCE 1527 (1990)	X
Ex. 1067	Saba Ahmed et al., *Biochemistry, Lipids*, STATPEARLS PUBLISHING (2023) (available at https://www.ncbi.nlm.nih.gov/books/NBK525952/)	X
Ex. 1068	Michael J. Bennett et al., *Cholesterol enhances cationic liposome-mediated DNA transfection of human respiratory epithelial cells*, 15 BIOSCIENCE REPORTS 47 (1995)	X
Ex. 1069	Zhaohua Huang et al. *Asymmetric 1-alkyl-2-acyl phosphatidylcholine: A helper lipid for enhanced non-viral gene delivery*, (Author Manuscript), published in final edited from as 427 INT. J. PHARM. 64 (2012)	X
Ex. 1070	James Heyes et al., *Cationic lipid saturation influences intracellular delivery of encapsulated nucleic acids*, 107 J. CONTROLLED RELEASE 276 (2005)	X
Ex. 1071	International Patent App. Pub. No. WO 2012/031046	X
Ex. 1072	Moderna Therapeutics, Inc. Petition for *Inter Partes* Review of U.S. Patent No. 8,058,069 (IPR2019-00554)	X

Exhibit No.	Document	Previously Submitted
Ex. 1073	Mikhail A. Zhukovsky et al., *Heterogeneity of early intermediates in cell-liposome fusion mediated by influenza hemagglutinin*, 91 BIOPHYSICAL JOURNAL 3349 (2006)	X
Ex. 1074	Yang Liu et al., *Influence of polyethylene glycol density and surface lipid on pharmacokinetics and biodistribution of lipid-calcium-phosphate nanoparticles*, (Author Manuscript), published in final edited form as 35 BIOMATERIALS 3027 (2014)	X
Ex. 1075	*Reserved*	
Ex. 1076	*Reserved*	
Ex. 1077	*Reserved*	
Ex. 1078	*Excerpts from* Kenneth Murphy, JANEWAY'S IMMUNOBIOLOGY, 8th Ed. (2012)	X
Ex. 1079	Sander van Boheemen et al., *Genomic characterization of a newly discovered coronavirus associated with acute respiratory distress syndrome in humans*, 3 MBIO e00473 (2012)	X
Ex. 1080	Fang Li, *Receptor recognition mechanisms of coronaviruses: A decade of structural studies*, 89 J. VIROL. 1954 (2015)	X
Ex. 1081	Jason McLellan et al., *Structure and function of RSV surface glycoproteins*, (Author Manuscript), published in final edited form as 372 CURRENT TOPICS IN MICROBIOLOGY AND IMMUNOLOGY 83 (2014)	X
Ex. 1082	Muthusamy Jayaraman et al., *Maximizing the potency of siRNA lipid nanoparticles for hepatic gene silencing in vivo*, 51 ANGEW. CHEM. INT. ED. 8259 (2012)	X

Exhibit No.	Document	Previously Submitted
Ex. 1083	Alex K. K. Leung et al., *Chapter Four – Lipid nanoparticles for short interfering RNA delivery*, in ADVANCES IN GENETIC, Vol. 88, (2014)	X
Ex. 1084	Sean C. Semple et al., *Efficient encapsulation of antisense oligonucleotides in lipid vesicles using ionizable aminolipids: Formation of novel small multilamellar vesicle structures*, 1510 BIOCHIMICA ET BIOPHYSICA ACTA 152 (2001)	X
Ex. 1085	Rosemary Kanasty et al., *Delivery materials for siRNA therapeutics*, 12 NATURE MATERIALS 967 (2013)	X
Ex. 1086	*Reserved*	
Ex. 1087	Shutao Guo & Leaf Huang, *Nanoparticles escaping RES and endosome: Challenges for siRNA delivery for cancer therapy*, 2011 JOURNAL OF NANOMATERIALS 1 (2011)	X
Ex. 1088	Philip L. Felgner et al., *Lipofection: A highly efficient, lipid-mediated DNA-transfection procedure*, 84 PROC. NATL. ACAD. SCI. USA 7413 (1987)	X
Ex. 1089	Erick J. Dufourc, *Sterols and membrane dynamics*, 1 J. CHEM. BIOL. 63 (2008)	X
Ex. 1090	Zhi-yong Yang et al., *A DNA vaccine induces SARS coronavirus neutralization and protective immunity in mice,* 428 NATURE 561 (2004) (downloaded from https://www.nature.com/articles/nature 02463.pdf) (not filed)	Not Filed
Ex. 1091	Zhi-yong Yang et al., *A DNA vaccine induces SARS coronavirus neutralization and protective immunity in mice*, 428 NATURE 561 (2004) ("Yang") (Library of Congress printed version) (not filed)	Not Filed

Exhibit No.	Document	Previously Submitted
Ex. 1092	Declaration of Robert F. Hartsmith (not filed)	Not Filed
Ex. 1093	Declaration of M. Ryan Meuth	X
Ex. 1094	Declaration of Gabrielle Landes	X
Ex. 1095	Declaration of Kathryn S. Kayali	X
Ex. 1096	Declaration of Thomas H. L. Selby	X
Ex. 1097	Declaration of Douglas L. Sawyer	X
Ex. 1098	Exhibit from the Deposition of Deborah Fuller, Curriculum Vitae	
Ex. 1099	Exhibit from the Deposition of Deborah Fuller, Jesse H. Erasmus et al., *An Alphavirus-derived replicon RNA vaccine induces SARS-CoV-2 neutralizing antibody and T cell responses in mice and nonhuman primates*, 12 SCI. TRANSL. MED. 1 (2020)	
Ex. 1100	Exhibit from the Deposition of Deborah Fuller, The Conversation, How mRNA and DNA vaccines could soon treat cancers, HIV, autoimmune disorders and genetic diseases (Jan 24, 2022) (available at https://theconversation.com/how-mrna-and-dna-vaccines-could-soon-treat-cancers-hiv-autoimmune-disorders-and-genetic-diseases-170772)	
Ex. 1101	Exhibit from the Deposition of Deborah Fuller, Lingshu Wang et al., *Evaluation of candidate vaccine approaches for MERS-CoV,* 6 NATURE COMMUNICATIONS 7712 (2015)	
Ex. 1102	Exhibit from the Deposition of James Malackowski, Moderna Science & Technology Day dated May 17, 2022	

