

adult loses thirty percent of his muscle mass between the ages of 20 and 70.

*Development Status:* Early stage.

*Inventors:* Jay H. Chung et al. (NHLBI).

*Publication:* In preparation.

*Patent Status:* U.S. Provisional

Application No. 60/958,714 filed 06 July 2007 (HHS Reference No. E-068-2007/0-US-01).

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

*Licensing Contact:* Tara L. Kirby, Ph.D.; 301/435-4426; [tarak@mail.nih.gov](mailto:tarak@mail.nih.gov).

*Collaborative Research Opportunity:* The National Heart Lung and Blood Institute, Laboratory of Biochemical Genetics, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize DNA-PKcs inhibitors for treatment or prevention of metabolic and degenerative diseases. Please contact Jay Chung ([chungj@nhlbi.nih.gov](mailto:chungj@nhlbi.nih.gov)) for more information.

#### **Predictive Diagnostic Test for Anti-Depressant Related Suicide Risk**

*Description of Technology:* A number of studies have reported a potential link between antidepressant treatment and suicides. Although the scientific basis for this phenomenon is not known, the Food and Drug Administration (FDA) required a black box warning of worsening depression and/or emergence of suicidality (i.e., development of suicidal thoughts or behavior) in both adult and pediatric patients taking several antidepressants. While use of antidepressants fell subsequent to the black box warning, recent studies suggest that pediatric suicides may actually be rising. This has led to concerns that untreated depression due to the black box warning could potentially result in an overall increase in suicides.

To determine whether a genetic basis for suicidal risk exists for a sub-group of depressed patients, NIH researchers genetically screened patients with major depression treated with the serotonin selective reuptake inhibitor (SSRI) citalopram (Celexa) in the NIMH-funded Sequenced Treatment Alternatives for Depression (STAR\*D) trial. Versions of two genes coding for components of the brain's glutamate chemical messenger system were linked to suicidal thinking associated with antidepressant use. Having both implicated versions increased risk of such thoughts more than 14-fold. By identifying those patients who need close monitoring,

alternative treatments and/or specialty care, these genetic tests should prevent the under prescribing of anti-depressant drugs and the resulting possibility of suicide due to sub-optimal treatment.

*Applications:* Diagnostic tests predicting the likelihood of suicide during anti-depressant treatment.

*Market:* Depression ranks among the ten leading causes of disability and will become the second-largest cause of the global health burden by 2020. An estimated 121 million people worldwide suffer from a depressive disorder for which they require treatment. It is estimated that 5.8% of all men and 9.5% of all women will suffer from a depressive disorder in any given year and that 17% of all men and women will suffer from a depressive disorder at some point in their lives.

*Development Status:* Clinical data.

*Inventors:* Francis J. McMahon et al. (NIMH).

*Patent Status:* U.S. Provisional Application No. 60/854,978 Filed 27 Oct 2006 (HHS Reference No. E-157-2006/0-US-01).

*Licensing Status:* Available for licensing.

*Licensing Contact:* Norbert Pontzer, Ph.D., J.D.; 301/435-5502; [pontzern@mail.nih.gov](mailto:pontzern@mail.nih.gov).

*Collaborative Research Opportunity:* The National Institute of Mental Health Mood and Anxiety Disorders Program Genetics Unit is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize the Predictive Diagnostic Test for Anti-Depressant Related Suicide. Please contact Dr. Francis McMahon at [mcmahonf@mail.nih.gov](mailto:mcmahonf@mail.nih.gov) for more information.

Dated: October 11, 2007.

**Steven M. Ferguson,**

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

[FR Doc. E7-20483 Filed 10-16-07; 8:45 am]

