

*National Institutes of Health
Office of Technology Transfer*



National Institutes of Health (NIH) Office of Technology Transfer

601 I Executive Boulevard, Suite 325 • Rockville MD 20852-3804

Phone: 301-496-7057 • Website: www.ott.nih.gov

INTRODUCTION

NIH has an extensive intellectual property portfolio of early-stage technologies¹ and also invests substantially in their development. Roughly 10 percent of the annual NIH budget is dedicated to intramural research and development activities that results in inventions in the areas of medical devices, software, vaccines, diagnostics, therapeutics, and reagents. Commercial partners are needed to ensure that the long hours at the lab bench and the public investment in the development of these inventions pay off in the end in marketed products.

NIH believes that innovative companies can play a significant role in the future development of leading-edge research. While the increasingly consolidated pharmaceutical industry remains a steady customer of research reagents and clinical collaborations with NIH, the more exciting therapeutic developments are increasingly coming from NIH licenses signed with small and medium-sized life science companies early in their growth phase.

NIH is sensitive to the needs of small companies and tries to provide license agreements that facilitate new areas of product development based upon NIH research to attract and help companies in the early-stages of their development. Of particular note for venture-backed firms is that companies do not give up equity or management control nor are their future development or marketing rights compromised by signing NIH license agreements. Finally, once the product is in development, NIH has the capability to **assist with clinical trials**, conduct **research collaborations**, and eventually **purchase the product** as a customer.

We have collected some stem cell technologies your company might be interested in for further discussion with our licensing managers.

Once you have picked the technology of interest, we urge you to apply for a License. A copy of the License Application template can be found at the NIH OTT website at:

<http://www.ott.nih.gov/agreements>

¹ *The NIH Office of Technology Transfer cannot guarantee that the listed technologies are still available for licensing. Please contact the Licensing and Patenting Manager (listed under each technology) for the current status and for other complementary technologies.*

Title Page

Use of Adult and Embryonic Stem Cells

- Engineer biological pacemakers [\[abs\]](#)
- Methods and materials for controlling stem cell and cancer cell proliferation and differentiation [\[abs\]](#)
- Method for promoting stem cell proliferation and survival [\[abs\]](#)
- Methods for promoting stem cell proliferation and survival [\[abs\]](#)
- Differentiation of human embryonic stem cells into dopaminergic nerve cells [\[abs\]](#)
- Zscan4, a therapeutic target for cancer, regenerative medicine and aging [\[abs\]](#)
- Genetically modified stem cells for personalized therapy of single gene disorders [\[abs\]](#)

Cancer Stem Cells

- Identification of cancer stem cells [\[abs\]](#)
- Methods for determining hepatocellular carcinoma subtype and detecting hepatic cancer stem cells [\[abs\]](#)

Hematopoietic Cells

- Methods of mobilizing pluripotent hematopoietic stem cells and accelerating leukocyte reconstitution with IL-7 [\[abs\]](#)
- Vasostatin as marrow protectant [\[abs\]](#)

Stem Cells-Dental Cosmetic Surgery

- Adult human dental pulp stem cells in vitro and in vivo [\[abs\]](#)
- Postnatal stem cells an uses thereof [\[abs\]](#)
- Multi-potent postnatal stem cells from human periodontal ligament and uses thereof [\[abs\]](#)

Others

- Spoc Cell: Stem cells that transform to beating cardiomyocytes [\[abs\]](#)
- Tendon Stem Cells [\[abs\]](#)

Research Materials/Devices

- A Nurr1-Knockout mouse model for Parkinson's disease and stem cell differentiation [\[abs\]](#)
- NUP98-HOXD13 transgenic mice [\[abs\]](#)
- 4G10, a monoclonal antibody against the chemokine receptor CXCR4 [\[abs\]](#)
- Monoclonal antibody (MP804) that specifically binds stem cells and its use [\[abs\]](#)
- C57BL/6J embryonic stem cell lines generated using serum-free media [\[abs\]](#)
- Stem cell culture, monitoring and storage system [\[abs\]](#)
- Mouse model and derived cells that hypersecrete leukemia inhibitory factor (LIF) [\[abs\]](#)

Engineered Biological Pacemakers

Technology Available for Licensing

A common symptom of many heart diseases is an abnormal heart rhythm or arrhythmias. Arrhythmias affect more than 3 million Americans and account for more than 400,000 deaths a year. This technology consists of biological pacemakers engineered to generate normal heart rhythm. This technology discloses the method for making biological pacemakers that are cardiac-like cells derived from embryonic stem cells or mesenchymal stem cells that naturally integrate into the heart and generate normal rhythmic functions.

Development Stage

In vitro proof of concept data are available.

