Paper No. _____
Filed: December 4, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BENSON HILL BIOSYSTEMS, INC.,
Petitioner
v.

THE BROAD INSTITUTE, INC., PRESIDENTS AND FELLOWS OF HARVARD COLLEGE, AND MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Patent Owner

Case PGR2018-00072
Patent No. 9,790,490

PETITIONER'S UPDATED EXHIBIT LIST, SUBMISSION OF NOVEMBER 27, 2018 TRANSCRIPT, AND ERRATA

Further to 37 C.F.R. § 42.63(e), Petitioner hereby submits a current listing of its exhibits to counsel for Patent Owner. Exhibits 1072 (Transcript of Teleconference with the Board, taken November 27, 2018) and 1073 (Errata to Transcript of Teleconference with the Board, taken November 27, 2018) were filed on PTAB E2E and served via email to counsel of record for the Patent Owner.

Filed Exhibits	**Description**
1001	United States Patent No. 9,790,490
1002	Prosecution History of the '490 patent
1003	Declaration of Dr. Chase L. Beisel and accompanying Appendices A-C
1004	Schunder et al., "First indication for a functional CRISPR/Cas system in *Francisella tularensis*," *International Journal of Medical Microbiology*, 303:51-60 (2013)
1005	Zetsche et al., "Cpf1 Is a Single RNA-Guided Endonuclease of a Class 2 CRISPR-Cas System," *Cell*, 163:759-71 (2015)
1006	Zetsche et al., "A Survey of Genome Editing Activity for 16 Cpf1 orthologs," *bioRxiv*, doi: https://doi.org/10.1101/134015 (2017)
1007	Hsu et al., "Development and Applications of CRISPR-Cas9 for Genome Engineering," *Cell*, 157:1262-78 (2014)
1008	Shmakov et al., "Discovery and Functional Characterization of Diverse Class 2 CRISPR-Cas Systems," *Molecular Cell*, 60:385-97 (2015)
1009	Koonin et al., "Diversity, classification and evolution of CRISPR-Cas systems," *Current Opinion in Microbiology*, 37:67-78 (2017)
1010	Karvelis et al., "Rapid characterization of CRISPR-Cas9 protospacer adjacent motif sequence elements," *Genome Biology*, 16:253, 1-13 (2015)
1011	Lowder et al., "Rapid Evolution of Manifold CRISPR Systems for Plant Genome Editing," *Frontiers in Plant Science*, 7(1683):1-12 (2016)

Filed Exhibits	Description
1012	Leenay et al., "Identifying and visualizing functional PAM diversity across CRISPR-Cas systems," *Mol Cell*, 62(1):137-47 (2016)
1013	Makarova & Koonin, "Annotation and Classification of CRISPR-Cas Systems," Chapter 4 in *CRISPR: Methods and Protocols, Methods in Molecular Biology*, 1311:47-75 (2015)
1014	HMM Summary Page: TIGR04330 (http://tigrfams.jcvi.org/cgi-bin/HmmReportPage.cgi?acc=TIGR04330) last visited June 27, 2018
1015	Begemann et al., "Characterization and Validation of a Novel Group of Type V, Class 2 Nucleases for *in vivo* Genome Editing," *bioRxiv*, doi: http://dx.doi.org/10.1101/192799 (2017)
1016	Ran et al., "*In vivo* genome editing using *Staphylococcus aureus* Cas 9," *Nature*, 520(7546):186-91 (2015)
1017	Kleinstiver et al., "Engineered CRISPR-Cas9 nucleases with altered PAM specificities," *Nature*, 523(7561):481-85 (2015)
1018	Gao et al., "Engineered Cpf1 variants with altered PAM specificities increase genome targeting range," *Nature Biotechnology*, 35(8):789-92 (2017)
1019	Stella et al., "Structure of the Cpf1 endonuclease R-loop complex after target DNA cleavage," *Nature*, 546(7659):559-63 (2017)
1020	Hirano et al., "Structure and Engineering of *Francisella novicida* Cas9," *Cell*, 164(5):950-61 (2016)
1021	Fieck et al., "Modifications of the *E. coli* Lac repressor for expression in eukaryotic cells: effects of nuclear signal sequences on protein activity and nuclear accumulation," *Nucleic Acids Research*, 20(7):1785-91 (1992)
1022	United States Patent No. 8,697,359
1023	Chiu et al., "Engineered GFP as a vital reporter in plants," *Current Biology*, 6(3):325-30 (1996)
1024	Mali et al., "RNA-Guided Human Genome Engineering via Cas9," *Science*, 339(6121):823-26 (2013)
1025	Sandy et al., "Mammalian RNAi: a practical guide," *BioTechniques*, 39:215-24 (2005)
1026	United States Patent Application Publication No. 2013/0302401
1027	International Publication No. WO 2014/118272