Exhibit No.	Document	Previously Submitted
Ex. 1103	Daniel O. Griffin et al., *Cytokine storm of a different flavour: the different cytokine signature of SARS-CoV-2 the cause of COVID-19 from the original SARS outbreak,* 24 JOURNAL OF GLOBAL ANTIMICROBIAL RESISTANCE 90 (2021)	
Ex. 1104	Deposition of Deborah Fuller, Ph.D., dated August 2, 2024	
Ex. 1105	Deposition of Philip Krause, M.D., dated August 14, 2024 (sealed)	
Ex. 1105	Deposition of Philip Krause, M.D., dated August 14, 2024 (redacted)	
Ex. 1106	Eric M. Slimko and Henry A. Lester, *Codon optimization of Caenorhabditis elegans GluCl ion channel genes for mammalian cells dramatically improves expression levels*, 127 JOURNAL OF NEUROSCIENCE METHODS 75 (2003)	
Ex. 1107	European Medicines Agency, Nuvaxovid (available at https://www.ema.europa.eu/en/medicines/human/EPAR/nuvaxovid)	
Ex. 1108	Frank Liang et al., *Efficient Targeting and Activation of Antigen-Presenting Cells In Vivo after Modified mRNA Vaccine Administration in Rhesus Macaques*, 25 MOL THERAPY 2635 (2017)	
Ex. 1109	Fei Song et al., *Middle East Respiratory Syndrome Coronavirus Spike Protein Delivered by Modified Vaccinia Virus Ankara Efficiently Induces Virus-Neutralizing Antibodies*, 87 J. OF VIROLOGY 11950 (2013)	

Exhibit No.	Document	Previously Submitted
Ex. 1110	FDA, FDA Takes Action on Updated mRNA COVID-19 Vaccines to Better Protect Against Currently Circulating Variants (Sept. 11, 2023) (available at https://www.fda.gov/news-events/press-announcements/fda-takes-action-updated-mrna-covid-19-vaccines-better-protect-against-currently-circulating)	
Ex. 1111	FDA, Novavax COVID-19 Vaccine, Adjuvanted (last updated Oct. 17, 2023) (available at https://www.fda.gov/vaccines-blood-biologics/coronavirus-covid-19-cber-regulated-biologics/novavax-covid-19-vaccine-adjuvanted)	
Ex. 1112	Gregory J. Atkins et al., The *molecular pathogenesis of Semliki Forest virus: a model virus made useful?*, 80 JOURNAL OF GENERAL VIROLOGY 2287 (1999)	
Ex. 1113	Gairdner, Pieter Cullis, (available at https://www.gairdner.org/winner/pieter-cullis)	
Ex. 1114	Gavi, Taming the spike: How Jason McLellan helped turn the tide of the pandemic (May 16, 2022) (available at https://www.gavi.org/vaccineswork/taming-spike-how-jason-mclellan-helped-turn-tide-pandemic)	
Ex. 1115	Himani Bisht et al., *Severe acute respiratory syndrome coronavirus spike protein expressed by attenuated vaccinia virus protectively immunizes mice*, 101 BIOLOGICAL SCIENCES 6641 (2004)	
Ex. 1116	History of Vaccines, The Future of Immunization: The Development of HIV Vaccines (available at https://historyofvaccines.org/vaccines-101/future-immunization/development-hiv-vaccines)	

Exhibit No.	Document	Previously Submitted
Ex. 1117	Ingmar Hoerr et al., *In vivo application of RNA leads to induction of specific cytotoxic T lymphocytes and antibodies*, 30 EUR. J. IMMUNOL. 1 (2000)	
Ex. 1118	Kapil Bahl et al., *Preclinical and Clinical Demonstration of Immunogenicity by mRNA Vaccines against H10N8 and H7N9 Influenza Viruses*, 25(6) MOL THER. 1316 (2017)	
Ex. 1119	Lorna Leal et al., *Phase I clinical trial of an intranodally administered mRNA-based therapeutic vaccine against HIV-1 infection*, 32(17) AIDS 2533 (2018)	
Ex. 1120	*Reserved*	
Ex. 1121	Matteo Vergati et al., *Strategies for Cancer Vaccine Development*, 2010.1 JOURNAL OF BIOMEDICINE AND BIOTECHNOLOGY 596432 (2010)	
Ex. 1122	Moderna, Moderna Files FDA Application for the JN.1 Targeting COVID-19 Vaccine (June 7, 2024) (available at https://investors.modernatx.com/news/news-details/2024/Moderna-Files-FDA-Application-for-the-JN.1-Targeting-COVID-19-Vaccine/default.aspx)	
Ex. 1123	Long S, Prober C, Fischer M (Griffin-Chapter on Tissue Nematodes). Principles and Practice of Pediatric Infectious Diseases, 6th Edition 2020 Expert Consult	
Ex. 1124	Nobel Prize, Discoveries concerning nucleoside base modifications that enabled the development of effective mRNA vaccines against COVID-19 (2023) (available at https://www.nobelprize.org/prizes/medicine/2023/advanced-information/)	

Exhibit No.	Document	Previously Submitted
Ex. 1125	Novavax, Novavax COVID-19 Vaccine Demonstrates 90% Overall Efficacy and 100% Protection Against Moderate and Severe Disease in PREVENT-19 Phase 3 Trial (June 14, 2021) (available at https://ir.novavax.com/press-releases/2021-06-14-Novavax-COVID-19-Vaccine-Demonstrates-90-Overall-Efficacy-and-100-Protection-Against-Moderate-and-Severe-Disease-in-PREVENT-19-Phase-3-Trial	
Ex. 1126	Novavax, Novavax Submits Application to U.S. FDA for Updated Protein-based 2024-2025 Formula COVID-19 Vaccine (June 14, 2024) (available at https://ir.novavax.com/press-releases/2024-06-14-Novavax-Submits-Application-to-U-S-FDA-for-Updated-Protein-based-2024-2025-Formula-COVID-19-Vaccine)	
Ex. 1127	Novavax, U.S. FDA Grants Emergency Use Authorization for Novavax COVID-19 Vaccine, Adjuvanted for Individuals Aged 18 and Over (July 13, 2022) (available at https://ir.novavax.com/press-releases/2022-07-13-U-S-FDA-Grants-Emergency-Use-Authorization-for-Novavax-COVID-19-Vaccine%2C-Adjuvanted-for-Individuals-Aged-18-and-Over	
Ex. 1128	ONPATTRO™ Prescribing Label (available at https://www.accessdata.fda.gov/drugsatfda_docs/label/2018/210922s000lbl.pdf)	
Ex. 1129	Silke Holtkamp et al., *Modification of antigen-encoding RNA increases stability, translational efficacy, and T-cell stimulatory capacity of dendritic cells*, 108(13) GENE THERAPY 4009 (2006)	

