[Billing Code 4140-01-P]

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Government-Owned Inventions; Availability for Licensing

AGENCY: National Institutes of Health, HHS

ACTION: Notice

SUMMARY: The inventions listed below are owned by an agency of the U.S. Government and are available for licensing in the U.S. in accordance with 35 U.S.C. 209 and 37 CFR Part 404 to achieve expeditious commercialization of results of federally-funded research and development. Foreign patent applications are filed on selected inventions to extend market coverage for companies and may also be available for licensing.

FOR FURTHER INFORMATION: Licensing information and copies of the U.S. patent applications listed below may be obtained by writing to the indicated licensing contact at the Office of Technology Transfer, National Institutes of Health, 6011 Executive Boulevard, Suite 325, Rockville, Maryland 20852-3804; telephone: 301-496-7057; fax: 301-402-0220. A signed Confidential Disclosure Agreement will be required to receive copies of the patent applications.

SUPPLEMENTARY INFORMATION: Technology descriptions follow.

AMA1-RON2 Complex-based Vaccine Against Malaria

Description of Technology: This technology relates to a malaria vaccine composed of a protein complex of Apical Membrane Antigen (AMA1) and rhoptry neck protein 2 (RON2) with an adjuvant. AMA1 is a crucial component of the *Plasmodium* invasion machinery and is a leading candidate for antimalarial vaccine development. AMA1-based vaccines have shown ability to block red cell invasion in *in vitro* assays, but protection has so far not translated to *in vivo* human infections. NIAID investigators have demonstrated that interaction between AMA1 and RON2 (or peptide thereof) is essential for malaria parasites to successfully enter human red blood cells (RBCs). Vaccination with un-complexed AMA1 and RON2 did not protect against lethal malaria. However, vaccination with a pre-formed AMA1-RON2 complex, highlighted in this technology, produced antibodies that protected against lethal malaria in an *in vivo* mouse model (*P. yoelli*) and blocked the entry of human malaria parasites into RBCs *in vitro*. Additionally, the inhibitory antibody response induced by the AMA1-RON2 complex was greater than AMA1 alone or when AMA1 and RON2 proteins were administered in a un-complexed form.

Immunization using the AMA1-RON2 complex of this technology represents a candidate for an effective malaria vaccine against multiple *Plasmodium* species.

Potential Commercial Applications: Malaria vaccine.

Competitive Advantages: Lower-cost malarial prevention for developing/developed countries.

Development Stage:

• Early-stage

• In vitro data available

• In vivo data available (animal)

Inventors: Prakash Srinivasan and Louis Miller (NIAID)

Publications:

1. Srinivasan P, et al. Binding of Plasmodium merozoite proteins RON2 and AMA1 triggers commitment to invasion. Proc Natl Acad Sci U S A. 2011 Aug 9;108(32):13275-80. [PMID 21788485]

2. Srinivasan P, et al. Disrupting malaria parasite AMA1-RON2 interaction with a small molecule prevents erythrocyte invasion. Nat Commun. 2013;4:2261. [PMID 23907321]

Intellectual Property: HHS Reference No. E-066-2013/0 - US Provisional Application No. 61/841,479 filed 01 Jul 2013

Licensing Contact: Edward (Tedd) Fenn; 424-297-0336; Tedd.fenn@nih.gov

Collaborative Research Opportunity: The National Institute of Allergy and Infectious Diseases is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate or commercialize MA1-RON2 vaccine by providing well established human adjuvants and clinical trial funding. For collaboration opportunities, please contact Mala Dutta, Ph.D. at 240-627-3684 or mala.dutta@nih.gov.

A Novel Therapeutic Technology for Treating Glioblastoma Multiforme and Other Cancers

Description of Technology: Glioblastoma Multiforme (GBM) is the most common and devastating form of brain cancer. Despite existing conventional therapies, including an initial surgical resection followed by chemotherapy and radiation, GBM is currently incurable with a median survival of approximate 15 months and a two-year survival of 30%.

This invention discloses a novel therapeutic technology to treat GBM by using induced electric fields that are applied to the brain tissue via an array of coils placed over the scalp. The device of the invention consists of a portable current generator with a customized coil array. It has been shown to reduce pain for patients and be easy to use.

Potential Commercial Applications:

• Treatment of patients with Glioblastoma Multiforme (GBM).

• Clinical research device for Glioblastoma Multiforme.

• Possible application to other cancers.

• Research tool to study mechanisms of electric field effects on mitosis and other cell and tissue processes.

• May be useful in improving effectiveness and enhancing delivery of adjuvant therapies.