Filed Exhibits	Description
1028	Nair et al., "Multivalent *N*-Acetylgalactosamine-Conjugated siRNA Localizes in Hepatocytes and Elicits Robust RNAi-Mediated Gene Silencing," *JACS*, 136:16958-63 (2014)
1029	Ludlum et al., "Alkylation of Synthetic Polynucleotides," *Science*, 145(3630):397-99 (1964).
1030	Glen Research, *The Glen Report*, 19(1):1-16 (2007)
1031	El-Andaloussi et al., "Exosome-mediated delivery of siRNA in vitro and in vivo," *Nat Protoc*, 7(12):2112-26 (2012)
1032	Choulika et al., "Transfer of single gene-containing long terminal repeats into the genome of mammalian cells by a retroviral vector carrying the cre gene and the loxP site," *J Virol.*, 70(3):1792-98 (1996)
1033	Bergemann et al., "Excision of specific DNA-sequences from integrated retroviral vectors via site-specific recombination," *Nucleic Acids Research*, 23(21):4451-56 (1995)
1034	Dahlman et al., "*In vivo* endothelial siRNA delivery using polymeric nanoparticles with low molecular weight," *Nat Nanotechnol.*, 9(8):648-55 (2014)
1035	Senís et al., "CRISPR/Cas9-mediated genome engineering: an adeno-associated viral (AAV) vector toolbox," *Biotechnol J.*, 9(11):1402-12 (2014)
1036	Shukla et al., "Precise genome modification in the crop species Zea mays using zinc-finger nucleases," *Nature*, 459(7245):437-41 (2009)
1037	Jinek et al., "A programmable dual-RNA-guided DNA endonuclease in adaptive bacterial immunity," *Science*, 337(6069):816-21 (2012).
1038	Mojica et al., "Biological significance of a family of regularly spaced repeats in the genomes of Archaea, Bacteria and mitochondria," *Mol Microbiol*, 36(1):244-46 (2000)
1039	Ishino et al., "Nucleotide Sequence of the *iap* Gene, Responsible for Alkaline Phosphatase Isozyme Conversion in *Escherichia coli*, and Identification of the Gene Product," *Journal of Bacteriology*, 169(12):5429-33 (1987)
1040	Jansen et al., "Identification of genes that are associated with DNA repeats in prokaryotes," *Molecular Microbiology*, 43(6):1565-75 (2002)

Filed Exhibits	Description
1041	Bolotin et al., "Clustered regularly interspaced short palindrome repeats (CRISPRs) have spacers of extrachromosomal origin," *Microbiology*, 151(Pt 8):2551-61 (2005)
1042	Mojica et al., "Intervening sequences of regularly spaced prokaryotic repeats derive from foreign genetic elements," *J Mol Evol*, 60(2):174-82 (2005)
1043	Pourcel, "CRISPR elements in Yersinia pestis acquire new repeats by preferential uptake of bacteriophage DNA, and provide additional tools for evolutionary studies," *Microbiology*, 151(Pt 3):653-3 (2005)
1044	Barrangou et al., "CRISPR provides acquired resistance against viruses in prokaryotes," *Science*, 315(5819):1709-12 (2007)
1045	Haft et al., "A Guild of 45 CRISPR-Associated (Cas) Protein Families and Multiple CRISPR/Cas Subtypes Exist in Prokaryotic Genomes," *PLOS Computational Biology*, 1(6):474-83 (2005)
1046	Brouns et al., "Small CRISPR RNAs Guide Antiviral Defense in Prokaryotes," *Science*, 321(5891):960-64 (2008)
1047	Garneau et al., "The CRISPR/Cas bacterial immune system cleaves bacteriophage and plasmid DNA," *Nature*, 468(7320):67-71 (2010)
1048	Deveau et al., "Phage Response to CRISPR-Encoded Resistance in *Streptococcus thermophilus*," *Journal of Bacteriology*, 190(4):1390-1400 (2008)
1049	Mojica et al., "Short motif sequences determine the targets of the prokaryotic CRISPR defence system," *Microbiology*, 155(Pt 3):733-40 (2009)
1050	Anders et al., "Structural basis of PAM-dependent target DNA recognition by the Cas9 endonuclease," *Nature*, 215(7219):569-73 (2014)
1051	Nishimasu et al., "Crystal Structure of Cas9 in Complex with Guide RNA and Target RNA," *Cell*, 156(5):935-49 (2014)
1052	Deltcheva et al., "CRISPR RNA maturation by *trans*-encoded small RNA and host factor RNase III," *Nature*, 471(7341):602-07 (2011)
1053	Makarova et al., "Unification of Cas protein families and a simple scenario for the origin and evolution of CRISPR-Cas systems," *Biology Direct*, 6:38, pp. 1-27 (2011)

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