

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Government-Owned Inventions; Availability for Licensing

AGENCY: National Institutes of Health, Public Health Service, 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. 207 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.

ADDRESSES: 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.

Pyruvate Kinase M2 Activators for the Treatment of Cancer

Description of Invention: NIH investigators have discovered a series of small compounds with the potential to treat a variety of cancers as well as hemolytic anemia. Contrary to most cancer medications, these molecules can be non-toxic to normal cells because they target a protein specific to the metabolic pathways in tumors, thus representing a significant clinical advantage over less-specific chemotherapeutics.

The invention described here is a series of small molecules that activate pyruvate kinase (PK) isoform M2. PK-M2 is a critical metabolic enzyme that is affected in all forms of cancer. Inactivation of PK-M2 leads to a buildup of metabolic intermediates inside the cell. Tumor cells require a buildup of metabolic intermediates in order to undergo rapid cell growth and proliferation. Hence, activation of PK-M2 in tumor cells may prevent the buildup of metabolic intermediates and thereby stall tumor cell proliferation or destroy the tumor cells. Further, while in normal post-embryonic cells only PK isoforms R, L, or M1 are active, in all tumors only PK-M2 is active. So, PK-

M2 activation would affect only tumor cells, and small-molecule PK-M2 activators may not be toxic to healthy cells.

This invention discloses the use of two new small molecule pharmacophores that can activate PKM2 through the allosteric site: 3-oxo-3,4-dihydro-2H-benzo [b] [1,4] oxazine-7-sulfonamides, and 2-oxo-1,2,3,4-tetrahydroquinoline-6-sulfonamides.

Applications:

- Therapeutic developments for various cancers.
- Diagnostic assays for various cancers.
- Regulation of embryonic stem cell proliferation.

Advantages:

- Small molecule (series of analogs can be derived in search of improved performance).
- Target a select group of cells (Cancerous cells).

Development Status:

- Pre-clinical; no animal data.
- In vitro data available.

Market:

- Cancer-diagnostics.
- Cancer-therapeutics.
- Research tool-proliferation of embryonic stem cells and/or cancer cells.

Inventors: Matthew Boxer (NHGRI-NCGC); Min Shen (NHGRI-NCGC); Doug Auld (NHGRI-NCGC); Craig Thomas (NHGRI-NCGC).

Publications:

1. Jiang JK *et al.* (2010) *Bioorg Med Chem Lett* 20:3387-93 [PubMed: 20451379].
2. Boxer MB *et al.* (2010) *J Med Chem.* 53:1048-55 [PubMed: 20017496].

Patent Status: U.S. Provisional Application No. 61/329,158 filed 29 April 2010 (HHS Reference No. E-120-2010/0-US-01).

Licensing Status: Available for licensing.

Licensing Contact: Steven H. Standley, PhD; 301-435-4074; sstand@mail.nih.gov.

Collaborative Research Opportunity: The NIH Chemical Genomics Center (NCGC), National Human Genome Research Institute, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize these pyruvate kinase M2 activators. Please contact Dr. Matthew Boxer at boxerm@mail.nih.gov for more information.

Nitisinone for Treatment of Oculocutaneous/Ocular Albinism and for Increasing Pigmentation

Description of Invention: Albinism (also called achromia, achromasia, or

achromatosis) is a congenital disorder characterized by the complete or partial absence of pigment in the skin, hair and eyes due to absence or defect in any one of a number of proteins involved in the production of melanin. Certain forms of albinism are known to be due to mutations in tyrosine metabolism. In oculocutaneous albinism (OCA), pigment is lacking in the eyes, skin and hair. In ocular albinism, only the eyes lack pigment. Patients with albinism experience varying degrees of vision loss associated with foveal hypoplasia, nystagmus, photophobia and/or glare sensitivity, refractive errors, and abnormal decussation of ganglion cell axons at the optic chiasm. Current treatment options for vision problems caused by albinism are limited to correction of refractive errors and amblyopia, low vision aids, and (in some cases) extraocular muscle surgery.

Nitisinone (NTBC) is an FDA-approved drug used in the treatment of tyrosinemia, type 1. The drug blocks the normal degradation pathway of tyrosine thus allowing greater circulating plasma levels of tyrosine. NIH investigators have identified that administration of NTBC to subjects (e.g., mice or humans) with certain forms of albinism, can result in increased circulating tyrosine levels, an increase in tyrosinase activity, and, subsequently, increased pigmentation.

This technology provides methods for increasing tyrosine plasma concentrations in patients suffering from oculocutaneous albinism or ocular albinism by administering a pharmaceutically acceptable composition of NTBC. Specifically, this technology can be useful in treating patients with type OCA1a albinism, who possess no measurable tyrosinase activity, or type OCA1b albinism, who exhibit greatly diminished tyrosinase activity.

Applications for this technology include treatment of impaired vision in patients suffering from oculocutaneous albinism, or ocular albinism, and as a treatment for increasing pigmentation in the eyes, hair and/or skin of patients.

Inventors: Brian P. Brooks (NEI), David R. Adams (NHGRI), William A. Gahl (NHGRI).

Patent Status: U.S. Provisional Application No. 61/308,771 filed 26 Feb 2010 (HHS Reference No. E-113-2010/0-US-01).