Intellectual Property

HHS Reference No. E-134-2009/0
PCT Application No.
PCT/US2010/035823, filed 21 May 2010

Inventor(s)

Victor A Maltsev (NIA)

Publication

VA Maltsev et al. (2009) [[PubMed abs](#)]

Collaborative Research Opportunity Available

The National Institute on Aging, Cellular Biophysics Section, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology. Please contact Vio Conley at 301-496-0477 or conleyv@mail.nih.gov for more information.

Potential Commercial Applications

- Treat heart disease characterized by arrhythmia
- Replace implantable cardiac pacemakers

Competitive Advantages

- Not externally powered like implantable pacemakers
- Lower risk of infection
- Decreased potential for interference from other devices
- Has full autonomic rate modulation

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

Methods and Materials for Controlling Stem Cell and Cancer Cell Proliferation and Differentiation

Technology Available for Licensing

There is tremendous interest in the use of stem cells to promote regenerative and cell transplantation therapies. This technology discloses the gene and novel protein that extends the proliferative capacity of stem cells. This protein, nucleostemin, regulates stem cell survival and cell cycle and interacts with p53, a well known regulator of cell cycle and apoptosis. Nucleostemin, and its related gene, may be a crucial target for increasing stem cell number, improving the use of stem cells in regenerative medicine and/or studying the proliferation of cancer cells.

Development Stage

In vitro proof of concept data are available.

Intellectual Property

HHS Reference No. E-001-2003/0
HHS Reference No. E-019-2003/0
HHS Reference No. E-001-2003/1

Inventor(s)

Robert Tsai and [Ronald D McKay](#)
(NINDS)

Publication

Tsai RY et al. (2005) [\[PubMed abs\]](#)
Tsai RY et al. (2002) [\[PubMed abs\]](#)

Potential Commercial Applications

- Regenerative medicine
- Slow / prevent the decrease in stem cell proliferation associated with aging (Cognitive implications)
- Develop assays for retarding the proliferation of cancer cells

Competitive Advantages

- Novel protein that can be used to develop screening assays for drugs impacting stem cell proliferation and differentiation

Licensing Contact:

Jaime Greene, MS

Licensing and Patenting Manager
Office of Technology Transfer
National Institutes of Health

greenejaime@mail.nih.gov

Phone: 301.435.5559

Method for Promoting Stem Cell Proliferation and Survival

Technology Available for Licensing

This technology describes a method to promote stem cell survival and proliferation by manipulating the phosphorylation state of Stat3 protein. STAT3 is involved in proliferation and cell growth and phosphorylation at serine 727 has been shown to partially regulate STAT3 activation and function. In addition, constitutively activated STAT3 is associated with cancerous cells. This technology has been shown to enhance survival and proliferation in stem cell cultures in vitro, and also in neuronal precursor cells in vivo through the regulation of STAT3. Disclosed are methods of using various ligands and growth factors to promote neural stem cell survival and proliferation. Also disclosed is a method for determining prognosis of cancer patients.

Development Stage

In vitro and *in vivo* proof of concept data are available.

Intellectual Property

HHS Reference No. E-239-2005/0
US Application No. 60/715,935 filed 07 Sep 2006
CA Application No. 2621161 filed 07 Sep 2006
US Application No. 12/066,075 filed 06 Mar 2008

Inventor(s)

[Ronald D McKay](#) and Andreas Androutsellis-Theotokis (NINDS)

Publication

A Androutsellis-Theotokis et al. (2006)
[\[PubMed abs\]](#)

Collaborative Research Opportunity Available

The National Institute of Neurological Disorders and Stroke, Laboratory of Molecular Biology, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology. Please contact Martha Lubet at 301/435-3120 or lubetm@mail.nih.gov.

Potential Commercial Applications

- Stem cell therapies for the treatment of neurodegenerative diseases, stroke, spinal cord injury and ALS
- Develop screening assays for agents that promote proliferation of stem cells
- Develop screening assays for agents that inhibit proliferation of cancer cells
- Diagnostic assay for cancerous cells

Competitive Advantages

- Increase generation of stem cells in vitro
- Determine cancer patients likely to respond to particular treatments based on STAT3 phosphorylation profile

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

Methods for Promoting Stem Cell Proliferation and Survival

Technology Available for Licensing

Regenerative medicine has the potential to treat numerous neurodegenerative diseases and spinal cord injury. This technology consists of a method to activate the endogenous neural stem cells to promote their survival and yield using angiopoietin-2 and a cocktail of ligands and growth factors. Inventors have used this method to stimulate behavioral recovery in a model of Parkinson's disease in vivo and have shown that this method is applicable to a variety of stem cell types.

Development Stage

In vitro and *in vivo* proof of concept data are available.

