UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MERCK, SHARP & DOHME LLC,
Petitioner

v.

HALOZYME, INC.,
Patent Owner

Case PGR2025-00024
U.S. Patent No. 12,060,590

PATENT OWNER'S UPDATED EXHIBIT LIST

Mail Stop "PATENT BOARD"
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Patent Owner submits this Updated Exhibit List to accompany filing of Exhibit 2214, the Declaration of Zachariah Summers.

PATENT OWNER'S UPDATED EXHIBIT LIST

Exhibit No.	Description
2001	Declaration of Barbara Triggs-Raine, Ph.D. in support of Patent Owner Discretionary Denial Brief (WITHDRAWN)
2002	*Curriculum Vitae* of Barbara Triggs-Raine, Ph.D.
2003	Disclaimer in a Patent under 37 C.F.R. § 1.321(a), filed in U.S. Patent Application No. 18/068,218, June 13, 2025
2004	"Halozyme Therapeutics to Present Data on PEGPH20 at the Upcoming 2011 EORTC-NCIASCO Annual Meeting," Halozyme Therapeutics, Inc. Press Release, October 24, 2011
2005	LinkedIn profiles of Michael Shepard, Robert Connor, Ge (Gina) Wei, and Qiping Zhao
2006	Sequence listing of U.S. Patent Application No. 18/068,218
2007	Gifre, L., et al., "Trends in recombinant protein use in animal production," *Microb Cell Fact* 16:40 (2017)
2008	"Recombinant Drugs," Smithsonian Institution, accessible at https://www.si.edu/spotlight/birth-of-biotech/recombinant-drugs (last accessed February 27, 2025)
2009	Naz, R., "Antisperm Contraceptive Vaccines: Where We Are and Where We Are Going?," *American Journal of Reproductive Immunology* 66:5-12 (2011)
2010	Primakoff, P., et al., "Fully effective contraception in male and female guinea pigs immunized with the sperm protein PH-20," *Nature* 335:543-546 (October 6, 1988)

Exhibit No.	Description
2011	Definition of "guinea pig," Merriam-Webster OnLine, archived by the Internet Archive on February 21, 2010, accessible at https://web.archive.org/web/20100221175034/http://www.merriam-webster.com/dictionary/guinea%20pig (last accessed February 27, 2025)
2012	"A decade in numbers," *Nature Materials* 11:743-744 (September 2012)
2013	Lin, Y., *et al.*, "Molecular cloning of the human and monkey sperm surface protein PH-20," *Proc. Natl. Acad. Sci USA* 90:10071-10075 (November 1993)
2014	*Intentionally Left Blank*
2015	File History of U.S. Patent No. 7,872,107
2016	Pils, B., *et al.*, "Variation in structural location and amino acid conservation of functional sites in protein domain families," *BMC Bioinformatics* 6 (August 25, 2005)
2017	European Patent Application Publication No. 0953574 A1, published November 3, 1999
2018	Duterme, C., *et al.*, "Two Novel Functions of Hyaluronidase-2 (Hyal2) Are Formation of the Glycocalyx and Control of CD44-ERM Interactions," *The Journal of Biological Chemistry*, 284(48):33495-33508 (November 27, 2009)
2019	Atmuri, V., *et al.*, "Hyaluronidase 3 (*HYAL3*) knockout mice do not display evidence of hyaluronan accumulation," *Matrix Biology* 27 (2008)
2020	Hemming, R., *et al.*, "Mouse Hyal3 encodes a 45- to 56-kDa glycoprotein whose overexpression increases hyaluronidase 1 activity in cultured cells," *Glycobiology* 18(4):280-289 (2008)

Exhibit No.	Description
2021	Miller, A., "Hyaluronidase 2 and its intriguing role as a cell-entry receptor for oncogenic sheep retroviruses," *Seminars in Cancer Biology* 18:296-301 (2008)
2022	Kaneiwa, T. *et al.*, "Identification of human hyaluronidase-4 as a novel chondroitin sulfate hydrolase that preferentially cleaves the galactosaminidic linkage in the trisulfated tetrasaccharide sequence," *Glycobiology* 20(3):300-309 (March 2010)
2023	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00004 (P.T.A.B.), November 26, 2024
2024	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00003 (P.T.A.B.), November 12, 2024
2025	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00009 (P.T.A.B.), December 27, 2024
2026	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00006 (P.T.A.B.), December 10, 2024
2027	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00030 (P.T.A.B.), February 4, 2025
2028	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00017 (P.T.A.B.), January 17, 2025
2029	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00004 (P.T.A.B.), November 26, 2024