**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, 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.

#### **HIV-1 Integrase Inhibitors for the Treatment of Retroviral Infections**

*Description of Technology:* This technology describes the structure and activity of N-benzyl derivatives of 2,3-dihydro-6,7-dihydroxy-1H-isoindol-1-ones and 2,3-dihydro-6,7-dihydroxy-1H-isoindole-1,3(2H)-diones as new HIV-1 integrase inhibitors. HIV, as well as other retroviruses, requires three key viral enzymes for replication: Reverse transcriptase, protease and integrase (IN). A significant number of patients fail to respond to combination therapies consisting of reverse transcriptase and protease inhibitors, due to the development of viral resistance. IN functions by initial processing of viral cDNA in a cleavage step termed 3'-processing (3'-P). This is followed by insertion of the cleaved cDNA into the host genome in a reaction known as "strand transfer" (ST). Certain agents covered under the subject technology have been shown to exhibit selective inhibition of ST reactions relative to 3'-P reactions. These compounds inhibit purified IN *in vitro* and are also active against HIV-1 derived vectors in cell-based assay. These inhibitors may have a potential therapeutic value for retroviral infections, including AIDS, especially for patients exhibiting drug resistance to current therapy regimes.

*Applications:* The treatment and prevention of HIV infections.

*Development Status:* *In vitro* data available.

*Inventors:* Terrence R. Burke Jr., Xue Zhi Zhao, Yves Pommier, and Elena Semenova (NCI).

*Related Publication:* WG Verschueren et al. Design and optimization of tricyclic phthalimide analogue as novel inhibitors of HIV-1 integrase. *J Med Chem* 2005 Mar 24;48(6):1930-1940.

*Patent Status:* U.S. Provisional Application No. 60/956,636 filed 17 Aug 2007 (HHS Reference No. E-237-2007/0-US-01).

*Licensing Status:* Available for licensing.

*Licensing Contact:* Sally Hu, Ph.D., M.B.A.; 301/435-5606; [HuS@mail.nih.gov](mailto:HuS@mail.nih.gov).

*Collaborative Research Opportunity:* The National Cancer Institute's Laboratory of Medicinal Chemistry and Laboratory of Molecular Pharmacology are seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize the HIV-1 integrase inhibitors described. Please contact John D. Hewes, Ph.D. at 301-435-3121 or [hewesj@mail.nih.gov](mailto:hewesj@mail.nih.gov) for more information.

### **Thiazepine Inhibitors of HIV-1 Integrase**

*Description of Technology:* The human immunodeficiency virus (HIV) is the causative agent of acquired immunodeficiency syndrome (AIDS). Drug-resistance is a critical factor contributing to the gradual loss of clinical benefit to treatments for HIV infection. Accordingly, combination therapies have further evolved to address the mutating resistance of HIV. However, there has been great concern regarding the apparent growing resistance of HIV strains to current therapies.

It has been found that a certain class of compounds including thiazepines and analogs and derivatives thereof are effective and selective anti-integrase inhibitors. These compounds have been found to inhibit both viral replication and the activity of purified HIV-1 integrase. The subject invention provides for such compounds and for methods of inhibiting HIV integrase.

*Inventors:* Yves Pommier et al. (NCI).

*Patent Status:* U.S. Patent No. 7,015,212 issued 21 Mar 2006 (HHS Reference No. E-036-1999/0-US-03).

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

*Licensing Contact:* Sally Hu, Ph.D., M.B.A.; 301/435-5606; [HuS@mail.nih.gov](mailto:HuS@mail.nih.gov).

*Collaborative Research Opportunity:* The Laboratory of Molecular Pharmacology of the National Cancer Institute is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize anti-integrase inhibitors. Please contact John D. Hewes, Ph.D. at 301-435-3121 or [hewesj@mail.nih.gov](mailto:hewesj@mail.nih.gov) for more information.

### **Quinoline Inhibitors of Retroviral Integrase**

*Description of Technology:* The subject invention describes certain diketo quinolin-4-1 derivatives and their use as integrase inhibitors in the treatment of HIV infection. The results of *in vitro* integrase inhibition studies show that these derivatives have significant anti-integrase activity (e.g., an IC50 for strand transfer inhibition of not greater than 2  $\mu$ M). Thus, these derivatives might be potentially important lead compounds for the development of integrase inhibitors. Since HIV integrase is an essential enzyme for effective viral replication, the development of such inhibitors of HIV integrase would thus potentially be useful and effective in the treatment of HIV infection.

*Inventors:* Yves Pommier et al. (NCI).

*Patent Status:* U.S. Patent Application No. 10/591,679 filed 01 Sep 2006, claiming priority to 10 Mar 2004 (HHS Reference No. E-187-2003/0-US-01).