Intellectual Property

HHS Reference No. E-182-2007/0
US Application No. 12/673,576 filed 15 Feb 2010

Inventor(s)

Andreas Androutsellis-Theotokis and [Ronald D McKay](#) (NINDS)

Publication

A Androutsellis-Theotokis et al. (2006)
[\[PubMed abs\]](#)

Collaborative Research Opportunity Available

The National Institute of Neurological Disorders and Stroke is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize agents with activity on proliferation and/or differentiation of stem cells. Please contact Laurie Arrants at 301-435-3112 or ArrantsL@ninds.nih.gov or Martha Lubet at 301-435-3120 or lubetm@mail.nih.gov for more information

Potential Commercial Applications

- Stem cell therapies for the treatment of neurodegenerative diseases, stroke, spinal cord injury and ALS
- Develop screening assays for agents that promote proliferation of stem cells
- Develop screening assays for agents that inhibit proliferation of cancer cells
- Diagnostic assay for cancerous cells

Competitive Advantages

- Develop culturing methods for optimal development of stem cells for regenerative therapies

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

Differentiation of Human Embryonic Stem Cells into Dopaminergic Nerve Cells

Technology Available for Licensing

Transplantation of fetal dopaminergic neurons in brains of Parkinson's disease patients has shown clinical promise. Currently, 3-5 embryos are needed to obtain enough dopaminergic tissue for cell transplantation. This invention describes a novel method of differentiating human embryonic stem cells into dopaminergic nerve cells. This technology offers an alternative source of dopaminergic cells that are applicable to clinical dopaminergic transplantation studies and require less starting materials.

Development Stage

In vitro proof of concept data are available.

Intellectual Property

HHS Reference No. E-176-2008/0
PCT Application No.
PCT/US2009/065007 filed 18 Nov 2009

Inventor(s)

William Freed and Tandis Vazin (NIDA)

Publication

Carpenter M et al. (2006) [[PubMed abs](#)]

Collaborative Research Opportunity Available

The National Institute on Drug Abuse, Development and Plasticity Section, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology. Please contact Vio Conley, M.S. at 301-496-0477 or vconley@mail.nih.gov for more information.

Potential Commercial Applications

- Clinical transplantation of dopaminergic tissue
- Human dopaminergic cell lines for screening assays for dopamine-related neurological disorders

Competitive Advantages

- Large and reliable source of dopaminergic cells
- Human embryonic stem cells grow in culture indefinitely and can differentiate into a variety of cell types
Can be used for clinical studies

Licensing Contact:

Jaime Greene, MS

Licensing and Patenting Manager
Office of Technology Transfer
National Institutes of Health

greenejaime@mail.nih.gov

Phone: 301.435.5559

NIH • OTT

[347 products](#) including [22 FDA-approved drugs](#) and biologics use OTT licensed technologies!

Science. Ideas. Breakthroughs.



Zscan4, a Therapeutic Target for Cancer, Regenerative Medicine and Aging

Technology Available for Licensing

Telomeres are regions of the chromosome that protect DNA from being degraded during cell division. As cells divide the telomere region becomes shorter. Short telomere regions are associated with cancer cells and with aging. This technology describes a method for targeting Zscan4, a gene that regulates telomere length and subsequently regulate genomic stability. Increasing telomere length and genome stability of embryonic stem cells may be critical for therapies in regenerative medicine, while decreasing telomere length may play a role in developing treatments for cancers.

Development Stage

In vitro and *in vivo* proof of concept data are available.

Intellectual Property

HHS Reference No. E-088-2007/1
US Application No. 12/529,004 filed 27 Aug 2009

Inventor(s)

Minoru S Ko and Michal Zalzman (NIA)

Publication

Zalzman M et al. (2010) [[PubMed abs](#)]
Falco G et al. (2007) [[PubMed abs](#)]

Collaborative Research Opportunity Available

The National Institute on Aging, Laboratory of Genetics, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology. Please contact Nicole Guyton, Ph.D. at 301-435-3101 or darackn@mail.nih.gov for more information.

Potential Commercial Applications

- Development of therapeutics for cancer treatment, regenerative medicine, and age-related diseases.

Competitive Advantages

- Increase genomic stability of stem cells; increase number of divisions without changes in genetic material

Licensing Contact:

Tara Kirby, Ph.D.

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Tk200h@nih.gov

Phone: 301.435.4426

Genetically Modified Stem Cells for Personalized Therapy of Single Gene Disorders

Technology Available for Licensing

There are over 10,000 human diseases caused by defects in a single gene, which collectively affects 1% of the population. Some of these diseases are associated with an inflammation response that mobilizes mesenchymal stem cells to the site of damage. This technology discloses methods for cultivating, genetically modifying, checking, selecting and reintroducing mesenchymal stem cells taken from the patient to treat single gene disorders. This technology works by using RNA interference to prevent the transcription of the defected gene and inflammation responses to target the genetically modified mesenchymal stem cells to damaged areas.

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

Development Stage

In vitro proof of concept data are available.