Exhibit No.	Description
2030	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00003 (P.T.A.B.), November 12, 2024
2031	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00009 (P.T.A.B.), December 27, 2024
2032	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00006 (P.T.A.B.), December 10, 2024
2033	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00030 (P.T.A.B.), February 4, 2025
2034	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00017 (P.T.A.B.), January 17, 2025
2035	Lokeshwar, V., *et al.*, "Regulation of Hyaluronidase Activity by Alternative mRNA Splicing," *The Journal of Biological Chemistry* 277(37):33654-33663 (2002)
2036	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00033 (P.T.A.B.), March 7, 2025
2037	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00033 (P.T.A.B.), March 7, 2025
2038	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00039 (P.T.A.B.), March 28, 2025
2039	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00039 (P.T.A.B.), March 28, 2025

Exhibit No.	Description
2040-2045	*Intentionally Left Blank*
2046	"2023 Pharma 50: The 50 largest pharma companies in the world," drugdiscoverytrends.com, accessible at https://www.drugdiscoverytrends.com/2023-pharma-50-largest-companies/ (last accessed April 28, 2025)
2047	"Merck Announces Fourth-Quarter and Full-Year 2024 Financial Results," Merck Press Release, February 4, 2025
2048	"Products list," Merck.com, accessible at https://www.merck.com/products/ (last accessed April 28, 2025)
2049	*Intentionally Left Blank*
2050	"Merck & Company, Inc. Common Stock (new) (MRK)," Nasdaq.com, accessible at https://www.nasdaq.com/market-activity/stocks/mrk (last accessed April 28, 2025)
2051	"Halozyme Therapeutics, Inc. Common Stock (HALO)," Nasdaq.com, accessible at https://www.nasdaq.com/market-activity/stocks/halo (last accessed April 28, 2025)
2052	"Halozyme reports full year 2024 record revenue of $1.015 billion and Exceeds its Financial Guidance for Royalty Revenue, Adjusted EBITDA and Non-GAAP Diluted EPS," Halozyme.com, accessible at https://ir.halozyme.com/news/news-details/2025/HALOZYME-REPORTS-FULL-YEAR-2024-RECORD-REVENUE-OF-1.015-BILLION-AND-EXCEEDS-ITS-FINANCIAL-GUIDANCE-FOR-ROYALTY-REVENUE-ADJUSTED-EBITDA-AND-NON-GAAP-DILUTED-EPS/default.aspx (last accessed April 28, 2025)
2053	"Commercial Products," Halozyme.com, accessible at https://halozyme.com/commercial-products/ (last accessed April 28, 2025)

Exhibit No.	Description
2054	"About Us," Halozyme.com, accessible at https://halozyme.com/about-us/#our-focus (last accessed April 28, 2025)
2055	Second Declaration of Barbara Triggs-Raine, Ph.D. in Support of Patent Owner's Preliminary Response (WITHDRAWN)
2056	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00042 (P.T.A.B.), April 15, 2025
2057	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00042 (P.T.A.B.), April 15, 2025
2058	Complaint for Patent Infringement and Declaratory Judgment of Patent Infringement, *Halozyme, Inc. v. Merck Sharp & Dohme Corp.*, Civil Action No. 2:25-cv-03179-ES (D.N.J.), filed April 24, 2025
2059	"Alteogen announces amendment to license agreement with MSD," Alteogen Press Release, February 22, 2025, accessible at https://www.alteogen.com/en/ir_1/?uid=2223&mod=document&pageid=1 (last accessed April 28, 2025)
2060	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00046 (P.T.A.B.), April 29, 2025
2061	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00046 (P.T.A.B.), April 29, 2025
2062	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00050 (P.T.A.B.), May 7, 2025
2063	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00050 (P.T.A.B.), May 7, 2025

Exhibit No.	Description
2064	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00053 (P.T.A.B.), June 6, 2025
2065	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00053 (P.T.A.B.), June 6, 2025
2066	Petition for Post-Grant Review, *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00052 (P.T.A.B.), June 27, 2025
2067	Declaration of Michael Hecht, Ph.D. (Exhibit 1003), *Merck Sharp & Dohme LLC v. Halozyme Inc.*, Case No. PGR2025-00052 (P.T.A.B.), June 27, 2025
2068	Declaration of Melanie A. Simpson, Ph.D. in Support of Patent Owner's Response
2069	*Curriculum Vitae* of Melanie A. Simpson, Ph.D.
2070	Declaration of Gregory A. Petsko, Ph.D. in Support of Patent Owner's Response
2071	*Curriculum Vitae* of Gregory A. Petsko, Ph.D.
2072	Declaration of Gary N. Cherr, Ph.D. in Support of Patent Owner's Response
2073	*Curriculum Vitae* of Gary N. Cherr, Ph.D.
2074	Declaration of James J. Moon, Ph.D. in Support of Patent Owner's Response
2075	*Curriculum Vitae* of James J. Moon, Ph.D.
2076	Transcript of the Deposition of Michael Hecht, Ph.D., August 26, 2025
2077	Transcript of the Deposition of Dr. Sheldon Park, August 7, 2025

