

Please contact Dr. W. Figg at 301-402-3623 for more information.

Anti-Notch-1 Monoclonal Antibodies for Inducing Cellular Differentiation and Apoptosis

Description of Technology: As cancer cells progress towards more aggressive forms, they often become highly resistant to drug or radiation-induced apoptosis, generally through the loss of function p53, a gene which can trigger apoptosis in response to DNA damage. Thus, novel strategies to induce apoptosis in tumor cells, especially p53-deficient cells, is an attractive and an active area of research.

Using a model constituted by a p53-deficient mouse leukemia cell line, PHS scientists found that: (1) Antisense synthetic DNA oligonucleotides and stable incorporation of an antisense gene (a model for gene therapy) targeting notch-1, when given together with a differentiation-inducing antitumor drug, cause the cells to respond by massive apoptosis rather than differentiation; (2) stable incorporation of an antisense notch-1 gene increases apoptosis in these cells even in the absence of any antitumor drugs. This suggests that antisense Notch-1 treatment, by antisense oligonucleotides or by gene therapy, may be used alone or together with anti-cancer drugs to cause apoptosis in tumor cells.

This invention provides compositions, pharmaceutical compositions, and methods for stimulating/increasing cell differentiation, and is particularly related to the treatment of tumors which have increased Notch-1 expression. A polyclonal and/or monoclonal antibody generated against human Notch-1 Epidermal Growth Factor ("EGF") that recognizes an extracellular epitope of Notch-1 and that stimulates target cell differentiation in the presence of a differentiation inducing agent is disclosed as is the hybridoma which produces these antibodies.

Inventors: Lucio L Miele and Chana Y. Fuchs (FDA).

Patent Status: PCT Application No. PCT/US99/23162 filed 01 Oct 1999, which published as WO 00/20576 on 13 Apr 2000 (HHS Reference No. E-176-1998/1-PCT-01); U.S. Patent Application No. 11/069,208 filed 28 Feb 2005, claiming priority to 02 Oct 1998 (HHS Reference No. E-176-1998/1-US-08).

Licensing Contact: David A. Lambertson, PhD.; 301-435-4632; lambertsond@od.nih.gov.

Novel Bis-Acridones as Anti-Tumor Agents: Potential for Treating Drug Resistant Tumors

Description of Technology: Cancer is the second leading cause of death in United States and it is estimated that there will be approximately 600,000 deaths caused by cancer in 2006. Current chemotherapies are mostly based on the use of small molecules. A major drawback of these existing chemotherapies is the acquired or inherent resistance of certain tumors against these drugs. Treating resistant tumors has been a major challenge in the successful management of cancer, necessitating the development of new therapies to treat resistant tumors and thus expanding the life expectancy of cancer patients.

The present invention discloses novel derivatives of Bis-acridones and related molecules and their pharmaceutically acceptable salts and their use as anti-tumor agents. Some of the derivatives have high anti-tumor activity both *in vitro* and *in vivo*. In addition to its anti-tumor activity these above mentioned compounds have been shown to be potent irreversible inhibitors of P-glycoprotein, a member of the ABC transporter protein family that has a major role in conferring multi-drug resistance. Therefore, these compounds have the potential of being used in combination with traditional chemotherapy to treat drug resistant tumors. In addition, to its anti-neoplastic property some of the derivatives of this family of compounds have been shown to have anti-HIV property.

Inventors: Christopher J. Michejda *et al.* (NCI).

Publications:

WM Cholody *et al.*, "Bisimidazoacridones and related compounds: New antineoplastic agents with high selectivity against colon tumors," *J Med Chem.* 1995 Aug 4; 38 (16): 3043-52.

JA Turpin *et al.*, "Inhibition of acute-, latent-, and chronic-phase human immunodeficiency virus type 1 (HIV-1) replication by a bistriazoloacridone analog that selectively inhibits HIV-1 transcription," *Antimicrob Agents Chemother.* 1998 Mar; 42 (3):487-94.

Patent Status: U.S. Patent No. 5,508,289 issued 16 Apr 1996 (HHS Reference No. E-106-1994/0-US-01); European Patent No. 0750612 issued.

Licensing Status: Available for non-exclusive or exclusive licensing.

Licensing Contact: Michelle A. Booden, PhD.; 301-451-7337; boodenm@mail.nih.gov.

Collaborative Research Opportunity: The National Cancer Institute, Center for Cancer Research is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize certain derivatives of Bis-acridones and related molecules as well as their pharmaceutically acceptable salts as anti-tumor agents. Please contact Kathy Higinbotham at 301-846-5465 or higinbok@mail.nih.gov for more information.

Dated: May 19, 2006.

David R. Sadowski,

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

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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.

Antibodies That Specifically Recognize S100A15, a Protein Involved in Epidermal Differentiation and Inflammation

Description of Technology: This technology describes rabbit polyclonal antibodies that recognize the human and mouse S100A15 proteins. S100A15 is involved in epidermal differentiation

and inflammation, and is dysregulated in skin tumors and inflammatory psoriasis.

Applications: Diagnostic tool for evaluation of agents that alter skin pathology; research tool to probe the role of S100A15 during epidermal maturation, skin carcinogenesis, and inflammation; diagnostic tool for the clinical evaluation of skin tumors and inflammatory diseases such as psoriasis.

Development Status: Early stage.

Inventors: Ronald Wolf, Stuart H. Yuspa, Paul Goldsmith, and Christopher J. Voscopoulos (NCI).

Publication: R. Wolf *et al.*, "The mouse S100A15 ortholog parallels genomic organization, structure, gene expression, and protein-processing pattern of the human S100A7/A15 subfamily during epidermal maturation," *J Invest Dermatol* advance online publication 09 March 2006, doi: 10.1038/sj.jid.5700210.