Intellectual Property

HHS Reference No. E-171-2008/0
PCT Application No.
PCT/US2010/045128 filed Aug 2010

Inventor(s)

Wilfried M Briest and [Mark I Talan](#) (NIA)

Potential Commercial Applications

- Therapies for single gene disorders

Competitive Advantages

- Personalized medicine (specific treatment)
- Isolated from patient (no graft-to-host disease)
- Therapeutic cells physiologically recruited to site of damage

Identification of Cancer Stem Cells

Technology Available for Licensing

Asymmetrical division allows stem cells to limit the accumulation of DNA replication errors that can lead to genetic mutations. This technology discloses a method for detecting, isolating, and purifying stem cells via their asymmetrical properties in cancers. Cancer stem cells are thought to be responsible for cancer initiation, maintenance, and therapeutic failure. The isolation of cancer stem cells divulged in this technology has shown superior tumor initiating potential in vivo. Furthermore, this technology encompasses a means by which the extracellular environment regulates the potential of these cancer stem cells to self-renew.

Development Stage

In vitro proof of concept data are available.

Intellectual Property

HHS Reference No. E-122-2010/0
US Application No. 61/342,642 filed 16
Apr 2010

Inventor(s)

[Itzhak Avital](#), Honwu Xin, and Danielle M
Hari (NCI)

Collaborative Research Opportunity Available

The Center for Cancer Research, Surgery Branch, National Cancer Institute, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize our unique method for isolating cancer stem cells. We are seeking interested parties who would be interested in collaboration with the goal of developing cancer stem cell cell-lines for personalized targeted therapies, drug testing and finding novel targets for cancer treatments. In addition, we would like to collaborate with parties interested in developing normal (not cancer) adult tissue stem-cell cell-lines for adult tissue regeneration such as Parkinson's disease, liver failure, Alzheimer, etc. Please contact John Hewes, Ph.D. at 301-435-3121 or hewesj@mail.nih.gov for more information. [Click here](#) to view the NCI collaborative opportunity announcement.

Potential Commercial Applications

- Develop new cancer therapeutics
- Develop cancer cell lines for screening assays

Competitive Advantages

- Pure selection of tumor-promoting stem cells

Licensing Contact:

Betty Tong, Ph.D.

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

tongb@mail.nih.gov

Phone: 301.594.6565

Methods for Determining Hepatocellular Carcinoma Subtype and Detecting Hepatic Cancer Stem Cells

Technology Available for Licensing

The most common form of liver cancer, Hepatocellular carcinoma (HCC), is the third leading cause of cancer death worldwide. HCC originates from both adult hepatocytes (liver cells) and liver stem cells. Prognosis and treatment of HCC is hampered by the inability to identify the cancerous cells. This invention disclosed methods and use of microRNAs (miR-181 family) found to be associated with liver stem cells and poor prognosis of HCC patients to identify these cancerous cells. These microRNAs are involved in the Wnt-beta-catenin signaling pathway, a critical pathway for the maintenance of stem cell function. Thus, this miR-181 family of microRNAs can be used in the detection of liver cancer stem cells, stratification of patients most-likely to show positive treatment results, and devising therapeutic treatments of HCC arising from liver stem cells.

Development Stage

In vitro proof of concept data are available.

Intellectual Property

HHS, Reference No. E-215-2007/0
PCT, Application No.
PCT/US2008/007196 filed 09 Jun 2008
US, Application No. 12/663,586 filed 21 Apr 2010

Inventor(s)

[Xin W Wang](#) (NCI), Junfang Ji (NCI),
Taro Yamashita (NCI) and Carlo M
Croce (Ohio State University)

Publication

Wang B et al. (2010) [\[PubMed abs\]](#)

Ji J et al. (2009) [\[PubMed abs\]](#)

Garzon R et al. (2006) [\[PubMed abs\]](#)

Collaborative Research Opportunity Available

The National Cancer Institute, Laboratory of Human Carcinogenesis, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology. Please contact John D. Hewes, Ph.D. at 301-435-3121 or hewesj@mail.nih.gov for more information.

Potential Commercial Applications

- Biomarker to profile clinical patients based on miRNA profile
- Screening assays to detect inhibitors of miR-181 function
- Increase proliferation and maintenance of liver stem/progenitor cells (miR-181 as an antagonist)

Competitive Advantages

- HCC screening assay prior to treatment trials
- Devised personalized therapeutic strategies based on miR-181 profile

Licensing Contact:

Jennifer Wong

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

wongje@mail.nih.gov

Phone: 301.435.4633

Method of Mobilizing Pluripotent Hematopoietic Stem Cells and Accelerating Leukocyte Reconstitution with IL-7

Technology Available for Licensing

Hematopoietic stem cells are pluripotent and not yet committed to Erythroid (red blood cells), Lymphocytes (T-cells and B-cells) or Myeloid (leukocytes; white blood cells) lineages. Therefore, hematopoietic stem cells can be used in transplantation studies to re-populate recipient's hematopoietic stem cells and immune cells. This invention discloses a method for stimulating hematopoiesis, increasing hematopoietic stem cell number, and isolating cellular factors promoting hematopoiesis as means of developing therapeutic strategies and/or agents to be used with treatments of immunodeficiency disorders.