Exhibit No.	Document	Previously Submitted
Ex. 1130	Sofia Stenler et al., *Safety and efficacy of DNA vaccines: Plasmids vs. minicircles*, 10(5) HUMAN VACCINES & IMMUNOTHERAPEUTICS 1306 (2014)	
Ex. 1131	*Reserved*	
Ex. 1132	Ursula J. Buchholz et al., *Contributions of the structural proteins of severe acute respiratory syndrome coronavirus to protective immunity,*101(26) BIOLOGICAL SCIENCES 9804 (2004)	
Ex. 1133	Ugur Sahin et al., *mRNA-based therapeutics — developing a new class of drugs*, 13 NATURE REVIEWS DRUG DISCOVERY 759 (2014)	
Ex. 1134	Vaccine Research & Development, How can Covid-19 vaccine development be done quickly and safely? (available at https://coronavirus.jhu.edu/vaccines /timeline#:~:text=Typical%20Timeline,vaccine%20doses%20for%20widespread%20distribution.)	
Ex. 1135	*Reserved*	
Ex. 1136	Yiu Wing Kam et al., *Antibodies against trimeric S glycoprotein protect hamsters against SARS-CoV challenge despite their capacity to mediate FcγRII-dependent entry into B cells in vitro*, 25 VACCINE 729 (2007)	
Ex. 1137	*Reserved*	
Ex. 1138	Armin Hekele et al., *Rapidly produced SAM® vaccine against H7N9 influenza is immunogenic in mice*, 2(8) EMERGING MICROBES AND INFECTIONS (2013)	
Ex. 1139	Borys Pedenko et al., *SARS-CoV-2 S Glycoprotein Stabilization Strategies,* 15 VIRUSES 557 (2023)	

Exhibit No.	Document	Previously Submitted
Ex. 1140	Damon Deming et al, *Vaccine Efficacy in Senescent Mice Challenged with Recombinant SARS-CoV Bearing Epidemic and Zoonotic Spike Variants,* 3(12) PLOS MEDICINE 2359 (2006)	
Ex. 1141	Daniel O. Griffin and Thomas L. Rothstein, *A small CD11b$^+$ human B1 cell subpopulation stimulates T cells and is expanded in lupu*s, 208(13) J. EXP. MED. 2591 (2011)	
Ex. 1142	Daniel O. Griffin et al., *Human B1 cells in umbilical cord and adult peripheral blood express the novel phenotype CD20$^+$ CD27$^+$ CD43$^+$ CD70$^-$,* 208(1) J. EXP. MED. 67 (2011)	
Ex. 1143	Daniel O. Griffin et al., *Co-infection with Hepatitis C Virus Increases Mortality in HIV-1 Infected Patients Through Increased Liver-Related Deaths Rather Than By Increasing Malignancy Related Deaths,* 7(4) J. AIDS AND CLIN. RES. 1000558 (2016)	
Ex. 1144	Code of Federal Regulations, 21 CFR 312.22 (last updated Aug. 22, 2024) (available at https://www.ecfr.gov/current/title-21/chapter-I/subchapter-D/part-312/subpart-B/section-312.22)	
Ex. 1145	FDA, Guidance Document, Formal Meetings Between the FDA and Sponsors or Applicants of PDUFA Products (Dec. 2017) (available at https://www.fda.gov/media/109951/download)	
Ex. 1146	FDA, Guidance Document, Formal Meetings Between the FDA and Sponsors or Applicants of PDUFA Products (Sept. 2023) (available at https://www.fda.gov/regulatory-information/search-fda-guidance-documents/formal-meetings-between-fda-and-sponsors-or-applicants-pdufa-products)	

Exhibit No.	Document	Previously Submitted
Ex. 1147	FDA, Investigational New Drug (IND) Application (last updated July 20, 2022) (available at https://www.fda.gov/drugs/types-applications/investigational-new-drug-ind-application)	
Ex. 1148	FDA, Vaccine Development – 101 (last updated Dec. 14, 2020) (available at https://www.fda.gov/vaccines-blood-biologics/development-approval-process-cber/vaccine-development-101)	
Ex. 1149	FDA, The FDA's Drug Review Process: Ensuring Drugs Are Safe and Effective (available at https://www.fda.gov/drugs/information-consumers-and-patients-drugs/fdas-drug-review-process-ensuring-drugs-are-safe-and-effective)	
Ex. 1150	*Reserved*	
Ex. 1151	Yuhua Hu et al., *Cytosolic delivery mediated via electrostatic surface binding of protein, virus, or siRNA cargos to pH-responsive core-shell gel particles*, 10(4) BIOMACROMOLECULES 756 (2009)	
Ex. 1152	Deposition of Warren C.W. Chan Ph.D., dated July 30, 2024	
Ex. 1153	Akin Akinc et al., *Targeted Delivery of RNAi Therapeutics With Endogenous and Exogenous Ligand-Based Mechanisms*, 18(7) MOLECULAR THERAPY 1357 (2010)	
Ex. 1154	Lloyd B. Jeffs et al., *A Scalable, Extrusion-Free Method for Efficient Liposomal Encapsulation of Plasmid DNA,* 22 PHARMACEUTICAL RESEARCH 362 (2005)	
Ex. 1155	*Reserved*	

Exhibit No.	Document	Previously Submitted
Ex. 1156	Teresa Coelho et al., *Safety and Efficacy of RNAi Therapy for Transthyretin Amyloidosis,* 369(9) NEW ENGLAND J. MED. 819 (2013)	
Ex. 1157	Deposition of James E. Malackowski dated July 22, 2024 and Errata Sheet dated Aug. 27, 2024	
Ex. 1158	*Reserved*	
Ex. 1159	Sealed Reply Declaration of Daniel Griffin	
Ex. 1159	Redacted Reply Declaration of Daniel Griffin	
Ex. 1160	*Reserved*	
Ex. 1161	Sealed Reply Declaration of James Moon	
Ex. 1161	Redacted Reply Declaration of James Moon	
Ex. 1162	*Reserved*	
Ex. 1163	Declaration of W. Christopher Bakewell	
Ex. 1164	Sealed Declaration of L. Ross Pierce	
Ex. 1164	Redacted Declaration of L. Ross Pierce	
Ex. 1165	*Reserved*	
Ex. 1166	"COVID-19 Timeline," CDC website (available at https://www.cdc.gov/museum/timeline/covid19.html)	
Ex. 1167	"After nearly $1B in research funding, Moderna takes $1.5B coronavirus vaccine order from U.S." Fierce Pharma, August 12, 2020 (available at https://www.fiercepharma.com/pharma/after-nearly-1b-research-funding-moderna-takes-1-5b-coronavirus-vaccine-order-from-u-s)	

Exhibit No.	Document	Previously Submitted
Ex. 1168	"The biotech targeting personalized medicine," CNBC, May 13, 2015 (available at https://www.cnbc.com/2015/05/12/moderna-therapeutics-is-trying-to-cure-disease-with-mrna-drugs.html)	
Ex. 1169	"Our History," BioNTech website (available at https://www.biontech.com/int/en/home/about/who-we-are/history.html)	
Ex. 1170	"Collaboration to Develop mRNA Vaccines Expands," CureVac press release, August 4, 2015 (available at https://www.curevac.com/en/collaboration-to-develop-mrna-vaccines-expands/)	
Ex. 1171	"COVID-19 Commercialization," HHS website (available at https://www.hhs.gov/coronavirus/commercialization/index.html)	
Ex. 1172	"Inside the $250 million effort to convince Americans the coronavirus vaccines are safe," CBS News, December 23, 2020 (available at https://www.cbsnews.com/news/covid-vaccine-safety-250-million-dollar-marketing-campaign/)	
Ex. 1173	Moderna Form 8-K, March 16, 2020	
Ex. 1174	"WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020," WHO website, March 11, 2020 (available at https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020)	