Exhibit No.	Description
2078	Transcript of the Deposition of Dr. Sheldon Park, August 21, 2025
2079	Koehl, P. et al., "Structure-based conformational preferences of amino acids," *PNAS*, 96(22):12524-12529 (October 26, 1999)
2080	Pommié, C. et al., "IMGT standardized criteria for statistical analysis of immunoglobulin V-REGION amino acid properties," *Journal of Molecular Recognition*, 17:17-32 (2004)
2081	*Intentionally Left Blank*
2082	Kyte, J. et al., "A Simple Method for Displaying the Hydropathic Character of a Protein,"*Journal of Molecular Biology*, 157:105-132 (1982)
2083	*Assay Guidance Manual*, Eli Lilly & Company and the National Center for Advancing Translational Sciences
2084	"The Central Role of Enzymes as Biological Catalysts," NCBI Bookshelf, National Institutes of Health (accessible at https://www.ncbi.nlm.nih.gov/books/NBK9921/, last accessed September 22, 2025)
2085	French, S. et al., "What is a Conservative Substitution?", *Journal of Molecular Evolution*, 19:171-175 (1983)
2086	El-Safory, N. et al., "Hyaluronidases, a group of glycosidases: Current and future perspectives," *Carbohydrate Polymers*, 81:165-181 (2010)
2087	Lu, J. et al., "Hyaluronidase: structure, mechanism of action, diseases and therapeutic targets," *Molecular Biomedicine*, 6:50-77 (2025)
2088	Stern, R. et al., "Mammalian Hyaluronidases," Hyaluronan Index (2000)
2089	Gmachl, M. et al., "The human sperm protein PH-20 has hyaluronidase activity," *FEBS Letters*, 336(3):545-548 (December 1993)

Exhibit No.	Description
2090	Gmachl, M. et al., "Bee venom hyaluronidase is homologous to a membrane protein of mammalian sperm," *PNAS USA*, 90:3569-3573 (April 1993)
2091	Davies, G. et al., "Structures and mechanisms of glycosyl hydrolases," *Current Biology*, 3:853-859 (1995)
2092	Marković-Housley, Z. et al., "Crystal Structure of Hyaluronidase, a Major Allergen of Bee Venom," *Structure*, 8:1025-1035 (October 2000)
2093	U.S. Patent No. 8,343,487 B2 to Baker et al., issued January 1, 2013
2094	Thermo Scientific Multidrop® 384 User Manual, Rev. 3.4, Thermo Fisher Scientific (October 2008)
2095	*Intentionally Left Blank*
2096	Frost, G. et al., "A Microtiter-Based Assay for Hyaluronidase Activity Not Requiring Specialized Reagents," *Analytical Biochemistry*, 251:263-269 (1997)
2097	U.S. Patent Application Publication No. 2005/0260186 A1 to Bookbinder et al., published November 24, 2005
2098	Delpech, B. et al., "Enzyme-Linked Hyaluronectin: A Unique Reagent for Hyaluronan Assay and Tissue Location and for Hyaluronidase Activity Detection," *Analytical Biochemistry*, 229:35-41 (1995)
2099	Takahashi, T. et al., "A fluorimetric Morgan-Elson assay method for hyaluronidase activity," *Analytical Biochemistry*, 322:257-263 (2003)
2100	Vines, C.V. et al., "Identification of a Hyaluronic Acid (HA) Binding Domain in the PH-20 Protein That May Function in Cell Signaling," *Molecular Reproduction and Development*, 60:542-552 (2001)

Exhibit No.	Description
2101	Wassarman, P. et al., "Structure and Function of the Mammalian Egg Zona Pellucida," *Journal of Experimental Zoology (Mol Dev Evol)*, 285:251-258 (1999)
2102	Yudin, A. et al., "Structure of the cumulus matrix and zona pellucida in the golden hamster: A new view of sperm interaction with oocyte-associated extracellular matrices," *Cell Tissue Res* 251:555-564 (1988)
2103	Tollner, T. et al., "Multifunctional glycoprotein DEFB126 – a curious story of defensin-clad spermatozoa," *Nature Reviews | Urology*, Vol. 9, pp. 365-375 (July 2012)
2104	Visconti, P. et al., "The Molecular Basis of Sperm Capacitation," *Journal of Andrology*, 19(2):242-248 (March/April 1998)
2105	Wassarman, P. et al., "A profile of fertilization in mammals," *Nature Cell Biology*, Vol. 3, pp. E59-E64 (February 2001)
2106	Bailey, J., "Factors Regulating Sperm Capacitation," *Systems Biology in Reproductive Medicine*, 56:334-348 (2010)
2107	Sabeur, K. et al., "The PH-20 Protein in Human Spermatozoa," *Journal of Andrology*, 18(2):151-158 (March/April 1997)
2108	Hunnicutt, G. et al., "Sperm Surface Protein PH-20 Is Bifunctional: One Activity Is a Hyaluronidase and a Second, Distinct Activity is Required in Secondary Sperm-Zona Binding," *Biology of Reproduction*, 55:80-86 (1996)
2109	Tollner, T. et al., "Beta-Defensin 126 on the Surface of Macaque Sperm Mediates Attachment of Sperm to Oviductal Epithelia," *Biology of Reproduction*, 78:400-412 (2008)
2110	Tollner, T. et al., "Release of DEFB126 From Macaque Sperm and Completion of Capacitation Are Triggered by Conditions That Simulate Periovulatory Oviductal Fluid," *Molecular Reproduction & Development*, 76:431-443 (2009)