Development Stage

In vitro and *in vivo* proof of concept data are available.

Intellectual Property

HHS Reference No. E-139-1994/0
[US Patent No. 5,637,323](#) issued 10 Jun 1997
HHS Reference No. E-139-1994/0

Inventor(s)

Robert H Wiltrout, Kris Grzegorzewski, and [Francis W Ruscetti](#) (NCI)

Publication

KL Komschlies et al. (1995) [\[PubMed abs\]](#)
OC Boerman et al. (1995) [\[PubMed abs\]](#)
KJ Grzegorzewski et al. (1995) [\[PubMed abs\]](#)

Potential Commercial Applications

- Screening assays for hematopoiesis
- Treating immunodeficiency diseases
- Increasing hematopoietic stem cells

Competitive Advantages

- Improved engraftment of transplants
- Minimized toxicity from chemotherapy and/or radiation treatment
- Increased efficiency of stem cell procurement

Licensing Contact:

Surekha Vathyam, Ph.D.

Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

vathyams@mail.nih.gov

Phone: 301.435.4076

Technology Available for Licensing

The treatment of various cancers utilizes chemotherapy and/or irradiation. An unwelcomed side effect of chemotherapeutic agents and radiation is the death of noncancerous cells, such as peripheral blood cells and bone marrow stem cells. This invention embodies the use of vasostatin, a peptide shown to reduce tumorigenesis and inhibit angiogenesis, as a stimulatory agent for the proliferation/survival of hematopoietic cells (bone marrow stem cells). Also disclosed is a method for protecting hematopoietic cells from chemotherapeutic agents and radiation.

Development Stage

In vitro proof of concept data are available.

Intellectual Property

HHS Reference No. E-230-2000/0
[US Patent No. 6,596,690](#) issued 22 Jul 2003

HHS Reference No. E-230-2000/0
[US Patent No. 7,432,236](#) issued 07 Oct 2008
US Application No. 12/198,810 26 Aug 2008

Inventor(s)

[Giovanna Tosato](#), Lei Yao, and Sandra E Pike (NCI)

Publication

Huegel R et al. (2007) [\[PubMed abs\]](#)
Yao L et al. (2002) [\[PubMed abs\]](#)
Pike SE et al. (1999) [\[PubMed abs\]](#)

Potential Commercial Applications

- Improved cancer therapeutics
- Treatments towards angiogenesis-related diseases (cardiovascular disease, stroke, diabetic ulcers, wound healing, etc.)

Competitive Advantages

- Improved proliferation/survival of hematopoietic stem cells

Licensing Contact:

Whitney Hastings, Ph.D.

Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

hastingw@mail.nih.gov

Phone: 301.451.7337

Adult Human Dental Pulp Stem Cells *in vitro* and *in vivo*

Technology Available for Licensing

Tooth loss due to injury and/or various diseases affecting the gum line area or the jaw is traditionally replaced with dentures. This invention discloses a novel source of stem cells, dental pulp, and methods of using dental pulp stem cells to recreate an individual's tooth. This invention has the possibility of reconstructing a complete set of teeth that can be grown within a mouth and fixed to the gum line area; serving as a replacement to detachable dentures.

Development Stage

In vitro and *in vivo* proof of concept data are available.

Intellectual Property

HHS Reference No. E-233-2000/0
[US Patent No. 7,052,907](#) issued 30 May 2006
PCT Application No. PCT/US01/23053 filed 23 Jul 2001

Inventor(s)

Songtao Shi, Stan Gronthos and Pamela G. Robey (NIDCR)

Publication

S. Gronthos et al. (2002) [[PubMed abs](#)]
S. Gronthos et al. (2000) [[PubMed abs](#)]

Potential Commercial Applications

- Dental cosmetic surgery

Competitive Advantages

- Personalized treatment
- Can use dental pulp stem cells isolated from removal of the wisdom tooth (Avoid graft-versus-host disease)
- Source of adult stem cells

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

Postnatal Stem Cells and Uses Thereof

Technology Available for Licensing

During childhood, baby teeth are replaced by adult teeth. Dental pulp stem cells are isolated from exfoliated baby teeth. These dental pulp stem cells have been found to be highly proliferative, and containing the capacity to give rise to nerve cells, dentin forming cells (forming calcified tissue that makes teeth), adipocytes (fat cells), and fibroblasts (forming connective tissue). This technology discloses the method for delineating dental pulp stem cells and methods for use in stem cell therapies and dental cosmetic surgery.