Exhibit No.	Document	Previously Submitted
Ex. 1175	"Moderna Ships mRNA Vaccine Against Novel Coronavirus (mRNA-1273) for Phase 1 Study," Moderna website, February 24, 2020 (available at https://investors.modernatx.com/news/news-details/2020/Moderna-Ships-mRNA-Vaccine-Against-Novel-Coronavirus-mRNA-1273-for-Phase-1-Study/default.aspx)	
Ex. 1176	"Operation Warp Speed Accelerated COVID-19 Vaccine Development Status and Efforts to Address Manufacturing Challenges," GAO website, February 5, 2021 (available at https://www.gao.gov/assets/gao-21-319.pdf)	
Ex. 1177	"Moderna Announces Expansion of BARDA Agreement to Support Larger Phase 3 Program for Vaccine (mRNA-1273) Against COVID-19," Moderna website, July 26, 2020 (available at https://web.archive.org/web/20200726212828/https://investors.modernatx.com/news-releases/news-release-details/moderna-announces-expansion-barda-agreement-support-larger-phase/)	
Ex. 1178	"FDA Takes Additional Action in Fight Against COVID-19 By Issuing Emergency Use Authorization for Second COVID-19 Vaccine," FDA website, December 18, 2020 (available at https://www.fda.gov/news-events/press-announcements/fda-takes-additional-action-fight-against-covid-19-issuing-emergency-use-authorization-second-covid)	

Exhibit No.	Document	Previously Submitted
Ex. 1179	"Moderna Receives Full U.S. FDA Approval for COVID-19 Vaccine Spikevax," Moderna website, January 31, 2022 (available at https://investors.modernatx.com/news/news-details/2022/Moderna-Receives-Full-U.S.-FDA-Approval-for-COVID-19-Vaccine-Spikevax/default.aspx)	
Ex. 1180	"Welcome to our investor page," BioNTech website (available at https://investors.biontech.de/)	
Ex. 1181	"Vision & Mission," BioNTech website (available at https://www.biontech.com/int/en/home/about/who-we-are/vision-and-mission.html)	
Ex. 1182	"The Husband-and-Wife Team Behind the Leading Vaccine to Solve Covid-19," The New York Times, November 10, 2020 (available at https://www.nytimes.com/2020/11/10/business/biontech-covid-vaccine.html)	
Ex. 1183	"Pfizer and BioNTech to Co-develop Potential COVID-19 Vaccine," BioNTech press release, March 17, 2020 (available at https://investors.biontech.de/news-releases/news-release-details/pfizer-and-biontech-co-develop-potential-covid-19-vaccine)	
Ex. 1184	Pfizer Form 10-K for the fiscal year ended December 31, 2022	
Ex. 1185	"About," Pfizer website (available at https://www.pfizer.com/about/history)	
Ex. 1186	"Science," Pfizer website (available at https://www.pfizer.com/science)	
Ex. 1187	"Ongoing Vaccine Research and Development at Pfizer," Pfizer website (available at https://www.pfizer.com/science/vaccines/research)	

Exhibit No.	Document	Previously Submitted
Ex. 1188	"How will Pfizer maintain vaccine integrity during distribution?" Pfizer website (available at https://www.pfizer.com/science/coronavirus/vaccine/manufacturing-and-distribution)	
Ex. 1189	"Working to Make COVID-19 Vaccines Accessible to Everyone, Everywhere," Pfizer website (available at https://www.pfizer.com/science/coronavirus/vaccine/working-to-reach-everyone-everywhere)	
Ex. 1190	"A vaccine is Pfizer's best-selling drug," Axios website, February 5, 2019 (available at https://www.axios.com/2019/02/05/pfizer-vaccine-prevnar-top-selling-drug)	
Ex. 1191	"Top selling vaccines in pharmaceutical history," Proclinical website, December 9, 2016 (available at https://www.proclinical.com/blogs/2016-9/top-selling-vaccines-in-pharmaceutical-history)	
Ex. 1192	"BioNTech Signs Collaboration Agreement with Pfizer to Develop mRNA-based Vaccines for Prevention of Influenza," Pfizer press release, August 16, 2018 (available at https://www.pfizer.com/news/press-release/press-release-detail/biontech-signs-collaboration-agreement-pfizer-develop-mrna)	
Ex. 1193	"FDA Takes Key Action in Fight Against COVID-19 By Issuing Emergency Use Authorization for First COVID-19 Vaccine," FDA press release, December 11, 2020 (available at https://www.fda.gov/news-events/press-announcements/fda-takes-key-action-fight-against-covid-19-issuing-emergency-use-authorization-first-covid-19)	

Exhibit No.	Document	Previously Submitted
Ex. 1194	"FDA grants full approval to Pfizer-BioNTech's Covid shot, clearing path to more vaccine mandates," CNBC, August 23, 2021 (available at https://www.cnbc.com/2021/08/23/fda-pfizer-biontech-covid-vaccine-wins-full-approval-clearing-path-to-mandates.html)	
Ex. 1195	"U.S. Department of Health and Human Services, Explaining Operation Warp Speed" (available at https://www.nihb.org/covid-19/wp-content/uploads/2020/08/Fact-sheet-operation-warp-speed.pdf)	
Ex. 1196	"The U.S. has already invested billions in potential coronavirus vaccines. Here's where the deals stand," CNBC, August 14, 2020 (available at https://www.cnbc.com/2020/08/14/the-us-has-already-invested-billions-on-potential-coronavirus-vaccines-heres-where-the-deals-stand.html)	
Ex. 1197	"Operation Warp Speed Contracts for COVID-19 Vaccines and Ancillary Vaccination Materials," Congressional Research Service, March 1, 2021 (available at https://crsreports.congress.gov/product/pdf/IN/IN11560/7)	
Ex. 1198	CNN, Facts First (available at https://www.cnn.com/factsfirst/politics/factcheck_565aa63a-4c46-4eea-9586-093253d1bdf3)	
Ex. 1199	"The U.S. Government's Role in Domestic and Global COVID-19 Vaccine Supply and Distribution: Frequently Asked Questions," Congressional Research Service, February 17, 2022 (available at https://crsreports.congress.gov/product/pdf/IF/IF12013)	