*Licensing Contact:* Sally Hu, Ph.D., M.B.A.; 301/435-5606; [HuS@mail.nih.gov](mailto:HuS@mail.nih.gov).

### **Discovery of Tropolone Inhibitors of HIV-1 Integrase that can be Used for the Treatment of Retroviral Infection, Including AIDS**

*Description of Technology:* This invention provides pharmaceutical compositions comprising one or more HIV-1 integrase inhibitor compounds, as well as methods for treatment or prevention of HIV infection. These compounds are alpha-hydroxytropolone or its salt, solvate or hydrate, and they have been shown to inhibit the integrase by interfering with the enzyme catalytic site by chelating magnesium ions, and have been shown to inhibit the strand transfer reaction. Integrase is an important target for AIDS therapy since it is critical for viral replication, and does not have cellular counterparts, which can potentially reduce toxic side effects. Thus, the compounds of this invention can be developed as novel anti-viral agents that can be used in combinational therapy, especially since they might be less toxic than other anti-viral agents.

In addition to licensing, the technology is available for further development through collaborative research opportunities with the inventors.

*Inventors:* Yves Pommier et al. (NCI).

*Patent Status:* PCT Application No. PCT/US2006/046259 filed 01 Dec 2006, which published as WO 2007/065007 on 06 Jul 2007 (HHS Reference No. E-308-2005/0-PCT-02).

*Licensing Contact:* Sally Hu, Ph.D., M.B.A.; 301/435-5606; [HuS@mail.nih.gov](mailto:HuS@mail.nih.gov).

### **Integrase Inhibitors for the Treatment of Retroviral Infection Including Human Immunodeficiency Virus-1**

*Description of Technology:* Available for licensing and commercial development are stilbenedisulfonic acid derivatives for treatment of human immunodeficiency virus-1 (HIV-1) and other retroviral infections. Current HIV-1 therapeutic treatments target the viral protease and reverse transcriptase enzymes, which are essential for retroviral infection. However, these drugs often have limitations due to drug resistant variants, which render drugs ineffective. Additionally, such drugs are often toxic when administered in combination therapies. Thus, efficacious inhibitors of retroviral infection that are devoid of toxicity are presently needed.

The subject invention describes stilbenedisulfonic acid derivatives, which target the integrase enzyme of retroviruses. Similar to protease and reverse transcriptase activity, integrase function is essential for retroviral infection. Integrase catalyzes integration of reverse transcribed viral DNA into a host cell's genome. For this reason, integrase is considered a rational therapeutic target for HIV-1 infection. Further, integrase is a favorable target because the enzyme has no human cellular counterpart, which could interact with a potential integrase inhibitor and cause harmful side effects. Recent clinical data with an integrase inhibitor from Merck shows impressive clinical activity. The Merck compound is different from the current invention and is projected for FDA approval mid 2007. Thus, the subject invention is valuable for safe and effective treatment of HIV-1 and other retroviral infections.

*Application:* Treatment of HIV infection.

*Development Status:* The technology is ready for use in drug discovery and development.

*Inventors:* Yves Pommier (NCI), Elena Semenova (NCI), Christophe Marchand (NCI).

*Patent Status:* U.S. Provisional Application No. 60/849,718 filed 04 Oct 2006 (HHS Reference No. E-264-2006/0-US-01).

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

*Licensing Contact:* Sally Hu, Ph.D., M.B.A.; 301/435-5606; [HuS@mail.nih.gov](mailto:HuS@mail.nih.gov).

Dated: October 10, 2007.

**Steven M. Ferguson,**

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

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#### Alpha 1-3 N-Acetylgalactosaminyltransferases With Altered Donor and Acceptor Specificities, Compositions, and Methods of Use

**Description of Invention:** The present invention relates to the field of glycobiology, specifically to glycosyltransferases. The present invention provides structure-based design of novel glycosyltransferases and their biological applications.