Development Stage

In vitro and *in vivo* proof of concept data are available.

Intellectual Property

HHS Reference No. E-018-2003/0
US Application No. 10/553,633 filed 18 Oct 2005

Inventor(s)

Songtao Shi, Pamela G. Robey, Stan Gronthos, and Masako Mura (NIDCR)

Publication

M Miura et al. (2003) [\[PubMed abs\]](#)

Potential Commercial Applications

- Dental cosmetic surgery
- Stem cell therapies for neurological diseases (Parkinson's and Alzheimer's disease), spinal cord injury, and bone defects.

Competitive Advantages

- Socially-acceptable source of stem cells
- Highly proliferative

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

Multipotent Postnatal Stem Cells from Human Periodontal Ligament and Uses Thereof

Technology Available for Licensing

The periodontal ligament is a specialized connective tissue that assists in maintaining teeth support for biting and chewing. Infection of the periodontal ligament is the most common disease that leads to tooth loss in humans. This technology discloses a method for selecting and isolating proliferative stem cells from the periodontal ligament. In addition, a method for differentiating periodontal ligament stem cells into cementoblasts, adipocytes, and fibroblasts is disclosed.

Development Stage

In vitro and *in vivo* proof of concept data are available.

Intellectual Property

HHS Reference No. E-033-2004/0
US Application No. 11/433,627 filed 12
May 2006

Inventor(s)

Songtao Shi, Byoung-Moo Seo, and
Masako Mura (NIDCR)

Publication

F Feng et al. (2010) [[PubMed abs](#)]
Y Liu et al. (2008) [[PubMed abs](#)]

Potential Commercial Applications

- Dental cosmetic surgery
- Stem cell therapy

Competitive Advantages

- High expression of adult periodontal ligament stem cells

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

Stem Cells that Transform to Beating Cardiomyocytes

Technology Available for Licensing

Heart failure contributes to over 300,000 deaths each year in the U.S. and over 5 million people in the U.S. have heart failure. In many cases, heart transplantation is sought as a means of treatment. Organ matching and immunosuppressive treatments make stem cell transplant using patient-derived stem cells a viable alternative. This invention discloses novel stem cells isolated from adult skeletal muscles that can be differentiated into beating cardiomyocytes. These stem cells named 'Spoc' cells (skeletal-based precursors of cardiomyocytes) also differentiate into cardiomyocytes in vivo.

Development Stage

In vitro and *in vivo* proof of concept data are available.

Intellectual Property

HHS Reference No. E-329-2001/0
[US Patent No. 7,220,582](#) issued 22 May 2007
US Application No. 11/747,060 filed 10 May 2007

Inventor(s)

Neal D Epstein, Thiru V Gopal, Steve O Winitsky, and Shahin Hassanzadeh (NHLBI)

Publication

Winitsky SO et al. (2005) [[PubMed abs](#)]

Potential Commercial Applications

- Adult stem cells from skeletal muscles (easily acquired, non-controversial)
- Can create cardiomyocytes cell lines for screening assays
- Stem cell therapies for heart failure

Competitive Advantages

- Personalized medicine
- Differentiate under standard culture conditions and in vivo
- Non-controversial source of stem cells

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

Technology Available for Licensing

Tendon injuries due to trauma and overuse are common problems in orthopedics. Tendon injuries can be surgically repaired either through reattachment or grafting procedures. The healing process can take several months to gain full joint function. This invention discloses a method to isolate stem cells from adult tendons and differentiate them into tendons that attaches to bone forming an enthesis-like structure. Also disclosed is a method for using biglycan and fibromodulin, proteoglycans found in the extracellular environment, to control the differentiation of these tendon stem cells and for treating other calcification that lead to stiffness and loss of mobility, such as ankylosis.

Development Stage

In vitro and *in vivo* proof of concept data are available.

Intellectual Property

HHS Reference No. E-233-2007/0
US Application No. 12/663,663 filed 8 Dec 2009

Inventor(s)

[Marian F Young](#), Yanming Bi, and Songtao Shi (NIDCR)

Publication

Y Bi et al. (2007) [[PubMed abs](#)]

Collaborative Research Opportunity Available

The NIDCR, Molecular Biology of Bones and Teeth Section is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize the use of tendon stem cells. Please contact Marian Young at 301-496-8860 or myoung@dir.nidcr.nih.gov.