Exhibit No.	Description
2111	Yudin, A. et al., "Beta-Defensin 126 on the Cell Surface Protects Sperm from Immunorecognition and Binding of Anti-Sperm Antibodies," *Biology of Reproduction*, 73:1243-1252 (2005)
2112	Yudin, A. et al., "The Carbohydrate Structure of DEFB126, the Major Component of the Cynomolgus Macaque Sperm Plasma Membrane Glycocalyx," *Journal of Membrane Biology*, 207:119-129 (2005)
2113	Tollner, T. et al., "A Common Mutation in the Defensin DEFB126 Causes Impaired Sperm Function and Subfertility," *Science Translational Medicine*, 3(92):1-9 (2011), with erratum
2114	Frayne, J. et al., "The potential use of sperm antigens as targets for immunocontraception; past, present and future," *Journal of Reproductive Immunology*, 43:1-33 (1999)
2115	Yanagimachi, R., "Acceleration of the Acrosome Reaction and Activation of Guinea Pig Spermatozoa by Detergents and Other Reagents," *Biology of Reproduction*, 13:519-526 (1975)
2116	Chamley, L. et al., "Antisperm antibodies and conception," *Seminars in Immunopathology*, 29:169-184 (2007)
2117	Kremer, J. et al., "The significance of antisperm antibodies for sperm-cervical mucus interaction," *Human Reproduction*, 7(6):781-784 (1992)
2118	Primakoff, P. et al., "A Map of the Guinea Pig Sperm Surface Constructed with Monoclonal Antibodies," *Developmental Biology*, 98:417-428 (1983)
2119	Myles, D. et al., "Localized Surface Antigens of Guinea Pig Sperm Migrate to New Regions Prior to Fertilization," *The Journal of Cell Biology*, 99:1634-1641 (1984)

Exhibit No.	Description
2120	Chan, C. et al., "Identification of Linear Surface Epitopes on the Guinea Pig Sperm Membrane Protein PH-20," *Life Sciences*, 64(22):1989-2000 (1999)
2121	Ganesan, R. et al., "Structural and mechanistic insight into how antibodies inhibit serine proteases," *Biochemistry Journal*,430:179-189 (2010)
2122	Mestecky, J. et al., "Mucosal Immune System of the Human Genital Tract," *The Journal of Infectious Diseases*, 179(Suppl 3):S470-S474 (1999)
2123	*Intentionally Left Blank*
2124	*Intentionally Left Blank*
2125	*Intentionally Left Blank*
2126	Suri, A., "Contraceptive vaccines targeting sperm," *Expert Opinion on Biological Therapy*, 5(3):381-392 (2005)
2127	Morrow, R. et al., "Sustained release of proteins from a modified vaginal ring device," *European Journal of Pharmaceutics and Biopharmaceutics*, 77:3-10 (2011)
2128	Hussain, A. et al., "The vagina as a route for systemic drug delivery," *Journal of Controlled Release*, 103:301-313 (2005)
2129	Veazey, R. et al., "Prevention of virus transmission to macaque monkeys by a vaginally applied monoclonal antibody to HIV-1 gp120," *Nature Medicine*, 9(3):343-346 (2003)
2130	Baloglu, E. et al., "Strategies to Prolong the Intravaginal Residence Time of Drug Delivery Systems," *Journal of Pharmaceutical Science*, 12(3):312-336 (2009)
2131	Suarez, S. et al., "Sperm transport in the female reproductive tract," *Human Reproduction Update*, 12(1):23-37 (2006)