Patent Status: HHS Reference No. E-145-2006/0—Research Tool.

Licensing Status: Available for non-exclusive licensing under a Biological Materials License.

Licensing Contact: Marlene K. Astor, JD, MS, MIP; 301/435-4426; ms482m@nih.gov.

Potent Pharmacophoric Delta- and Mu-Opioid Receptor Antagonists and Conversion of Endomorphin Mu-Opioid Agonists to Antagonists

Description of Technology: The inhibition (antagonism) of mu-opioid receptors is a critical human health topic, since this receptor is the key element in the neural reward pathway in the central nervous system responsible for craving and addiction to food, alcohol or various drugs, such as morphine and its derivatives. Furthermore, antagonists to these receptors are absent in nature. This invention provides compositions for new modified opioid antagonists.

For example, a series of dimeric *N,N*-dimethyl-Dmt-Tic (2',6'-dimethyl-L-tyrosyl-1,2,3,4-tetrahydroisoquinoline-3-carboxylic acid) analogues were covalently linked tail-to-tail through diaminoalkane, and symmetric or asymmetric 3,6-diaminoalkyl-2(1*H*)-pyrazinone moieties. The latter compounds exhibit dual antagonism toward delta- and mu-opioid receptors providing a means to simultaneously regulate two independent opioid receptors to combat addiction, tolerance, and alcohol dependency. Dmt is the essential pluripotent amino acid residue that regulates binding to all opioid receptor molecules, which are classified into delta, mu, and kappa subtypes depending on the type of

interacting opioid. Compounds from another class of mu-opioid antagonists were also prepared, including [N-allyl-Dmt1]endomorphin-1 (N-allyl-Dmt-Pro-Trp-Phe-NH₂) and [N-allyl-Dmt1]endomorphin-2 (N-allyl-Dmt-Pro-Phe-Phe-NH₂).

The former set of dimeric compounds readily pass through the epithelial barriers in the gut and brain when injected systemically or taken orally. Additionally, these bivalent ligands would be attractive in drug design due to their stability to proteolytic degradation. That they are also slightly more hydrophobic may increase potency by their ability to transit membranes.

Application: Potential opiate, food and alcohol addiction therapeutics.

Development Status: Early stage.

Inventors: Lawrence H. Lazarus (NIEHS) *et al.*

Publications:

T Li *et al.*, "Potent Dmt-Tic pharmacophoric delta- and mu-opioid receptor antagonists," (2005) *J Med Chem*. 48:8035-44.

T Li *et al.*, "New series of potent delta-opioid antagonists containing the H-Dmt-Tic-NH-hexyl-NH-R motif," (2005) *Bioorg Med Chem Lett*. 15:5517-20.

Patent Status: U.S. Provisional Application No. 60/714,071 filed 04 Feb 2005 (HHS Reference No. E-305-2005/0-US-01).

Licensing Status: This technology is available for exclusive, co-exclusive, or nonexclusive licensing.

Licensing Contact: Marlene K. Astor, JD, MS, MIP; 301/435-4426; ms482m@nih.gov.

Collaborative Research Opportunity: The National Institute of Environmental Health Sciences, Laboratory of Pharmacology and Chemistry, Medicinal Chemistry Group, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology. Please contact John S. Penta, PhD, at 919-541-3696 or penta@niehs.nih.gov for more information.

Novel Glycated Peptides and Proteins as Biomarkers for Diabetes Control

Description of Technology: A primary goal of diabetes therapy is to improve control of blood glucose levels (known as glycemic control) in patients. Prospective studies of both Type 1 and Type 2 diabetes indicate that careful glycemic control significantly reduces the risk of microvascular, neurological, and cardiovascular complications of diabetes.

The current method to monitor glycemic control is by measurement of the relative concentration of glycated red-cell hemoglobin (HbA1C). However, levels of HbA1C, an intracellular protein, reflect glycemic control over a timeframe of several months. They are also susceptible to a variety of perturbing factors such as hematologic disorders, kidney disease, aspirin or penicillin use, or alcohol intake.

This technology describes a family of novel glycated peptide and protein biomarkers for glycemic control, as well as a method to monitor glycemic control in diabetic patients. In contrast to HbA1C, which is an intracellular protein, the glycated proteins described in this invention are found in blood plasma, and might reflect changes in glycemic control more rapidly, and with more sensitivity. A test developed using this technology could be envisioned to supplement or replace current monitoring of glycemic control by HbA1C. Also described are methods for making antibodies and aptamers that bind the described glycated peptides and proteins, and a database listing glycated peptide concentrations in diabetic and control samples.

Applications: Diagnostic tool to monitor glycemic control in diabetic or at-risk individuals; markers to track development of diabetes complications.

Development Status: Early stage.

Inventors: Perry J. Blackshear (NIEHS).

Patent Status: U.S. Provisional Application No. 60/779,710 filed 06 Mar 2006 (HHS Reference No. E-057-2005/0-US-01).

Licensing Status: This technology is available for exclusive, co-exclusive, or nonexclusive licensing.

Licensing Contact: Marlene K. Astor, JD, MS, MIP; 301/435-4426; ms482m@nih.gov.

Collaborative Research Opportunity: The National Institute of Environmental Health Sciences, Office of Clinical Research, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology. Please contact John S. Penta, PhD, at 919-541-3696 or penta@niehs.nih.gov for more information.

Dated: May 18, 2006.

David R. Sadowski,
Acting Director, Division of Technology Development and Transfer, Office of Technology Transfer, National Institutes of Health.

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