Exhibit No.	Document	Previously Submitted
Ex. 1200	"Johnson & Johnson Updates U.S. COVID-19 Vaccine Fact Sheet," Johnson & Johnson press release, May 5, 2022 (available at https://www.jnj.com/johnson-johnson-updates-u-s-covid-19-vaccine-fact-sheet)	
Ex. 1201	"From zero to 500 million: America's vaccination effort in 4 charts," NBC News, December 30, 2021 (available at https://www.nbcnews.com/news/all/zero-500-million-america-s-vaccination-effort-4-charts-n1286773)	
Ex. 1202	"Daily COVID-19 vaccine doses administered," Our World in Data (available at https://ourworldindata.org/grapher/daily-covid-19-vaccination-doses?tab=chart&country=~USA)	
Ex. 1203	"Household Pulse Survey Shows Many Don't Trust COVID Vaccine, Worry About Side Effects," United States Census Bureau, December 28, 2021 (available at https://www.census.gov/library/stories/2021/12/who-are-the-adults-not-vaccinated-against-covid.html)	
Ex. 1204	"Joint CDC and FDA Statement on Johnson & Johnson COVID-19 Vaccine," FDA website, April 13, 2021 (available at https://www.fda.gov/news-events/press-announcements/joint-cdc-and-fda-statement-johnson-johnson-covid-19-vaccine)	
Ex. 1205	"Coronavirus (COVID-19) Update: FDA Limits Use of Janssen COVID-19 Vaccine to Certain Individuals," FDA News Release, May 5, 2022 (available at https://web.archive.org/web/20220505225458/https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-limits-use-janssen-covid-19-vaccine-certain-individuals)	

Exhibit No.	Document	Previously Submitted
Ex. 1206	"Use of the Janssen (Johnson & Johnson) COVID-19 Vaccine: Updated Interim Recommendations from the Advisory Committee on Immunization Practices," CDC website, January 20, 2022 (available at https://www.cdc.gov/mmwr/volumes/71/wr/mm7103a4.htm)	
Ex. 1207	"What You Need to Know About the Novavax Protein-Based Vaccine," Johns Hopkins, July 14, 2022 (available at https://publichealth.jhu.edu/2022/what-you-need-to-know-about-the-novavax-protein-based-vaccine)	
Ex. 1208	"What is the Novavax vaccine, and why does the world need another type of COVID-19 vaccine?" Gavi, February 14, 2022 (available at https://www.gavi.org/vaccineswork/what-novavax-vaccine-and-why-does-world-need-another-type-covid-19-vaccine)	
Ex. 1209	"Tracking Coronavirus Vaccinations Around the World," The New York Times, March 13, 2023 (available at https://www.nytimes.com/interactive/2021/world/covid-vaccinations-tracker.html)	
Ex. 1210	"Covid vaccine rates in the U.S. are slumping — and it will be a challenge to boost them," CNBC, November 30, 2023 (available at https://www.cnbc.com/2023/11/30/us-covid-shot-rates-are-low-and-it-will-be-a-challenge-to-boost-them.html)	
Ex. 1211	"WHO chief declares end to COVID-19 as a global health emergency," UN News, May 5, 2023 (available at https://news.un.org/en/story/2023/05/1136367)	

Exhibit No.	Document	Previously Submitted
Ex. 1212	"CDC COVID-19 Vaccination Program Provider Requirements and Support: 10/6/2023 Update," CDC website, October 6, 2023 (available at https://www.cdc.gov/vaccines/covid-19/vaccination-provider-support.html)	
Ex. 1213	"HHS Launches Bridge Access Program to Safeguard Free COVID-19 Vaccination for Uninsured and Underinsured Adults," CDC Newsroom Releases, September 14, 2023 (available at https://www.cdc.gov/media/releases/2023/p0914-uninsured-vaccination.html)	
Ex. 1214	"FACT SHEET: How Are COVID-19 Vaccines Covered by Insurance?" COVID-19 Vaccine Education and Equity Project, September 2023 (available at https://covidvaccineproject.org/wp-content/uploads/2023/09/CVEEP_Youre-Covered_Coverage-Overview_0923.pdf)	
Ex. 1215	"BioNTech Announces Fourth Quarter and Full Year 2023 Financial Results and Corporate Update," BioNTech press release, March 20, 2024 (available at https://investors.biontech.de/system/files-encrypted/nasdaq_kms/assets/2024/03/20/8-02-08/BNTX%20Q4%202023%20Press%20Release_EN_post-issuance%20update.pdf)	
Ex. 1216	"BioNTech Announces Fourth Quarter and Full Year 2022 Financial Results and Corporate Update," BioNTech press release, March 27, 2023 (available at https://investors.biontech.de/node/14871/pdf)	
Ex. 1217	"BioNTech Announces Fourth Quarter and Full Year 2021 Financial Results and Corporate Update," BioNTech press release, March 30, 2022 (available at https://investors.biontech.de/node/11911/pdf)	

Exhibit No.	Document	Previously Submitted
Ex. 1218	"Moderna Covid vaccine sales plunge by two-thirds in 2023, but meet company's $6 billion forecast," CNBC, January 8, 2024 (available at https://www.cnbc.com/2024/01/08/moderna-covid-vaccine-sales-plunge-in-2023-but-meet-company-forecast.html)	
Ex. 1219	"Patents," Moderna website, October 8, 2020 (available at https://web.archive.org/web/20201008145751/https://www.modernatx.com/patents)	
Ex. 1220	"Patents," Moderna website, December 1, 2021 (available at https://web.archive.org/web/20211201193750/https://www.modernatx.com/patents)	
Ex. 1221	"Patents," Moderna website, December 5, 2022 (available at https://web.archive.org/web/20221205004929/https://www.modernatx.com/patents)	
Ex. 1222	"Patents," Moderna website, March 8, 2023 (available at https://web.archive.org/web/20230308131232/https://www.modernatx.com/patents)	
Ex. 1223	"Patents," Moderna website, December 9, 2023 (available at https://web.archive.org/web/20231209004401/https://www.modernatx.com/en-US/patents)	
Ex. 1224	"Why Did The World Shut Down For COVID-19 But Not Ebola, SARS Or Swine Flu?" ABC News, April 14, 2020 (available at https://fivethirtyeight.com/features/why-did-the-world-shut-down-for-covid-19-but-not-ebola-sars-or-swine-flu/)	
Ex. 1225	Bishai, D. et al, Handbook of Applied Health Economics In Vaccines, Oxford University Press, 2023	

Exhibit No.	Document	Previously Submitted
Ex. 1226	"Landmark moment as first NHS patient receives COVID-19 vaccination," NHS England, December 8, 2020 (available at https://www.england.nhs .uk/2020/12/landmark-moment-as-first-nhs-patient-receives-covid-19-vaccination/)	
Ex. 1227	Edouard Mathieu et al., *A global database of COVID-19 vaccinations,* 5 NAT HUM BEHAV 947 (2021)	
Ex. 1228	"2020 Final Death Statistics: COVID-19 as an Underlying Cause of Death vs. Contributing Cause," National Center for Health Statistics, January 7, 2022 (available at https://www.cdc.gov/nchs/ pre ssroom/podcasts/2022/20220107/20220107.htm#print)	
Ex. 1229	"Provisional Mortality Data — United States, 2021," CDC website, April 29, 2022 (available at https://www.cdc.gov/mmwr/volumes/71/wr/mm7117e1.htm)	
Ex. 1230	"COVID-19 hospitalizations," Our World in Data, (available at https://ourworldindata.org/covid-hospitalizations)	
Ex. 1231	"US death rate dropped 6% in 2023, with Covid-19 falling to 10th leading cause of death, CDC says," CNN, August 8, 2024 (available at https://www.cnn.com/ 2024/08/08/health/us-death-rate-2023-cdc/index.html)	
Ex. 1232	"FDA authorizes Novavax COVID-19 vaccine for emergency use in US," ABC News, July 13, 2022 (available at https://abcnews.go.com/Health/fda-authorizes-novavax-covid-19-vaccine-emergency-us/story?id=86769988)	