Exhibit No.	Description
2132	Cauci, S. et al., "Combination of vaginal pH with vaginal sialidase and prolidase activities for prediction of low birth weight and preterm birth," *American Journal of Obstetrics and Gynecology*, 192:489-496 (2005)
2133	Flori, F. et al., "Menstrual cycle–related sialidase activity of the female cervical mucus is associated with exosome-like vesicles," *Fertility and Sterility*, 88(Suppl 2):1212-1219 (October 2007)
2134	Mestecky, J. et al., "Antibody-mediated protection and the mucosal immune system of the genital tract: relevance to vaccine design," *Journal of Reproductive Immunology*, 85:81-85 (2010)
2135	Kim, S. et al., "Antibody Engineering for the Development of Therapeutic Antibodies," *Molecules and Cells*, 20(1):17-29 (2005)
2136	Lardner, A., "The effects of extracellular pH on immune function," *Journal of Leukocyte Biology*, 69:522-530 (April 2001)
2137	Lipman, N. et al., "Monoclonal Versus Polyclonal Antibodies: Distinguishing Characteristics, Applications, and Information Resources," *ILAR Journal*, 46(3):258-268 (2005)
2138	Rhee, J. et al., "Mucosal vaccine adjuvants update," *Clinical and Experimental Vaccine Research*, 1:50-63 (2012)
2139	Lycke, N., "Recent progress in mucosal vaccine development: potential and limitations," *Nature Review*, 12:592-605 (August 2012)
2140	Rudin, A. et al., "Differential Kinetics and Distribution of Antibodies in Serum and Nasal and Vaginal Secretions after Nasal and Oral Vaccination of Humans," *Infection and Immunity*, 66(7):3390-3396 (July 1998)
2141	Wu, H. et al., "Generation of Female Genital Tract Antibody Responses by Local or Central (Common) Mucosal Immunization," *Infection and Immunity*, 68(10):5539-5545 (October 2000)

Exhibit No.	Description
2142	Russell, M., "Immunization for Protection of the Reproductive Tract: A Review," *American Journal of Reproductive Immunology*, 47:265-268 (2002)
2143	Uppada, S. et al., "Enhanced humoral and mucosal immune responses after intranasal immunization with chimeric multiple antigen peptide of LcrV antigen epitopes of Yersinia pestis coupled to palmitate in mice," *Vaccine*, 29:9352-9360 (2011)
2144	*Intentionally Left Blank*
2145	Gallichan, W. et al., "Specific secretory immune responses in the female genital tract following intranasal immunization with a recombinant adenovirus expressing glycoprotein B of herpes simplex virus," *Vaccine*, 13(6):1589-1595 (1995)
2146	Johansson, E. et al., "Antibodies and Antibody-Secreting Cells in the Female Genital Tract after Vaginal or Intranasal Immunization with Cholera Toxin B Subunit or Conjugates," *Infection and Immunity*, 66(2):514-520 (February 1998)
2147	Bergquist, C. et al., "Intranasal Vaccination of Humans with Recombinant Cholera Toxin B Subunit Induces Systemic and Local Antibody Responses in the Upper Respiratory Tract and the Vagina," *Infection and Immunity*, 65(7):2676-2684 (July 1997)
2148	Neto, H. et al., "Efficacy and Safety of 1 and 2 Doses of Live Attenuated Influenza Vaccine in Vaccine-Naive Children," *The Pediatric Infectious Disease Journal*, 28(5):365-371 (May 2009)
2149	Rhorer, J. et al., "Efficacy of live attenuated influenza vaccine in children: A meta-analysis of nine randomized clinical trials," *Vaccine*, 27:1101-1110 (2009)
2150	Mielcarek, N., "Genital Antibody Responses in Mice after Intranasal Infection with an Attenuated Candidate Vector Strain of *Bordetella pertussis*," *Infection and Immunity*, 68(2):485-491 (February 2000)

Exhibit No.	Description
2151	Houghton, A., "Immune recognition of self in immunity against cancer," *The Journal of Clinical Investigation*, 114(4):468-471 (August 2004)
2152	Wan, Y. et al., "Prepared and screened a modified TNF-a molecule as TNF-α autovaccine to treat LPS induced endotoxic shock and TNF-α induced cachexia in mouse," *Cellular Immunology*, 246:55-64 (2007)
2153	Dieudé, M. et al., "Autoantibodies to heat shock protein 60 promote thrombus formation in a murine model of arterial thrombosis," *Journal of Thrombosis and Haemostasis*, 7:710-719 (2009)
2154	Oliver, A. et al., "Rat and Human Myelin Oligodendrocyte Glycoproteins Induce Experimental Autoimmune Encephalomyelitis by Different Mechanisms in C57BL/6 Mice," *The Journal of Immunology*, 171(1):462-468 (2003)
2155	Trentham, D. et al. "Autoimmunity to Type II Collagen: An Experimental Model of Arthritis," *The Journal of Experimental Medicine*, 146:857-868 (1977)
2156	Courtenay, J. et al., "Immunisation against heterologous type II collagen induces arthritis in mice," *Nature*, 283:666-668 (1980)
2157	Tomita, M. et al., "Hybridoma technologies for antibody production," *Immunotherapy*, 3(3):371-380 (2011)
2158	Excerpts from *Antibody Methods and Protocols*, Proetzel G. and Ebersbach H. eds., Humana Press (2012) (including Zhang, C., "Hybridoma Technology for the Generation of Monoclonal Antibodies," Chapter 7; and Lee, E. et al., "The Application of Transgenic Mice for Therapeutic Antibody Discovery," Chapter 8)
2159	Zeitlin, L. et al., "Topically Applied Human Recombinant Monoclonal IgG1 Antibody and Its Fab and $F(ab')_2$ Fragments Protect Mice from Vaginal Transmission of HSV-2," *Virology*, 225:213-215 (1996)