Potential Commercial Applications

- Treatment of damaged tendons
- Prevention or treatment of ectopic calcification and/or ossification

Competitive Advantages

- Highly proliferative and clonogenic
- Adult stem cells (non-controversial)

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

A Nurr1-Knockout Mouse Model for Parkinson's disease and Stem Cell Differentiation

Technology Available for Licensing

Nurr1, nuclear hormone receptor, is a transcription factor that has been shown to play a role in the differentiation of dopaminergic precursors and the survival of dopaminergic neurons. When knocked out it leads to the arrest and eventual death of midbrain dopamine neurons. Over expressing Nurr1 can aid in the differentiation of embryonic stem cells into dopaminergic neurons. Nurr1 has also been shown to regulate osteoblast differentiation, suggesting that Nurr1 may play a general role in stem cell differentiation and growth. Thus, this invention discloses a research material, Nurr1-knockout mice, which can be used to investigate the function of Nurr1 in stem cell differentiation, development of dopaminergic neurons, and treatments for dopamine-related diseases.

Development Stage

Research materials (Animal model)

Intellectual Property

IP rights are not being pursued
HHS Reference No. E-024-1999
HHS Reference No. E-172-2006

Inventor(s)

Vera M Nikodem (NIDDK)

Publication

M K Lee et al. (2006) [\[PubMed abs\]](#)
J. Jankovic et al. (2005) [\[PubMed abs\]](#)

Potential Commercial Applications

- Therapeutic testing for Parkinson's Disease, Attention Deficit/Hyperactivity Disorder (ADHD), and Schizophrenia
- Stem cell development and differentiation (screening assays)

Licensing Contact:

Charlene Sydnor, Ph.D.

Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

sydnorc@mail.nih.gov

Phone: 301.435.4689

NUP98-HOXD13 Transgenic Mice

Technology Available for Licensing

Myelodysplastic syndrome (MDS) is a collection of closely related blood diseases that arise in the bone marrow as a result of hematopoietic stem cell disorders. The only curative therapy for MDS is allogeneic bone marrow transplant. These genetically engineered mice expressing the NUP98-HOXD13 transgene recapitulates all of the biological features (peripheral blood cytopenia, bone marrow dysplasia, and transformation to acute leukemia) of human MDS allowing for therapeutic investigation and development for MDS treatments.

Development Stage

Research materials (Animal Model)

Intellectual Property

IP rights will not be pursued
HHS Reference No. E-071-2007/0

Inventor(s)

[Peter D Aplan](#), YingWei Lin, Zhen H Zhang and Christopher I Slape (NCI)

Publication

YW Lin et al. (2006) [\[PubMed abs\]](#)
YW Lin et al. (2005) [\[PubMed abs\]](#)

Collaborative Research Opportunity Available

The Leukemia Biology Section, Genetics Branch, National Cancer Institute is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize the NHD13 mouse model. Please contact John D. Hewes, Ph.D. at 301-435-3121 or hewesj@mail.nih.gov for more information.

Potential Commercial Applications

- Model to study MDS
- Therapeutic development for MDS
- Investigate NUP98-HOXD13 transgene in hematopoietic stem cell differentiation and proliferation

Licensing Contact:

Jenifer Wong

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

wongje@mail.nih.gov

Phone: 301.435.4633

4G10, a Monoclonal Antibody Against the Chemokine Receptor CXCR4

Technology Available for Licensing

CXCR4 has been shown to be involved in the activation of B cells and B cell progenitors and their migration into the bone marrow. CXCR4 also functions in T cell progenitor migration and neural stem cell activation. In addition, CXCR4 has been identified as a co-receptor mediating entry of HIV-1 into T cells. 4G10 can be used to study the function of CXCR4 in the above physiological responses. 4G10 is a monoclonal antibody raised against a synthetic peptide derived from the N-terminus of CXCR4 making it useful for western blotting, immunoprecipitation, immunohistochemistry and ELISA.

Development Stage

Research materials

Intellectual Property

IP rights will not be pursued
HHS Reference No. E-340-2002/0

Inventor(s)

[Edward A Berger](#) (NIAID) and
Christopher C Broder (Uniform Services University)

Potential Commercial Applications

- Antibody for CXCR4 (immunodetection experiments)

Licensing Contact:

Sally Hu, Ph.D., M.B.A.

Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

hus@mail.nih.gov

Phone: 301.435.5606

NIH • OTT

[347 products](#) including [22 FDA-approved drugs](#) and
biologics use OTT licensed technologies!

[Science. Ideas. Breakthroughs.](#)



Monoclonal Antibody (MP804) that Specifically Binds Stem Cells and Its Use

Technology Available for Licensing

Adult stem cells hold great promise for regenerative medicine with respect to finding treatments for spinal-cord injuries and neurodegenerative disorders, such as Alzheimer's disease. This invention encompasses an antibody, MP804, which can be used to detect and isolate adult stem cells in skeletal tissue.