Licensing Status: Available for licensing.

Licensing Contact: Suryanarayana (Sury) Vepa, PhD, J.D.; 301-435-5020; vepas@mail.nih.gov.

Collaborative Research Opportunity: The National Eye Institute, Ophthalmic

Genetics and Visual Function Branch, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize the use of nitisinone (NTBC) for oculocutaneous albinism or as a treatment for increasing pigmentation in the eyes, hair and/or skin of patients. Please contact Alan Hubbs, PhD at 301-594-4263 or hubbsa@mail.nih.gov for more information.

Modulators of Survival Motor Neuron Production

Description of Invention: This technology discloses compounds that modulate the amount of Survival Motor Neuron protein (SMN). Low levels of SMN protein are associated with Spinal Muscular Atrophy (SMA), which constitutes a group of inherited diseases that cause progressive muscle degeneration leading to death. Consequently, therapeutic inventions have focused on increasing SMN protein levels. This invention discloses novel arylthiazolyl piperidines which are shown to be modulators of SMN production. This invention also discloses methods of treating SMA by administering SMN protein modulators.

Applications: Therapeutic developments for Spinal Muscular Atrophy.

Advantages: Small molecule (series of analogs can be derived in search of improved performance).

Development Status:

- Pre-clinical; no animal data.
- In vitro data available.

Market: Muscular dystrophy.

Inventors: Juan Jose Marugan (NHGRI-NCGC); Wei Zheng (NHGRI-NCGC); Noel Southall (NHGRI-NCGC); Jingbo Xiao (NHGRI-NCGC); Steve Titus (NHGRI-NCGC); Elliot Androphy (University of Massachusetts Medical School); Jonathan Cherry (University of Massachusetts Medical School).

Patent Status: U.S. Provisional Application No. 61/323,963 filed 14 April 2010 (HHS Reference No. E-109-2010/0-US-01).

Licensing Status: Available for licensing.

Licensing Contact: Steven H. Standley, PhD; 301-435-4074; sstand@mail.nih.gov.

Collaborative Research Opportunity: The NIH Chemical Genomics Center (NCGC), National Human Genome Research Institute, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize these SMN modulator compounds. Please contact Dr. Juan

Marugan at maruganj@mail.nih.gov for more information.

Use of Sterculic Acid To Treat Choroidal Neovascularization

Description of Invention: Sterculic acid is a naturally occurring cyclopropene acid present in kapok seed oil, cottonseed oil, and in the seeds of the *Sterculia foetida* tree. Sterculic acid has been reported to be a non-specific inhibitor of stearoyl-Co desaturase (SCD), which has been implicated in several disease states, including cardiovascular disease, obesity, non-insulin-dependent diabetes mellitus, skin disease, hypertension, neurological diseases, immune disorders and cancer (Ntambi JM, *J. Lipid Res.*, 1999, 40(9):1549-1558). NIH investigators have recently discovered that sterculic acid inhibits the neovascularization of the chick chorioallantoic membrane demonstrating that this compound exhibits a potent anti-angiogenic activity. Further, the NIH investigators have shown that sterculic acid inhibits the formation of choroidal neovascularization in the retina of laser treated rats. These results suggest that sterculic acid possesses anti-angiogenic effect likely through regulating genes involved in the angiogenic process.

The present invention is directed to methods of using sterculic acid for the treatment of inflammation, in particular, 7-ketocholesterol mediated inflammation, 7-ketocholesterol cytotoxicity, or unregulated angiogenesis. Diseases mediated by 7-ketocholesterol-induced inflammation and 7-ketocholesterol cytotoxicity include atherosclerosis age-related macular degeneration, and Alzheimer's disease. Diseases mediated by unregulated angiogenesis include certain cancers and age-related macular degeneration. Also disclosed are methods of treating atherosclerosis or Alzheimer's disease using sterculic acid.

Applications: Therapeutics for inflammation, in particular, atherosclerosis, age-related macular degeneration, and Alzheimer's disease

Development Status: Early stage in vitro and animal model data.

Inventors: Ignacio R. Rodriguez *et al.* (NEI).

Patent Status: U.S. Provisional Application No. 61/358,485 filed 25 Jun 2010 (HHS Reference No. E-092-2010/0-US-01).

Licensing Status: Available for licensing.

Licensing Contact: Suryanarayana Vepa, PhD, J.D.; 301-435-5020; vepas@mail.nih.gov.

Collaborative Research Opportunity: The National Eye Institute (NEI), Laboratory of Retinal Cell and Molecular Biology, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize sterculic acid, and its derivatives for the treatment of diseases related to angiogenesis or mediated by 7-ketocholesterol-induced inflammation. Please contact David L. Whitmer, Technology Development Coordinator, NEI, at 301-496-4876 or whitmerd@mail.nih.gov for more information.

Dated: December 8, 2010.

Richard U. Rodriguez,

Director, Division of Technology Development and Transfer, Office of Technology Transfer, National Institutes of Health.

[FR Doc. 2010-31320 Filed 12-13-10; 8:45 am]

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Software System for Quantitative Assessment of Vasculature in Three Dimensional Images

Description of Invention:

This invention offered for licensing and further development is a software system that provides the capability of