Exhibit No.	Description
2160	Sherwood, J. et al., "Controlled release of antibodies for long-term topical passive immunoprotection of female mice against genital herpes," *Nature Biotechnology*, 14:468-471 (April 1996)
2161	Veselinovic, M. et al., "Topical gel formulation of broadly neutralizing anti-HIV-1 monoclonal antibody VRC01 confers protection against HIV-1 vaginal challenge in a humanized mouse model," *Virology*, 432:505-510 (2012)
2162	Schweitzer, M. et al., "Microscopic, chemical and molecular methods for examining fossil preservation," *Comptes Rendus Palevol*, 7:159-184 (2008)
2163	National Medal of Science in Medicine Citation for Gregory Petsko, 2022 (accessible at https://nationalmedals.org/laureate/gregory-petsko/?amp=1, last accessed September 19, 2025)
2164	Petsko, G., et al., *Protein Structure and Function*, New Science Press (2004)
2165	U.S. Patent Application Publication No. 2010/0143457 A1 to Wei et al., published June 10, 2010
2166	Petsko Patent Analysis Data
2167	Huang, C. et al., " Effect of sublingual administration with a native or denatured protein allergen and adjuvant CpG oligodeoxynucleotides or cholera toxin on systemic TH2 immune responses and mucosal immunity in mice," *Annals of Allergy, Asthma, and Immunology*, 99:443-452 (November 2007)
2168	Profile of Gregory A. Petsko, American Academy of Arts and Sciences (accessible at https://www.amacad.org/person/gregory-petsko, last accessed September 22, 2025)
2169	"BLAST Topics," National Institutes of Health (accessible at https://blast.ncbi.nlm.nih.gov/doc/blast-topics, last accessed September 22, 2025)

Exhibit No.	Description
2170	Chain, E. et al., "Identity of Hyaluronidase and Spreading Factor," *British Journal of Experimental Pathology*, 21(6):324-338 (1940)
2171	Tollner, T. et al., "Macaque Sperm Release ESP13.2 and PSP94 During Capacitation: The Absence of ESP13.2 Is Linked to Sperm-Zona Recognition and Binding," *Molecular Reproduction and Development*, 69:325-337 (2004)
2172	Yudin, A. et al., "Characterization of the active site of monkey sperm hyaluronidase," *Reproduction*, 121:735-743 (2001)
2173	Yudin, A. et al., "PH-20 but Not Acrosin Is Involved in Sperm Penetration of the Macaque Zona Pellucida," *Molecular Reproduction and Development*, 53:350-362 (1999)
2174	Errata from Park Deposition (introduced during Park deposition and marked by court reporter as "Park 2068")
2175	Mutational Analysis Table, 2024-11-7, Native Excel File (introduced during Park deposition and marked by court reporter as "Park 2069")
2176	Mutational Analysis Table, 2024-11-7, PDF File (introduced during Park deposition and marked by court reporter as "Park 2070")
2177	E-mail Correspondence dated August 14, 2025
2178	1LOH pdb file
2179	1FCV pdb file
2180	2PE4 pdb file
2181	8SMN pdb file
2182	L307G Swiss Model
2183	L307K Swiss Model
2184	L307N Swiss Model

Exhibit No.	Description
2185	L307Q Swiss Model
2186	L307S Swiss Model
2187	L307T Swiss Model
2188	L307 V Swiss Model
2189	L307W Swiss Model
2190	L307Y Swiss Model
2191	PH20 Swiss Model
2192	N47A_N131A_ L307W Swiss Model
2193	N47A_N131A_N219A_ L307W Swiss Model
2194	N131A_N219A_ L307W Swiss Model
2195	N47A_N219A_L307T Swiss Model
2196	N47A_N131A_ L307T Swiss Model
2197	N47A_N131A_N219A_ L307T Swiss Model
2198	N131A_N219A_ L307T Swiss Model
2199	N47A_N219A_L307S Swiss Model
2200	N47A_N131A_ L307S Swiss Model
2201	N47A_N131A_N219A_ L307S Swiss Model
2202	Declaration of Tyler C. Liu (*served not filed*)
2203	N131A_N219A_ L307S Swiss Model
2204	N47A_N219A_L307W Swiss Model
2205	Orangutan_ L307W Swiss Model