Exhibit No.	Document	Previously Submitted
Ex. 1233	"Novavax Says U.S. Will Pause Funding for Production of Its Vaccine," The New York Times, August 8, 2021 (available at https://www.nytimes.com/2021/08/06/us/politics/novavax-coronavirus-vaccine.html)	
Ex. 1234	"AstraZeneca's COVID-19 vaccine authorised for emergency supply in the UK," AstraZeneca press release, December 30, 2020 (available at https://www.astrazeneca.com/media-centre/press-releases/2020/astrazenecas-covid-19-vaccine-authorised-in-uk.html#)	
Ex. 1235	"Vaxzevria receives full marketing authorisation in the EU for the prevention of COVID-19," AstraZeneca, November 1, 2022 (available at https://www.astrazeneca.com/media-centre/press-releases/2022/vaxzevria-receives-full-marketing-authorisation-in-the-eu-for-the-prevention-of-covid-19.html)	
Ex. 1236	"Press Briefing by White House COVID-19 Response Team and Public Health Officials, April 27, 2021 (available at https://www.whitehouse.gov/briefing-room/press-briefings/2021/04/27/press-briefing-by-white-house-covid-19-response-team-and-public-health-officials-32/)	
Ex. 1237	"AZD1222 US Phase III primary analysis confirms safety and efficacy," AstraZeneca, March 25, 2021 (available at https://www.astrazeneca.com/media-centre/press-releases/2021/azd1222-us-phase-iii-primary-analysis-confirms-safety-and-efficacy.html)	
Ex. 1238	"Is Novavax a Buy Now?" The Motley Fool, March 4, 2024 (available at https://www.fool.com/investing/2024/03/04/is-novavax-a-buy-now/)	

Exhibit No.	Document	Previously Submitted
Ex. 1239	"Novavax's COVID-19 Shot Just in Time, Optimism Surrounds As Demand Picks Up Momentum," Business Insider, October 4, 2023, (available at https://markets.businessinsider.com/news/stocks/novavax-s-covid-19-shot-just-in-time-optimism-surrounds-as-demand-picks-up-momentum-1032679259)	
Ex. 1240	"This was mRNA's breakout year," ACS Publications website, December 6, 2021 (available at https://pubs.acs.org/doi/10.1021/cen-09944-cover2)	
Ex. 1241	Hussain S. Lalani et al., *US public investment in development of mRNA covid-19 vaccines: retrospective cohort study*, 380 BRITISH MEDICAL JOURNAL e073747 (2023)	
Ex. 1242	Moderna LinkedIn post (available at https://www.linkedin.com/posts/modernatx_breaking-news-the-nobel-assembly-at-karolinska-activity-7114610548184334336-NP4y?utm_source=share&utm_medium=member_desktop)	
Ex. 1243	"How researchers unlocked mRNA: Learn about mRNA research history," Moderna website, video transcript (available at https://www.modernatx.com/en-US/power-of-mrna/about-mrna#how-researchers-unlocked-mrna)	
Ex. 1244	"A Nobel for Modified mRNA," American Association for the Advancement of Science, October 2, 2023 (available at https://www.science.org/content/blog-post/nobel-modified-mrna)	

Exhibit No.	Document	Previously Submitted
Ex. 1245	"Moderna Reports Fourth Quarter and Fiscal Year 2022 Financial Results and Provides Business Updates," Moderna press release, February 23, 2023 (available at https://investors.modernatx.com/news/news-details/2023/Moderna-Reports-Fourth-Quarter-and-Fiscal-Year-2022-Financial-Results-and-Provides-Business-Updates/default.aspx)	
Ex. 1246	NIH Technology Transfer Annual Report for the year ended December 31, 2021, pp. 48-49 (available at https://www.techtransfer.nih.gov/sites/default/files/documents/pdfs/FY2021%20NIH%20Technology%20Transfer%20Annual%20Report.pdf)	
Ex. 1247	Moderna Form 10-K for the fiscal year ended December 31, 2018	
Ex. 1248	"Acuitas Therapeutics Non-Confidential Presentation," Acuitas website, November 2018 (available at https://acuitastx.com/wp-content/uploads/2018/11/Acuitas-non-confidential-overview_Nov_2018.pdf)	
Ex. 1249	"Our Journey," Acuitas website (available at https://acuitastx.com/company/our-journey/)	
Ex. 1250	AICPA Accounting & Valuation Guide: Assets Acquired to Be Used in Research and Development Activities (updated May 2013)	
Ex. 1251	"First Quarter 2020: Corporate update and financial results," BioNTech website, May 12, 2020 (available at https://investors.biontech.de/static-files/7700eaa3-12b1-43e1-855e-d7c08856b9b8)	
Ex. 1252	*Reserved*	
Ex. 1253	*Reserved*	

Exhibit No.	Document	Previously Submitted
Ex. 1254	"A Guide to Valuation of the Assembled Workforce Intangible Asset," American Bankruptcy Institute website, October 1, 2006 (available at https://www.abi.org/abi-journal/a-guide-to-valuation-of-the-assembled-workforce-intangible-asset)	
Ex. 1255	"Leveraging 13 Years of Investment in mRNA Innovation for Future Pandemic Preparedness," Moderna website, May 24, 2023 (available at https://www.modernatx.com/en-US/media-center/all-media/blogs/leveraging-13-years-of-investment-in-mrna)	
Ex. 1256	"How the Moderna Covid-19 mRNA vaccine was made so quickly," CNBC website, July 3, 2021 (available at https://www.cnbc.com/2021/07/03/how-moderna-made-its-mrna-covid-vaccine-so-quickly-noubar-afeyan.html)	
Ex. 1257	"How Moderna is racing to a coronavirus vaccine," MIT Sloan website, April 3, 2020 (available at https://mitsloan.mit.edu/ideas-made-to-matter/how-moderna-racing-to-a-coronavirus-vaccine)	
Ex. 1258	"The Race to Develop the Pfizer-BioNTech COVID-19 Vaccine: From the Pharmaceutical Scientists' Perspective," NIH website, September 18, 2022 (available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9482796/)	
Ex. 1259	"Cracking the mRNA Manufacturing Code with Pfizer's Supply Chain Chief," Industry Week, January 31, 2023 (available at https://www.industryweek.com/profiles-in-leadership/article/21259181/cracking-the-mrna-manufacturing-code-with-pfizers-supply-chain-chief)	

