**[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.

**Boron Amino Acid Mimetics for PET Imaging of Cancer**

**Description of Technology:** Available for licensing and commercial development as imaging agents for positron emission tomography of cancer are boramino acid compounds. The inventors showed that mimetics created by substituting the carboxylate group (-$COO^-$) of an amino acid with trifluoroborate (-$BF_3^-$) are metabolically stable and allow for the use of fluorene-18 ($^{18}F$) as the radiolabel. Using boroamino acid for $^{18}F$-labeling allows for integrating the $^{18}F$ radiolabel into the core molecular backbone rather than the side-chains thus increasing the agent's target specificity. There is a direct relationship between amino acid uptake and cancer cell replication, where the uptake is extensively upregulated in most cancer cells. This uptake increases as cancer progresses, leading to greater uptake in high-grade tumors and metastases. Amino acids act as signaling molecules for proliferation and may also reprogram metabolic networks in the buildup of biomass. This invention provides for an unmet need for traceable amino acid mimics, including those based on naturally-occurring amino acids, which may be non-invasively detected by imaging technology, including for clinical diagnosis and anti-cancer drug evaluation.

**Potential Commercial Applications:**

• Cancer imaging

• Anti-cancer drug development

**Competitive Advantages:**

• Fluorene-18 labeling

• Metabolic stability

**Development Stage:**

• Early-stage

• In vitro data available

• In vivo data available (animal)

**Inventors:** Xiaoyuan Chen and Zhibo Liu (NIBIB)

**Publications:**

1. Liu Z, et al. Preclinical evaluation of a high-affinity 18F-trifluoroborate octreotate derivative for somatostatin receptor imaging. J Nucl Med. 2014 Sep;55(9):1499-505. [PMID 24970911]

2. Liu Z, et al. (18)F-trifluoroborate derivatives of [des-arg(10)]kallidin for imaging bradykinin b1 receptor expression with positron emission tomography. Mol Pharm. 2015 Mar 2;12(3):974-82. [PMID 25629412]

**Intellectual Property:** HHS Reference No. E-135-2015/0 - US Provisional Patent Application 62/155,085 filed April 30, 2015

**Licensing Contact:** Michael Shmilovich, Esq., CLP; 301-435-5019 or 301-402-5579; shmilovm@mail.nih.gov

**Collaborative Research Opportunity:** The National Institute of Biomedical Imaging and Bioengineering is seeking statements of capability or interest from parties

interested in collaborative research to further develop, evaluate or commercialize Boramino Acid Mimetics for Use in Cancer Imaging. For collaboration opportunities, please contact Cecilia Pazman at pazmance@nih.gov.

**Resolution Enhancement for Light Sheet Microscopy Systems**

**Description of Technology:** The invention pertains to a technique for enhancing the resolution of images in light sheet microscopy by adding additional enhanced depth-of-focus optical arrangements and high numerical aperture objective lenses. The technique employs an arrangement of three objective lenses and a processor for combining captured images. The image composition utilizes the greater resolving power of the third high numerical aperture objective lens by imaging the light sheet and enhanced depth-of-focus arrangement resulting in improved overall resolution of the light sheet system. The depth of field arrangement could be a simple oscillation of the third objective, a "layer cake," or cubic phase mask component. Any loss in lateral resolution that results from the depth of field arrangement may be compensated for by deconvolution. In some embodiments, other optics, such as an axicon or annular aperture, can provide extended depth of field.

**Potential Commercial Applications:**

- High speed imaging
- Fast single cell and cellular dynamics imaging
- Superresolution and single molecule imaging
- 3D single particle tracking
- 3D superresolution imaging in thick samples

**Competitive Advantages:** Resolution enhancement in light microscopy

**Development Stage:** In vitro data available

**Inventors:** Hari Shroff (NIBIB), Yicong Wu (NIBIB), Sara Abrahamsson

**Intellectual Property:** HHS Reference No. E-232-2014/0 - US Application No. 62/054,484 filed September 24, 2014

**Related Technology:** HHS Reference No. E-078-2011/0

**Licensing Contact:** Michael Shmilovich, Esq., CLP; 301-435-5019 or 301-402-5579; shmilovm@mail.nih.gov

**Collaborative Research Opportunity:** The National Institute of Biomedical Imaging and Bioengineering is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate or commercialize Resolution Enhancement Technique for Light Sheet Microscopy Systems. For collaboration opportunities, please contact Cecilia Pazman at 301-594-4273 or pazmance@nhlbi.nih.gov.

**Device for Selective Partitioning of Frozen Cellular Products**

**Description of Technology:** Cryopreservation using liquid nitrogen frozen polyvinyl bags allows for storing cellular materials for extended periods while maintaining their activity and viability. Such bags are commonly used in the clinic to store blood products including blood cells, plasma, hematopoietic stem cells, umbilical cord blood for future uses including transplantation. These materials, typically obtained in limited quantities, may be of great therapeutic value, as is the case of stem cells or cord blood derived cells which can be used to potentially treat a number of diseases. Currently,

even if only a small portion of the cryopreserved sample is needed the whole bag must be thawed, wasting much of the sample or rendering the remaining sample susceptible to contamination since it cannot be effectively refrozen or sterilized. The present device meets an unmet need for retrieving a portion of a frozen sample stored in polyvinyl cryopreserved bags, resealing the remainder of the sample and preserving the cryopreserved state and integrity of the rest of the cellular product without compromising viability and sterility.

**Potential Commercial Applications:**

- Cryopreservation
- Cellular Products
- Hematopoietic stem cells
- Umbilical cord blood
- iPSCs
- Transplantation
- Chronic spinal cord injury
- Neurological disorders
- Cancer immunotherapy
- Cell banking
- Cell replacement therapy

**Competitive Advantages:**

- Partitioning cryopreserved cell products
- Maintenance of sterility of partitioned product
- Maintenance of viability of partitioned product

• Resealing of cryopreservation bag

• Multiple use of patient derived cellular products

**Development Stage:** Prototype

**Inventors:** Richard Childs, Sumithira Vasu, Herb Cullis, PJ Broussard, Kevin Clark, Eric Harting (all rights assigned to the US Government)

**Intellectual Property:** HHS Reference No. E-173-2009/0 -

• US Provisional App. 61/175,131

• Int'l App. PCT/US2010/033575

• Canadian App. 2,760,363

• EP App. 10719496.1

• IL App. 216085

• US Patent 8,790,597

• US Patent App. 14/305,578

**Licensing Contact:** Michael Shmilovich, Esq., CLP; 301-435-5019 or 301-402-5579; shmilovm@mail.nih.gov

**Collaborative Research Opportunity:** The National Heart, Lung, and Blood Institute is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize Device for Partitioning Cryopreserved Cellular Products. For collaboration opportunities, please contact Cecilia Pazman, Ph.D. at 301-594-4273 or pazmance@nhlbi.nih.gov.

Dated: June 4, 2015.

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Richard U. Rodriguez,

Acting Director, Office of Technology Transfer
National Institutes of Health
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