Exhibit No.	Description
2206	Orangutan_ L307T Swiss Model
2207	Orangutan_ L307S Swiss Model
2208	Chimpanzee_L307W Swiss Model
2209	Chimpanzee_L307T Swiss Model
2210	Chimpanzee_L307S Swiss Model
2211	Gibbon_L307W Swiss Model
2212	Gibbon_L307T Swiss Model
2213	Gibbon_L307S Swiss Model
2214	Declaration of Zachariah Summers in Support of *Pro Hac Vice* Admission
2215-2399	*Intentionally Left Blank*
2400	Merck & Co., Inc. Form 10-Q, Securities and Exchange Commission, November 5, 2025
2401	E-mail Correspondence between Counsel for Petitioner and Patent Owner, January 6, 2026 (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2402	MERCK_PGR00006 - 30November2023 Merck 031988 Master Agreement - executed 4932-6153-3216 1_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2403	MERCK_PGR00056 - MSA - Term 4 – Dechert LLP_Signed_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2404	MERCK_PGR00467 - Mark Stewart Offer Letter_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)

Exhibit No.	Description
2405	MERCK_PGR00052 - Hecht Engagement Letter (7-19)_Signed (Redacted)_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2406	MERCK_PGR00086 - Park Engagement Letter with signature - sjp (redacted)_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2407	"Executive team," MSD, accessible at http://www.msd.com/company-overview/leadership/executive- team/ (last accessed January 5, 2026)
2408	"Executive team," Merck, accessible at http://www.merck.com/company-overview/leadership/executive-team/ (last accessed January 5, 2026)
2409	"Board of directors," MSD, accessible at http://www.msd.com/company-overview/leadership/board-of-directors/ (last accessed January 5, 2026)
2410	"Board of directors," Merck, accessible at http://www.merck.com/company-overview/leadership/ board-of-directors/ (last accessed January 5, 2026)
2411	"Contact us," MSD, accessible at http://www.msd.com/contact-us/ (last accessed January 5, 2026)
2412	"Contact us," Merck, accessible at http://www.merck.com/contact-us/ (last accessed January 5, 2026)
2413	"Who we are," MSD, accessible at http://www.msd.com/company-overview/ (last accessed January 5, 2026)
2414	Who we are," Merck, accessible at http://www.merck.com/company-overview/ (last accessed January 5, 2026)
2415	Merck & Co., Inc. Form 10-K, Securities and Exchange Commission, February 25, 2025

Exhibit No.	Description
2416	USPTO OED Practitioner Search - Mark J. Stewart, October 30, 2025
2417	Petition for Inter Partes Review, *Merck Sharp & Dohme LLC v. The Johns Hopkins University*, IPR2024-00240 (P.T.A.B.), November 30, 2023
2418	Petition for Inter Partes Review, *Merck Sharp & Dohme LLC v. The Johns Hopkins University*, IPR2024-00622 (P.T.A.B.), March 4, 2024
2419	Petition for Inter Partes Review, *Merck Sharp & Dohme LLC v. The Johns Hopkins University*, IPR2024-00623 (P.T.A.B.), March 4, 2024
2420	Petition for Inter Partes Review, *Merck Sharp & Dohme LLC v. The Johns Hopkins University*, IPR2024-00624 (P.T.A.B.), March 4, 2024
2421	Petition for Inter Partes Review, *Merck Sharp & Dohme LLC v. The Johns Hopkins University*, IPR2024-00625 (P.T.A.B.), March 4, 2024
2422	Petition for Inter Partes Review, *Merck Sharp & Dohme LLC v. The Johns Hopkins University*, IPR2024-00647 (P.T.A.B.), March 13, 2024
2423	Petition for Inter Partes Review, *Merck Sharp & Dohme LLC v. The Johns Hopkins University*, IPR2024-00648 (P.T.A.B.), March 13, 2024
2424	Petition for Inter Partes Review, *Merck Sharp & Dohme LLC v. The Johns Hopkins University*, IPR2024-00649 (P.T.A.B.), March 13, 2024
2425	Petition for Inter Partes Review, *Merck Sharp & Dohme LLC v. The Johns Hopkins University*, IPR2024-00650 (P.T.A.B.), March 13, 2024

Exhibit No.	Description
2426	MERCK_PGR00035 - 20250813 Payment Remittance_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2427	MERCK_PGR00042 - Dechert T360 Halozyme - 202500327_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2428	MERCK_PGR00045 - FW_ Attn_ Accounts Receivable Dept - PAYMENT REMITTANCE DETAIL (Nov 2025)_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2429	MERCK_PGR00049 - Halozyme - 202000447 - Invoices 5_1_2024-12_22_2025_1 of 3_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2430	MERCK_PGR00465 - Mark Stewart Payroll Statement for Dec 12 2025_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2431	MERCK_PGR00001 - Workday - Ginkel Organization Screen Shot (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2432	MERCK_PGR00002 - Workday - Lally Organization Screen Shot (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2433	MERCK_PGR00003 - Workday - Majchrzak Organization Screen Shot (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2434	MERCK_PGR00004 - Workday - Stewart Organization Screen Shot (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2435	MERCK_PGR00005 - Workday - Su Organization Screen Shot (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2436	MERCK_PGR00036 - 20250903 Payment Remittance_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2437	MERCK_PGR00037 - 20251001 Payment Remittance_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)