Exhibit No.	Document	Previously Submitted
Ex. 1260	"The power of mRNA," Moderna website (available at https://www.modernatx.com/en-US/power-of-mrna/modernas-mrna-platform)	
Ex. 1261	"Updated vaccines. Consistent storage," Moderna website (available at at https://spikevax.com/healthcare-provider-guide/helpful-vaccine-resource-tools)	
Ex. 1262	"Shot of a Lifetime: How Two Pfizer Manufacturing Plants Upscaled to Produce the COVID-19 Vaccine in Record Time," Pfizer website (available at https://www.pfizer.com/news/articles/shot_of_a_lifetime_how_two_pfizer_manufacturing_plants_upscaled_to_produce_the_covid_19_vaccine_in_record_time)	
Ex. 1263	"'None of us were ready' to manufacture genetic vaccines for a billion people," MIT Technology Review, December 17, 2020 (available at https://www.technologyreview.com/2020/12/17/1014989/moderna-vaccine-availability-stephane-bancel-ceo/)	
Ex. 1264	"Here's Why COVID-19 Vaccines Like Pfizer's Need to be Kept So Cold," Science News, November 20, 2020 (available at https://www.sciencenews.org/article/coronavirus-covid-19-why-vaccines-cold-freeze-pfizer-moderna)	
Ex. 1265	"Accelerating Digital Technology for the COVID-19 Vaccine Rollout," Pfizer website, March 2022 (available at https://www.pfizer.com/news/behind-the-science/accelerating-digital-technology-covid-19-vaccine-rollout)	
Ex. 1266	"United Airlines Begins Pfizer COVID-19 Vaccine Charter Flights," Airline Geeks website, November 28, 2020 (available at https://airlinegeeks.com/2020/11/28/united-airlines-begins-pfizer-charter-flights/)	

Exhibit No.	Document	Previously Submitted
Ex. 1267	"Update on our COVID-19 vaccine," BioNTech website, December 22, 2020 (available at https://investors.biontech.de/static-files/3193fc38-2158-45df-a19c-b9e294db3f11)	
Ex. 1268	"Pfizer and BioNTech Conclude Phase 3 Study of COVID-19 Vaccine Candidate, Meeting All Primary Efficacy Endpoints," Pfizer website, November 18, 2020 (available at https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-conclude-phase-3-study-covid-19-vaccine)	
Ex. 1269	"Pfizer Wins 2022 Supply Chain Award," Gartner (available at https://www.gartner.com/en/supply-chain/trends/supply-chain-award-winner-2022-pfizer)	
Ex. 1270	"Pfizer and BioNTech Achieve First Authorization in the World for a Vaccine to Combat COVID-19," Pfizer website, December 2, 2020 (available at https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-achieve-first-authorization-world)	
Ex. 1271	"Moderna struggling to supply promised doses of Covid vaccine," The Guardian, April 16, 2021 (available at https://www.theguardian.com/world/2021/apr/16/moderna-struggling-to-supply-promised-doses-of-covid-vaccine)	
Ex. 1272	Moderna Form 10-K for the fiscal year ended December 31, 2022	
Ex. 1273	FDA, Current Good Manufacturing Practices (CGMP) Regulations, May 2023 (available at https://www.fda.gov/drugs/pharmaceutical-quality-resources/current-good-manufacturing-practice-cgmp-regulations)	

Exhibit No.	Document	Previously Submitted
Ex. 1274	"What Is the Network Effect?" WHARTON UNIVERSITY OF PENNSYLVANIA, January 17, 2023 (available at https://online.wharton.upenn.edu/blog/what-is-the-network-effect/)	
Ex. 1275	Pfizer's Form 10-K for the fiscal year ended December 31, 2020	
Ex. 1276	"Number of COVID-19 vaccine doses administered in the United States as of April 26, 2023, by vaccine manufacturer," Statista, April 2023 (available at https://www.statista.com/statistics/1198516/covid-19-vaccinations-administered-us-by-company/)	
Ex. 1277	"Fourth Quarter 2021 Earnings Teleconference," Pfizer website, February 8, 2022 (available at https://s28.q4cdn.com/781576035/files/doc_financials/2021/q4/Q4-2021-Earnings-Charts-FINAL.pdf)	
Ex. 1278	Louise C. Druedahl et al., *Collaboration in times of crisis: A study on COVID-19 vaccine R&D partnerships*, 39 VACCINE 6291 (2021)	
Ex. 1279	"Our Collaborators," BioNTech website (available at https://www.biontech.com/int/en/home/about/collaborators.html)	
Ex. 1280	"Pfizer and BioNTech Announce Collaboration With Brazil's Eurofarma to Manufacture COVID-19 Vaccine Doses for Latin America," Pfizer website, August 26, 2021 (available at https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-announce-collaboration-brazils)	

Exhibit No.	Document	Previously Submitted
Ex. 1281	"As COVID vaccine patent dispute drags on, Moderna forks over $400M to NIH," ARS Technica, February 24, 2023 (available at https://arstechnica.com/science/2023/02/moderna-forks-over-400m-to-nih-amid-dispute-over-covid-vaccine-ip/)	
Ex. 1282	"What happened to the AstraZeneca vaccine? Now rare in rich countries, it's still saving lives around the world," The Conversation, May 23, 2022 (available at https://theconversation.com/what-happened-to-the-astrazeneca-vaccine-now-rare-in-rich-countries-its-still-saving-lives-around-the-world-181791)	
Ex. 1283	Vaxzevria (previously COVID-19 Vaccine AstraZeneca)," European Medicines Agency (available at https://www.ema.europa.eu/en/medicines/human/EPAR/ vaxzevria-previously-covid-19-vaccine-astrazeneca)	
Ex. 1284	"VidPrevtyn Beta," European Medicines Agency (available at https://www.ema.europa.eu/en/medicines/human/EPAR/vidprevtyn-beta)	
Ex. 1285	"Coronavirus vaccine trial begun by drug firms GSK and Sanofi," BBC, September 3, 2020 (available at https://www.bbc.com/news/business-54009633)	
Ex. 1286	"Fast-forward: Will the speed of COVID-19 vaccine development reset industry norms?" McKinsey & Company, May 13, 2021 (available at https://www.mckinsey.com/industries/life-sciences/our-insights/fast-forward-will-the-speed-of-covid-19-vaccine-development-reset-industry-norms)	

