FCR 17

Office of the President
June 24, 2016

Members, Board of Trustees:

PATENT ASSIGNMENT REPORT

Recommendation: that the Board of Trustees accept the patent assignment report for the period January 1, 2016 – March 31, 2016.

Background: At its March 1997 meeting, the Board of Trustees authorized the University of Kentucky Research Foundation to conduct all future copyright and patent filings and prosecutions. Quarterly reports on patent and copyright applications are to be submitted to the Finance Committee of the Board.

Action taken: ☑ Approved ☐ Disapproved ☐ Other ─────────────

Patents

The following assignment on behalf of the Board of Trustees of the University of Kentucky Research Foundation has been executed:

1. **PCT Patent Application Serial Number: PCT/US16/13702**
   Filed: January 15, 2016
   Title: Lipid Bilayer-Integrated SPP1 Connector Protein Nanopore and SPP1 Connector Protein Variants for Use as a Lipid Bilayer-Integrated Nanopore.
   Inventors: Peixuan Guo, Shaoying Wang (Pharmaceutical Sciences)
   Technical Description: This invention relates to an engineered SPP1 viral DNA-packaging motor connector protein that can be incorporated into a lipid membrane to form an electroconductive aperture.
   Summary: Genomic applications (such as DNA sequencing), disease diagnosis and environmental monitoring require methods to detect and identify molecules at extremely low levels. Stochastic sensing is a method to detect a wide variety of analytes at the level of individual molecules. Detection is accomplished by observing the modulation of the current that flows through transmembrane channel that has been engineered to bind an analyte of interest. This invention discloses multiple embodiments of a conductive channel-containing polypeptide comprised of (a) a membrane layer, such as a lipid bilayer and (b) a SSP1 (secreted phosphoprotein 1) connector polypeptide that is incorporated into the membrane to form an aperture through which conductance can occur when an electric potential is applied across the membrane. The invention also discloses a method of sensing a molecule—a polypeptide or a nucleic acid molecule, depending on the SSP1 connector polypeptide variant—using the conductive channel-containing membrane. The invention further discloses a method of DNA sequencing using the conductive membrane.

2. **U.S. Patent Application Serial Number: 15/002,310**
   Filed: January 20, 2016
   Title: Methods for Diagnosing and Treating Alzheimer's Disease (AD) Using the Molecules that Stabilize Intracellular Calcium (Ca2+) Release
   Inventors: Philip Landfield, John Gant, Eric Blalock, Kuey-Chu Chen, Oliver Thibault and Nada Porter (Pharmacology & Nutritional Sciences)
   Technical Description: This invention relates to treatment of various forms of age-related cognitive decline in humans, including Alzheimer's Disease.
   Summary: This invention relates to a method of treating Alzheimer's Disease (AD), early-stage AD, elevated risk of AD, mild cognitive impairment (MCI) or other forms of age-related cognitive decline by administering a molecule that promotes calcium-release stabilization in ryanodine receptors (RyRs) and/or inosital triphosphate receptors (InsP3Rs) in brain cells. Various embodiments of such molecule are disclosed. Diagnostic methods using calcium-release stabilizing immunophilins, junctophilins or calmidulin are also disclosed. The invention also discloses methods of diagnosing individuals who are at risk of developing AD by detecting the level of one or more calcium-release stabilizing immunophilin, junctophilin and/or calmodulin genes in a patient's blood sample.

3. **PCT Patent Application Serial Number: PCT/US16/19852**
   Filed: February 26, 2016
   Title: Compositions and Methods for Treating Retinal Degradation
   Inventors: Jayakrishna Ambati, Benjamin Fowler, Kameshwari Ambati (Ophthalmology and Visual Science)
   Technical Description: Age-related macular degeneration is a leading cause of blindness worldwide, and this invention addresses the need for compositions and methods for treating retinal degradation and retinal degeneration.
   Summary: This invention relates to compounds, compositions and methods useful for treating retinal damage and/or retinal degradation/retinal degeneration, for inhibiting inflammasome activation by Alu RNA associated with a cell, for reducing ATP-induced permeability of a cell, for reducing an amount of mitochondrial reactive oxygen species in a cell, and for reducing an amount of mitochondrial reactive oxygen species in a cell. The invention relates to compounds and compositions comprising a nucleoside and/or nucleoside transcriptase inhibitor (NRTI).

4. **U.S. Patent Application Serial Number: 15/078,403**
   Filed: March 23, 2016
   Title: Noncontact Three-Dimensional Diffuse Optical Imaging of Deep Tissue Blood Flow Distribution
   Inventors: Guoqiang Yu, Yu Lin, Chong Huang (Center for Biomedical Engineering)
   Technical Description: This invention relates to 3-D reflectance imaging of deep tissue to better assess any potential tissue injury therein.
   Summary: The invention provides systems and methods for 3-D reflectance imaging of blood flow distribution in deep tissue. The systems offer an approach that avoids contact with the subject being imaged, thereby offering systems that allow for imaging of sensitive, supple or diseased tissue. The imaging can be achieved of depths of 1.5 cm or less. The systems and methods provide for projecting and focusing an imaging probe onto a tissue surface of a subject. The imaging probe may comprise source fibers connected to long-coherence lasers that emit near-infrared (NIR) light. The systems and methods further comprise a detector array also projected on the tissue. The imaging probe may then apply beams of NIR light through a set of optical lenses to the tissue and the detector array to detect the diffused NIR light from the tissue through a second set of optical lenses. An image may then be constructed based on measured diffused NIR light transporting from the source fibers through the tissue to the detector array. The invention also provides, in part, for computing systems to construct a 3-D flow image from the collected data and for creating a 3-D solid model of the tissue being imaged.

<div align="center">

Patent Activities
Fiscal year to date as of March 31, 2016

</div>

Number of Patent Applications	9
Number of Patents Issued	24
Patent Gross Revenue	$ 6,485,819.32