Exhibit No.	Description
2438	MERCK_PGR00038 - 20251203 Payment Remittance_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2439	MERCK_PGR00040 - 20251215 Payment Remittance_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2440	MERCK_PGR00046 - FW_ Attn_ Accounts Receivable Dept - PAYMENT REMITTANCE DETAIL (Oct 2025)_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2441	MERCK_PGR00047 - FW_ Attn_ Accounts Receivable Dept - PAYMENT REMITTANCE DETAIL (Sept 2025)_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2442	MERCK_PGR00048 - Halozyme - 202000447 - Invoice IN00125072310 Review History (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2443	MERCK_PGR00050 - Halozyme - 202000447 – Invoices 5_1_2024-12_22_2025_2 of 3_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2444	MERCK_PGR00051 - Halozyme - 202000447 - Invoices 5_1_2024-12_22_2025_3 of 3_Redacted (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2445	By-Laws of Merck & Co., Inc., Effective as of November 19, 2024
2446	U.S. Supreme Court Amicus Curiae Brief by the Intellectual Property Owners Association, *Jack Daniel's Properties, Inc. v. VIP Products LLC*, Case No. 22-148
2447	Board of Directors – Intellectual Property Owners Association, accessible at https://ipo.org/index.php/board-of-directors (last accessed February 15, 2026)
2448	ChIPs Speaker Bio Information
2449	LinkedIn Profile Page

Exhibit No.	Description
2450	Form PTO-158, Office of Enrollment and Discipline, United States Patent & Trademark Office
2451	Jennifer Zachary's March 16, 2018 Job Offer Letter
2452	Form 13F Cover Page, Merck & Co., Inc., September 2025
2453	Form 13F Cover Page, Merck Sharp & Dohme LLC, September 2025
2454	Form 10-Q, Merck & Co. Inc., Quarterly Report for Quarter Ended June 30, 2025
2455	*Intentionally Left Blank*
2456	Exhibit 24.1 to Merck & Co. Inc.'s Form 10-K for the Fiscal Year Ended December 31, 2024
2457	Sarbanes-Oxley Act of 2002
2458	Jennifer Zachary Biography, Merck.com
2459	Rules of Professional Conduct of the New Jersey Bar
2460	Jennifer Zachary Biography, MSD.com
2461	USPTO Office of Enrollment and Discipline Practitioner Search for Mark J. Stewart, February 13, 2026
2462	Schedule 13D, Harpoon Therapeutics, Inc., January 17, 2024
2463	Schedule 14A Proxy Statement, Merck & Co., Inc., 2025
2464	Form 13F, Information Required of Institutional Investment Managers Pursuant to Section 13(f) of the Securities Exchange Act of 1934 and Rules Thereunder, accessible at https://www.sec.gov/pdf/form13f.pdf (last accessed February 15, 2026)

Exhibit No.	Description
2465	USPTO Office of Enrollment and Discipline Practitioner Search for "Merck," February 15, 2026
2466	Form 8-K, Merck & Co. Inc., February 3, 2026
2467	Exhibit 99.1 to Form 8-K, Merck & Co. Inc., February 3, 2026
2468	Exhibit 99.2 to Form 8-K, Merck & Co. Inc., February 3, 2026

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX PLLC

/Eldora L. Ellison/

Eldora L. Ellison, Ph.D.
Registration No. 39,967
Lead Attorney for Patent Owner

Date: May 13, 2026

1101 K Street, NW, 10th Floor
Washington, DC 20005
(202) 371-2600

CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e))

I certify that the above-captioned **PATENT OWNER'S UPDATED EXHIBIT LIST** was served in its entirety on May 13, 2026, upon the following parties via electronic mail:

Jeffrey P. Kushan (Lead Counsel)	jkushan@sidley.com
Leif Peterson (Back-up Counsel)	leif.peterson@sidley.com
Sue Wang (Back-up Counsel)	sue.wang@sidley.com
Katherine A. Helm (Back-up Counsel)	khelm@dechert.com
Blaine Hackman (Back-up Counsel)	Blaine.Hackman@dechert.com
Amy Mahan (Back-up Counsel)	amy.mahan@sidley.com
Christine M. Engen (Back-up Counsel)	christine.engen@sidley.com
Amit Bhatla (Back-up Counsel)	abhatla@sidley.com
Brian M. Goldberg (Back-up Counsel)	Brian.Goldberg@dechert.com
Mark Stewart (Back-up Counsel)	mark.stewart@merck.com
	HalozymePGRs@sidley.com
	Merck-Halozyme-Dechert@dechert.com

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX PLLC

/Eldora L. Ellison/

Eldora L. Ellison, Ph.D.
Registration No. 39,967
Lead Attorney for Patent Owner

Date: May 13, 2026

1101 K Street, NW, 10th Floor
Washington, DC 20005
(202) 371-2600