Exhibit No.	Document	Previously Submitted
Ex. 1287	"Emergency Use Authorization for Vaccines Explained," FDA website, November 20, 2020 (available at https://www.fda.gov/vaccines-blood-biologics/vaccines/emergency-use-authorization-vaccines-explained)	
Ex. 1288	"FDA Issues Emergency Use Authorization for Third COVID-19 Vaccine," FDA website, February 27, 2021 (available at https://www.fda.gov/news-events/press-announcements/fda-issues-emergency-use-authorization-third-covid-19-vaccine)	
Ex. 1289	"Oxford / AstraZeneca vaccine reaches two billion dose milestone," University of Oxford website, November 16, 2021 (available at https://www.ox.ac.uk/news/2021-11-16-oxford-astrazeneca-vaccine-reaches-two-billion-dose-milestone)	
Ex. 1290	"A Guide to Global COVID-19 Vaccine Efforts," Council on Foreign Relations, December 5, 2022 (available at https://www.cfr.org/backgrounder/guide-global-covid-19-vaccine-efforts)	
Ex. 1291	"Trump signs $8.3 billion emergency coronavirus spending package," CNBC News, March 6, 2020 (available at https://www.cnbc.com/2020/03/06/trump-signs-8point3-billion-emergency-coronavirus-spending-package.html)	
Ex. 1292	"Pfizer and BioNTech Announce an Agreement with U.S. Government for up to 600 Million Doses of mRNA-based Vaccine Candidate Against SARS-CoV-2," Pfizer press release, July 22, 2020 (available at https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-announce-agreement-us-government-600)	

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Ex. 1293	"The Covid Vaccine Is Free, but Not Everyone Believes That," The New York Times, June 1, 2021 (available at https://www.nytimes.com/2021/06/01/upshot/covid-vaccine-hesitancy-cost.html)	
Ex. 1294	"Commercialization of COVID-19 Vaccines, Treatments, and Tests: Implications for Access and Coverage," KFF, February 6, 2024 (available at https://www.kff.org/coronavirus-covid-19/issue-brief/commercialization-of-covid-19-vaccines-treatments-and-tests-implications-for-access-and-coverage/)	
Ex. 1295	"COVID-19 Claims Reimbursement to Health Care Providers and Facilities for Testing, Treatment, and Vaccine Administration for the Uninsured," HRSA, January 1, 2024 (available at https://www.hrsa.gov/ provider-relief/ about/covid-uninsured-claim)	
Ex. 1296	"Government Warns Doctors and Insurers: Don't Bill for Covid Vaccines," The New York Times, June 9, 2021 (available at https://www.nytimes.com/ 2021/06/09/upshot/covid-vaccines-government-warning-bills.html)	
Ex. 1297	"Incentives for COVID-19 Vaccination: Food, Cash, & Other Perks," GoodRx Health, June 24, 2021 (available at https://www.goodrx.com/health-topic/vaccines/covid-19-vaccination-incentives)	
Ex. 1298	"LA Has Imposed One of the US's Strictest Vaccine Mandates. Will It Prevent a Covid Surge?" The Guardian, November 13, 2021 (available at https://www.theguardian.com/us-news/2021/nov/13/los-angeles-vaccine-mandate-covid-surge)	

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Ex. 1299	"Here Are The U.S. Cities Where You Need A Covid Vaccine To Dine In A Restaurant," Forbes, December 22, 2021 (available at https://www.forbes.com/sites/carlieporterfield/2021/12/22/here-are-the-us-cities-where-you-need-a-covid-vaccine-to-dine-in-a-restaurant/)	
Ex. 1300	"'Key to NYC': Indoor vaccine mandate begins on Tuesday," ABC 7 News, August 16, 2021 (available at https://abc7ny.com/nyc-vaccine-pass-proof-of-vaccination-key-to-mandate/10954428/)	
Ex. 1301	"NYC Slaps 14 Businesses With $1,000 Fines for Violating Vaccine Mandate," Eater, October 12, 2021 (available at https://ny.eater.com/2021/10/12/22722297/nyc-business-vaccine-mandate-violations-fines)	
Ex. 1302	"Moderna vs Pfizer: Is it OK to mix and match the updated COVID-19 booster shots?" Los Angeles Times, September 23, 2022 (available at https://www.latimes.com/california/story/2022-09-23/moderna-vs-pfizer-is-it-ok-to-mix-and-match-the-updated-covid-19-booster-shots)	
Ex. 1303	"Covid-19: Biden tells states to offer $100 vaccine incentive as cases rise," BBC, July 30, 2021 (available at https://www.bbc.com/news/world-us-canada-58020090)	
Ex. 1304	Moderna Form 10-Q for the quarterly period ended June 30, 3024	
Ex. 1305	Updated Curriculum Vitae of Daniel O. Griffin, Ph.D.	
Ex. 1306	U.S. Patent Number 11,638,693 (Asserted in *GlaxoSmithKline Biologicals SA et al v. Pfizer Inc. et al*, C.A. No. 24-512 (GBW) (D. Del.))	

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Ex. 1307	U.S. Patent Number 11,638,694 (Asserted in *GlaxoSmithKline Biologicals SA et al v. Pfizer Inc. et al*, C.A. No. 24-512 (GBW) (D. Del.))	
Ex. 1308	U.S. Patent Number 11,666,534 (Asserted in *GlaxoSmithKline Biologicals SA et al v. Pfizer Inc. et al*, C.A. No. 24-512 (GBW) (D. Del.))	
Ex. 1309	U.S. Patent Number 11,766,401 (Asserted in *GlaxoSmithKline Biologicals SA et al v. Pfizer Inc. et al*, C.A. No. 24-512 (GBW) (D. Del.))	
Ex. 1310	U.S. Patent Number 11,786,467 (Asserted in *GlaxoSmithKline Biologicals SA et al v. Pfizer Inc. et al*, C.A. No. 24-512 (GBW) (D. Del.))	
Ex. 1311	International Publication Number WO 2012/006378 A1 (Asserted in *GlaxoSmithKline Biologicals SA et al v. Pfizer Inc. et al*, C.A. No. 24-512 (GBW) (D. Del.))	
Ex. 1312	Answer, Affirmative Defenses, and Counterclaims in Response to Complaint for Patent Infringement, *GlaxoSmithKline Biologicals SA et al v. Pfizer Inc. et al*, C.A. No. 24-512 (GBW) (D. Del.)	
Ex. 1313	Amended Answer in Response to Complaint for Patent Infringement, *GlaxoSmithKline Biologicals SA et al v. Pfizer Inc. et al*, C.A. No. 24-512 (GBW) (D. Del.)	
Ex. 1314	Petsch, B., et al. *Protective efficacy of in vitro synthesized, specific mRNA vaccines against influenza A virus infection*, 30 NATURE BIOTECHNOLOGY 121 (2012)	
Ex. 1315	Hattinger, E., et al. P*rophylactic mRNA Vaccination against Allergy Confers Long-Term Memory Responses and Persistent Protection in Mice.* JOURNAL OF IMMUNOLOGY RESEARCH 2015, 797421 (2015)	

Respectfully submitted,

Dated: August 30, 2024

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CERTIFICATE OF SERVICE

I hereby certify that on August 30, 2024, I caused the foregoing Petitioner's Current List of Exhibits to be served on counsel for Patent Owner via email at:

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