Development Stage

Research materials

Intellectual Property

HHS Reference No. E-014-2004/0
PCT Application No.
PCT/US2005/14176 filed 25 Apr 2005
US Application No. 11/578,891 filed 20
Oct 2006

Inventor(s)

Neal E Epstein, Steve O Winitsky,
Thiru V Gopal and Shahin Hassanzadeh (NHLBI)

Licensing Contact:

Fatima Sayyid, MHPM

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.4521

Potential Commercial Applications

- *Adult stem cell production*

Competitive Advantages

- *Isolation of adult stem cells*

C57BL/6J Embryonic Stem Cell Lines Generated Using Serum-Free Media

Technology Available for Licensing

Embryonic stem cells are used to study gene function, regulation of genes, and the investigation of cell differentiation. However, embryonic stems isolated from mice are largely used to generate animal models of human diseases. The preferred mouse/genetic background are the C57BL/6J. However, very few pure C57BL/6J embryonic stem cell lines exist for generating mouse models. Therefore backcrossing of mice with the C57BL/6J line is needed to generate a mouse model with the C57BL/6J genetic background. The following are pure C57BL/6J embryonic stem cell lines that were generated using a defined serum-free media.

Development Status

Research materials

Intellectual Property

IP rights will not be pursued
HHS Reference No. E-038-2009/0

Inventor(s)

Jun Cheng and
Pamela L Schwartzberg (NHGRI)

Publication

J Cheng et al. (2004) [[PubMed abs](#)]

Potential Commercial Applications

- Creation of various mouse models
- Creation of other embryonic cell lines from embryonic lethal animal models

Competitive Advantages

- No backcrossing necessary (less labor intensive)

Licensing Contact:

Suryanarayana Vepa, Ph.D.

Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

Fatima.Sayyid@nig.hhs.gov

Phone: 301.435.5020

Stem Cell Culture, Monitoring and Storage System

Technology Available for Licensing

Available for licensing is a closed microscopy device in which the external environment can be manipulated to investigate responses in proliferation, survival, and differentiation of cultured stem cells. The device allows changes in gas, liquid, volume and pressure. In addition, it has an articulating ball joint for a glass capillary for electrophysiological recordings, microinjections, and/or drug application to cultured stem cells. The closed chamber allows for long term culture and observation of stem cells in a controlled environment.

Development Stage

Research device

Intellectual Property

HHS Reference No. E-171-2002/0
[US Patent No. 7,091,035](#) Issued 15 Aug 2006

PCT Applicatin No. PCT/US03/41544 filed 30 Dec 2003

Potential Commercial Applications

- Development of stem cell chamber for electrophysiological recordings

Inventor(s)

Rea Ravin (NINDS), James V Sullivan (ORS) and [Ronald D McKay](#) (NINDS)

Competitive Advantages

- Ability to control volume and pressure of liquids and gases
- Microelectrode to influence/monitor stem cell development continuously

Licensing Contact:

Michael Shmilovich, J.D.

Sr. Licensing & Patenting Manager
Office of Technology Transfer
National Institutes of Health

shmilovm@mail.nih.gov

Phone: 301.435.5019

Mouse Model and Derived Cells That Hypersecrete Leukemia Inhibitory Factor (LIF)

Technology Available for Licensing

Embryonic stem cells (ESCs) are pluripotent cells that can be cultured indefinitely, and maintain their capability to differentiate into all cell lineages. To maintain these cells as well as various types of related induced stem cells and progenitor cells in culture, Mouse Embryonic Fibroblasts (MEFs) are routinely used as feeder cells, largely to serve as a source of Leukemia Inhibitory Factor (LIF). ESCs can also be cultured without feeders if the medium is supplemented with recombinant LIF and other factors. However, these methods of culturing ESCs suffer from certain drawbacks, such as limited proliferation capacity and variability of primary MEFs. Therefore, finding improved conditions that maintain ESC pluripotency is an area of great interest.

Licensing Contact:

Betty Tong

Sr. Licensing and Patenting Manager
Office of Technology Transfer
National Institutes of Health

tongb@mail.nih.gov

Phone: 301.594.6565

Scientists at NIEHS have now developed a knock-in (KI) mouse model in which LIF is overproduced from its endogenous locus because of increased stability of its mRNA. MEFs and presumably other cells derived from the homozygous mice hypersecrete LIF protein; lesser degrees of overexpression would be expected from heterozygous mice. These mice can be used to study LIF function, including how LIF contributes to various physiological and pathological states. Cells derived from these mice can be used to culture ESCs, as well as other progenitor cells. Cells or genetic material derived from these mice can also be used as sources of LIF for isolation and purification.

Potential Commercial Applications

- Maintenance of ESCs and progenitor cells
- In vivo, cellular and cell-free sources of LIF
- Sources of LIF for isolation and purification
- Studies of LIF function in mice, such as contribution of LIF to tumor growth

Development Stage

Research Tool: Patent protection is not being pursued

Intellectual Property

HHS Reference No. E-175-2011/0

Inventor(s)

Sonifa Patial (NIEHS)
Perry J. Blackshear (NIEHS)
Deborah J. Stumpo (NIEHS)