The structural information of glycosyltransferases has revealed that the specificity of the sugar donor in these enzymes is determined by a few residues in the sugar-nucleotide binding pocket of the enzyme, which is conserved among the family members from different species. This conservation has made it possible to reengineer the existing glycosyltransferases with broader sugar donor specificities. Mutation of these

residues generates novel glycosyltransferases that can transfer a sugar residue with a chemically reactive functional group to N-acetylglucosamine (GlcNAc), galactose (Gal) and xylose residues of glycoproteins, glycolipids and proteoglycans (glycoconjugates). Thus, there is potential to develop mutant glycosyltransferases to produce glycoconjugates carrying sugar moieties with reactive groups that can be used in the assembly of bio-nanoparticles to develop targeted-drug delivery systems or contrast agents for medical uses.

Accordingly, methods to synthesize N-acetylglucosamine linkages have many applications in research and medicine, including in the development of pharmaceutical agents and improved vaccines that can be used to treat disease.

This application claims compositions and methods based on the structure-based design of alpha 1-3 N-Acetylgalactosaminyltransferase (alpha 3 GalNAc-T) mutants from alpha 1-3galactosyltransferase (a3Gal-T) that can transfer 2'-modified galactose from the corresponding UDP-derivatives due to mutations that broaden the alpha 3Gal-T donor specificity and make the enzyme alpha3 GalNAc-T.

**Application:** Development of pharmaceutical agents and improved vaccines.

**Developmental Status:** Enzymes have been synthesized and preclinical studies have been performed.

**Inventors:** Pradman Qasba, Boopathy Ramakrishnan, Elizabeth Boeggman, Marta Pasek (NCI).

**Patent Status:** PCT Patent Application filed 22 Aug 2007 (HHS Reference No. E-279-2007/0-PCT-01).

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

**Licensing Contact:** Peter A. Soukas, J.D.; 301/435-4646; [soukasp@mail.nih.gov](mailto:soukasp@mail.nih.gov).

**Collaborative Research Opportunity:** The National Cancer Institute's Nanobiology Program is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize structure-based design of novel glycosyltransferases. Please contact John D. Hewes, Ph.D. at 301-435-3121 or [hewesj@mail.nih.gov](mailto:hewesj@mail.nih.gov) for more information.

#### Beta 1,4-Galactosyltransferases With Altered Donor and Acceptor Specificities, Compositions and Methods of Use

**Description of Invention:** The present invention relates to the field of glycobiology, specifically to

glycosyltransferases. The present invention provides structure-based design of novel glycosyltransferases and their biological applications.

The structural information of glycosyltransferases has revealed that the specificity of the sugar donor in these enzymes is determined by a few residues in the sugar-nucleotide binding pocket of the enzyme, which is conserved among the family members from different species. This conservation has made it possible to reengineer the existing glycosyltransferases with broader sugar donor specificities. Mutation of these residues generates novel glycosyltransferases that can transfer a sugar residue with a chemically reactive functional group to N-acetylglucosamine (GlcNAc), galactose (Gal) and xylose residues of glycoproteins, glycolipids and proteoglycans (glycoconjugates). Thus, there is potential to develop mutant glycosyltransferases to produce glycoconjugates carrying sugar moieties with reactive groups that can be used in the assembly of bio-nanoparticles to develop targeted-drug delivery systems or contrast agents for medical uses.

Accordingly, methods to synthesize N-acetylglucosamine linkages have many applications in research and medicine, including in the development of pharmaceutical agents and improved vaccines that can be used to treat disease.

The invention claims beta (1,4)-galactosyltransferase I mutants having altered donor and acceptor and metal ion specificities, and methods of use thereof. In addition, the invention claims methods for synthesizing oligosaccharides using the beta (1,4)-galactosyltransferase I mutants and to using the beta (1,4)-galactosyltransferase I mutants to conjugate agents, such as therapeutic agents or diagnostic agents, to acceptor molecules. More specifically, the invention claims a double mutant beta 1,4 galactosyltransferase, human beta-1,4-Tyr289Leu-Met344His-Gal-T1, constructed from the individual mutants, Tyr289Leu-Gal-T1 and Met344His-Gal-T1, that transfers modified galactose in the presence of magnesium ion, in contrast to the wild-type enzyme which requires manganese ion.

**Application:** Development of pharmaceutical agents and improved vaccines.

**Developmental Status:** Enzymes have been synthesized and preclinical studies have been performed.