UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Merck Sharp & Dohme LLC,
Petitioner,

v.

Halozyme Inc.,
Patent Owner.

Case No. PGR2025-00004
U.S. Patent No. 12,018,298

PETITIONER'S UPDATED EXHIBIT LIST

No.	Exhibit Description
1001	U.S. Patent No. 12,018,298
1002	File History of U.S. Patent No. 12,018,298
1003	Declaration of Dr. Michael Hecht
1004	Declaration of Dr. Sheldon Park
1005	U.S. Patent No. 7,767,429
1006	Chao et al., "Structure of Human Hyaluronidase-1, a Hyaluronan Hydrolyzing Enzyme Involved in Tumor Growth and Angiogenesis," Biochemistry, 46:6911-6920 (2007)
1007	WO 2010/077297, published 8 July 2010
1008	Stern et al., "The Hyaluronidases: Their Genomics, Structures, and Mechanisms of Action," Chem. Rev. 106:818-839 (2006)
1009	Jedzrejas et al., "Structures of Vertebrate Hyaluronidases and Their Unique Enzymatic Mechanism of Hydrolysis," Proteins: Structure, Function and Bioinformatics, 61:227-238 (2005)
1010	Zhang et al., "Hyaluronidase Activity of Human Hyal1 Requires Active Site Acidic and Tyrosine Residues," J. Biol. Chem., 284(14):9433-9442 (2009)
1011	Arming et al., "In vitro mutagenesis of PH-20 hyaluronidase from human sperm," Eur. J. Biochem., 247:810-814 (1997)
1012	Bordoli et al., "Protein structure homology modeling using SWISS-MODEL workspace," Nature Protocols, 4(1):1-13 (2008)
1013	Frost, "Recombinant human hyaluronidase (rHuPH20): an enabling platform for subcutaneous drug and fluid administration," Expert Opinion on Drug Delivery, 4(4):427-440 (2007)
1014	Brandon & Tooze, "Introduction to Protein Structure," Second Ed., Chapters 1-6, 11-12, 17-18 (1999)
1015	Table Associating Citations from the '298 Patent (EX1001) to Corresponding Citations in the '731 Application (EX1026)
1016	Steipe, "Consensus-Based Engineering of Protein Stability: From Intrabodies to Thermostable Enzymes," Methods in Enzymology, 388:176-186 (2004)

No.	Exhibit Description
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1019	Hardy et al., "Assessment of contraceptive vaccines based on recombinant mouse sperm protein PH20," Reprod., 127:325-334 (2004)
1020	Pomering et al., "Restricted Entry of IgG into Male and Female Rabbit Reproductive Ducts Following Immunization with Recombinant Rabbit PH-20," Am. J. Reprod. Immunol., (3):174-82 (2002)
1021	Baba et al., "Mouse Sperm Lacking Cell Surface Hyaluronidase PH-20 Can Pass through the Layer of Cumulus Cells and Fertilize the Egg," J. Biol. Chem., 277(33):30310-4 (2002)
1022	Primakoff et al., "Reversible Contraceptive Effect of PH-20 Immunization in Male Guinea Pigs," Biol Reprod., 56(5):1142-6 (1997)
1023	Tung et al., "Mechanism of Infertility in Male Guinea Pigs Immunized with Sperm PH-20," Biol. Reprod., 56(5):1133-41 (1997)
1024	Rosengren et al., "Recombinant Human PH20: Baseline Analysis of the Reactive Antibody Prevalence in the General Population Using Healthy Subjects," BioDrugs, 32(1):83-89 (2018)
1025	U.S. Patent No. 9,447,401
1026	U.S. Patent Application No. 13/694,731
1027	2024 Chemistry Nobel Prize Background
1028	[Reserved]
1029	Gmachl et al., "The human sperm protein PH-20 has hyaluronidase activity," FEBS Letters, 3:545-548 (1993)
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1031	Yue et al., "Loss of Protein Structure Stability as a Major Causative Factor in Monogenic Disease," J. Mol. Biol., 353:459-473 (2005)
1032	Wang & Moult, "SNPs, Protein Structure, and Disease," Hum. Mutation, 17:263-270 (2001)
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1039	Alberts, "Molecular Biology of the Cell," Fifth Edition, Chapter 3 (2007).
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1043	Sievers et al., "Fast, Scalable Generation of High-Quality Protein Multiple Sequence Alignments Using Clustal Omega," Molecular Sys. Biology, 7.1 (2011)
1044	Mihel, "PSAIA – Protein Structure and Interaction Analyzer," BMC Structural Biology, 8:21 (2008)
1045	Redline Comparison of the '731 and '298 Specifications

No.	Exhibit Description
1046	Beasley & Hecht, "Protein Design: The Choice of *de Novo* Sequences," J. Biological Chemistry, 272:2031-2034 (1997)
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1051	U.S. Patent Application No. 61/631,313
1052	U.S. Patent Application No. 61/796,208
1053	Hom_pre2011
1054	Hom_pre2011_header
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1059	Leisola & Turunen, "Protein Engineering: Opportunities and Challenges," Appl. Microbiol. Biotechnol. 75:1225-1232 (2007)
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1061	Rosengren et al., "Clinical Immunogenicity of rHuPH20, a Hyaluronidase Enabling Subcutaneous Drug Administration," AAPS J., 17:1144-1156 (2015)
1062-1063	[Reserved]
1064	Collection of BLAST Webpages from the Internet Archive, navigable from:

No.	Exhibit Description
	https://web.archive.org/web/20111022151531/http://www.clustal.org/omega/
1065	Collection of Clustal Omega Webpages from the Internet Archive, navigable from: https://web.archive.org/web/20111022151531/http://www.clustal.org/omega/
1066	Collection of SWISS-MODEL Webpages from the Internet Archive, navigable from: https://web.archive.org/web/20110519141121/http://swissmodel.expasy.org/?pid=smh01&uid=&token=
1067	Collection of PyMol Webpages from the Internet Archive, navigable from: https://web.archive.org/web/20110701072314/http://pymol.org/
1068	Declaration of Jeffrey P. Kushan
1069	Swiss Model Printout of PH20 Model
1070	Swiss Model Printout of PH20 Model with M313K Mutation
1071	Swiss Model Printout of PH20 Model with M313A Mutation
1072	Swiss Model Printout of PH20 Model with M313R Mutation
1073	Swiss Model Printout of PH20 Model with M313Y Mutation
1074	Swiss Model Printout of PH20 Model with M313P Mutation
1075	Swiss Model Printout of PH20 Model with M313L Mutation
1076	Declaration of Leif E. Peterson, II
1077-1112	[Reserved]
1113	Declaration of Sue Wang
1114	Declaration of Brian M. Goldberg
1115	Declaration of Katherine A. Helm
1116-1118	[Reserved]
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1123-1124	[Reserved]
1125 [NEW]	Emails re: AutoDock Vina (Sept. 9, 2025 - Oct. 27, 2025)
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1129 [NEW]	Transcript of the Deposition of Dr. Gary Cherr, Ph.D., November 12, 2025
1130 [NEW]	Melanie Ann Simpson, Ph.D. Deposition Transcript
1131 [NEW]	Gregory Petsko, Ph.D. Deposition Transcript
1132 [NEW]	Transcript of the Deposition of Dr. James Moon, Ph.D., November 18, 2025
1133 [NEW]	Declaration of James Naismith, Ph.D.
1134 [NEW]	Declaration of Dr. Garnett Kelsoe
1135 [NEW]	Dr. Naismith Analysis Spreadsheet
1136 [NEW]	Dobson, "Principles of protein folding, misfolding and aggregation" Semin. Cell. Dev. Biol. 15(1):3-16 (2004)

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1138 [NEW]	Dobson, "Experimental investigation of protein folding and misfolding" Methods 34(1):4-14 (2004)
1139 [NEW]	Chiti & Dobson, "Protein Misfolding, Functional Amyloid, and Human Disease" Annu. Rev. Biochem. 75:333–66 (2006)
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1153 [NEW]	Petsko, "Herding CATS" Sci. Transl. Med. 24;3(97):97 (2011)
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1164	MERCK_PGR00355 - PTAB-PGR2021-00036-1 Merck-Genentech PGR
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1166	MERCK_PGR00462 - RE_ 2_25-cv-03179-ES-JRA_ HALOZYME, INC. v. MERCK SHARP & DOHME CORP.
1167	MERCK_PGR00094 - DNJ-2-25-cv-03179 Stipulation to Substitute Parties
1168	MERCK_PGR00090 - DNJ-2-25-cv-03179 2025-07-14 [019] Corporate Disclosure Statement
1169 [NEW]	Declaration of Jeffrey P. Kushan (Petitioner's Reply)
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1197 [NEW]	Hirsch, C. et al., "The Ubiquitylation Machinery of the Endoplasmic Reticulum," Nature, 458(7237):453-60 (2009)

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1199 [NEW]	Li, M. et al., "Importance of Glycosylation and Disulfide Bonds in Hyaluronidase Activity of Macaque Sperm Surface PH-20," J Androl., 23(2):211-9 (2002)
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1201 [NEW]	Rodriguez, L. et al., "Foot and mouth disease virus vaccines," Vaccine 27:D90-D94 (2009)
1202 [NEW]	Redwood, A. et al., "Viral Vectored Immunocontraception: Screening of Multiple Fertility Antigens using Murine Cytomegalovirus as a Vaccine Vector," Vaccine, 25(4):698-708 (2007)
1203 [NEW]	Russell, M. et al., "Complement-Fixing Properties of Human IgA Antibodies. Alternative Pathway Complement Activation by Plastic-Bound, but not Specific Antigen-Bound, IgA," Scand J Immunol., 30(2):175-83 (1989)
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1205 [NEW]	Goodey, N. et al., "Allosteric Regulation and Catalysis Emerge via a Common Route," Nat Chem Biol. 4(8):474-82 (2008)
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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)
2068	Declaration of Melanie A. Simpson, Ph.D. in Support of Patent Owner's Response
2070	Declaration of Gregory A. Petsko, Ph.D. in Support of Patent Owner's Response

No.	Exhibit Description
2072	Declaration of Gary N. Cherr, Ph.D. in Support of Patent Owner's Response
2074	Declaration of James J. Moon, Ph.D. in Support of Patent Owner's Response
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
2078	Transcript of the Deposition of Dr. Sheldon Park, August 21, 2025
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)
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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

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	responses and mucosal immunity in mice," Annals of Allergy, Asthma, and Immunology, 99:443-452 (November 2007)
2176	Park Analysis Spreadsheet

Dated: January 23, 2026

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I hereby certify that on this 23rd day of January, 2025, I caused to be served a true and correct copy of the foregoing and any accompanying exhibits by e-mail on the following counsel of record for Patent Owner:

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