Competitive Advantages:

• Portable

• Painless

• Easy to operate

• No scalp burns that occur when using current electrodes

Development Stage:

• Early-stage

• Prototype

Inventor: Peter J. Basser (NICHD)

Publications:

1. Silva S, et al. Elucidating the mechanisms and loci of neuronal excitation by transcranial magnetic stimulation using a finite element model of a cortical sulcus. Clin Neurophysiol. 2008 Oct;119(10):2405-13. [PMID 18783986]

2. Salvador R, el al. Determining which mechanisms lead to activation in the motor cortex: a modeling study of transcranial magnetic stimulation using realistic stimulus waveforms and sulcal geometry. Clin Neurophysiol. 2011 Apr;122(4):748-58. [PMID 21035390]

3. Miranda PC, et al. Tissue heterogeneity as a mechanism for localized neural stimulation by applied electric fields. Phys Med Biol. 2007 Sep 21;52(18):5603-17. [PMID 17804884]

4. Miranda PC, et al. The electric field induced in the brain by magnetic stimulation: a 3-D finite-element analysis of the effect of tissue heterogeneity and anisotropy. IEEE Trans Biomed Eng. 2003 Sep;50(9):1074-85. [PMID 12943275]

5. Basser PJ. Focal magnetic stimulation of an axon. IEEE Trans Biomed Eng. 1994 Jun;41(6):601-6. [PMID 7927380]

6. Miranda PC, et al. Modeling the current distribution during transcranial direct current stimulation. Clin Neurophysiol. 2006 Jul;117(7):1623-9. [PMID 16762592]

Intellectual Property: HHS Reference No. E-187-2012/0 - US Patent Application No. 61/954,494 filed 17 March 2014

Licensing Contact: John Stansberry, Ph.D.; 301-435-5236; stansbej@mail.nih.gov

Collaborative Research Opportunity: The *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, Program on Pediatric Imaging and Tissue Sciences, Section on Tissue Biophysics and Biomimetics, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate or commercialize technology that uses a.c. current electrodes to try to kill GBM cells. For collaboration opportunities, please contact Alan Hubbs, Ph.D. at hubbsa@mail.nih.gov.

Broadly Neutralizing Human Anti-HIV Monoclonal Antibody 10E8 and Related Antibodies Capable of Neutralizing Most HIV-1 Strains

Description of Technology: The uses for human anti-HIV monoclonal antibody 10E8 and its variants include passive immunization, therapeutic vaccination, and the development of vaccine immunogens. 10E8 is one of the most potent HIV-neutralizing antibodies isolated and it neutralizes up to 98% of diverse HIV-1 strains. 10E8 is specific to the membrane-proximal external region (MPER) of the HIV envelope protein gp41 and 10E8 is orthogonal to other anti-HIV antibodies. In combination with other antibodies 10E8 may provide an antibody response that neutralizes nearly all strains of HIV-1. Additionally, 10E8 effectively induces antibody-

dependent cellular cytotoxicity (ADCC) indicating its potential use for therapeutic vaccine strategies. Further, 10E8 is a tool for immunogen design and validation of immunogen structure.

NIAID is currently developing certain embodiments of 10E8 for clinical use. Therefore, for some fields of use, NIH will evaluate a license applicant's capabilities and experience in advancing similar technologies through the regulatory process. This technology is not eligible for the NIH's start-up license program.

Potential Commercial Applications:

• Passive protection to prevent HIV infection

• Passive protection to prevent mother-to-infant HIV transmission

• Topical microbicide to prevent HIV infection

• Gene-based vectors for anti-gp41 antibody expression

• Therapeutic for the elimination of HIV infected cells that are actively producing virus

Competitive Advantages:

• One of the most potent Human broadly-neutralizing anti HIV antibodies isolated to date

• Broad reactivity and high affinity to most HIV-1 strains

• Activity is highly complementary to existing broadly neutralizing antibodies, such as CD4 binding site antibodies.

• Not auto-reactive

Development Stage:

• In vitro data available

• In vivo data available (animal)

Inventors: Mark Connors, Jinghe Huang, Leo Laub, John Mascola, Gary Nabel, Peter Kwong, Baoshan Zhang, Rebecca Rudicell, Ivelin Geogiev, Yongping Yang, Jiang Zhu, and Giled Oflek

Publication: Huang J, et al. Broad and potent neutralization of HIV-1 by a gp41-specific human antibody. Nature. 2012 Nov 15;491(7424):406-12. [PMID 23151583]

Intellectual Property: HHS Reference Nos. E-253-2011/0,1,2,3 - Neutralizing gp41 antibodies and their use.

• US Provisional Patent Application Nos. 61/556,660 filed 07 Nov 2011; 61/672,708 filed 17 Jul 2012; and 61/698,480 filed 07 Sep 2012.

• PCT Patent Application No. PCT/US2012/063958 (Publication No. WO/2013/070776) filed 07 Nov 2012; and corresponding applications filed in BR, CN, EP, IN, RU, US, and ZA.

Licensing Contact: Cristina Thalhammer-Reyero, PhD, MBA; +1 301-435-4507; thalhamc@mail.nih.gov

Collaborative Research Opportunity: The National Institute of Allergy and Infectious Diseases is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate or commercialize 10E8-related vaccines or immunotherapies. For collaboration opportunities, please contact Bill Ronnenberg at +1 240-627-3726 or wronnenberg@niaid.nih.gov.

Dated: June 18, 2014.

Richard U. Rodriguez, M.B.A.
Director
Division of Technology Development and Transfer
Office of Technology Transfer
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