

**ANNUAL REPORT**  
**CENTER FOR GENE THERAPY**  
**2007**

**TULANE UNIVERSITY**  
**HEALTH SCIENCES CENTER**  
**NEW ORLEANS, LOUISIANA**

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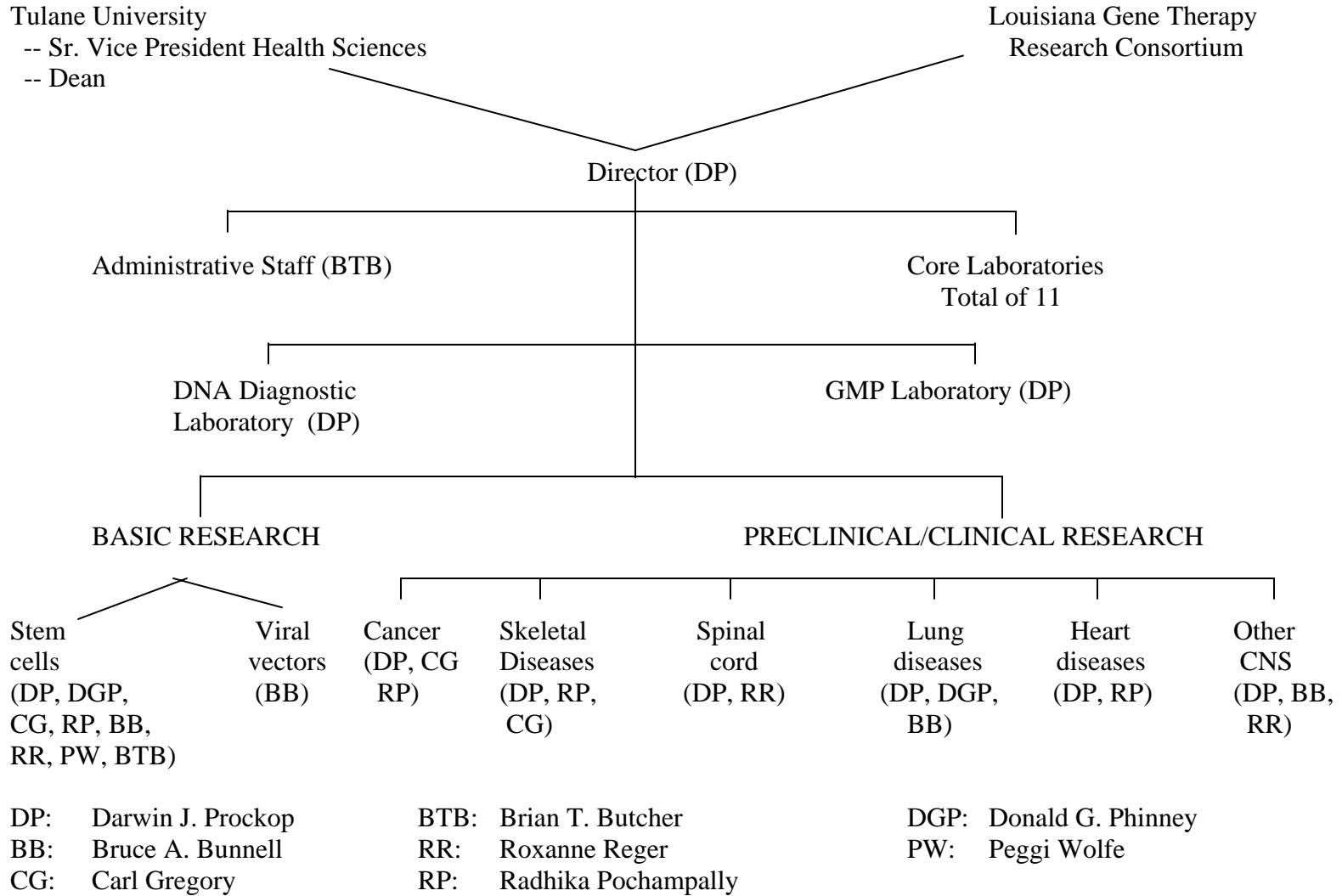
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**Tulane University Health Sciences Center**  
**Center for Gene Therapy**  
**2007**



## ORGANIZATIONAL CHART FOR CENTER FOR GENE THERAPY



## **DIRECTOR'S MESSAGE**

### **HISTORY, VISION, AND GOALS FOR THE CENTER**

The Tulane Center for Gene Therapy was formed within the Tulane University Health Sciences Center in July of 2000. The major aim of the Center is to develop new therapies for a variety of common illnesses that include osteoporosis, osteoarthritis, Parkinsonism, spinal cord injury, Alzheimer's, stroke, cardiac diseases and pulmonary diseases. The primary strategy of the Center is to use adult stem/progenitor cells that can easily be obtained from a patient and then used for therapy of the same patient. The adult stem/progenitor cells studied in the Center have many similarities to embryonic stem/progenitor cells obtained from human embryos, but the Center does not do any research with human embryos or human embryonic stem/progenitor cells. Instead, scientists at the Center work entirely with adult stem/progenitor cells that can be obtained from the patient who is to be treated.

The Center also provides educational programs for career development, job training and life-long learning of citizens, and it is developing commercial applications of gene therapy with emphasis on commercial developments within the state of Louisiana.

The Center is supported by research funds from the federal government via the National Institutes of Health, from the state of Louisiana via the Louisiana Gene Therapy Research Consortium and the Louisiana Board of Regents, from the Tulane University Health Sciences Center, from the HCA-Healthcare Company and from several private foundations. The Center is a major participant in the Louisiana Gene Therapy Research Consortium that includes gene therapy research centers at the LSU Health Sciences Centers in New Orleans and in Shreveport.

The Center, under the direction of Darwin Prockop, M.D., Ph.D., currently has a staff of approximately 85. The Center is housed in 16,000 sq. ft. of modern laboratory space in the Tulane University Health Sciences Center's J. Bennett Johnston Building, located at 1324 Tulane Avenue, New Orleans, LA, and also has research laboratories at the Tulane National Primate Research Center in Covington, LA. A 2,400 sq. ft. pilot clinical Good Manufacturing Procedures (cGMP) facility, with four dedicated production rooms, financed in part by the Louisiana Gene Therapy Research Consortium, has been completed in the Tulane Tidewater Building, 1440 Canal Street, New Orleans, LA. This facility, which is in the process of validation for FDA approval, will produce adult stem/progenitor cells for clinical studies.

Dr. Prockop has a distinguished career and his pioneering research is recognized throughout the world. He has been honored by his peers in many ways, including election to The National Academy of Science and The National Institute of Medicine, three honorary degrees, two distinguished alumnus awards, and the Lee C. Howley Prize of the Arthritis Foundation for research in arthritis.

The therapies being developed by the Center are based on the discoveries, largely made by Dr. Prockop and his associates, that adult stem/progenitor cells from a patient's own bone marrow can be expanded and then used in the same patient to target diseases of the central nervous system, bones, cartilage and many other tissues. In some diseases, the stem/progenitor cells do not need to be gene engineered because the cells are part of a natural repair system. Therefore, simply administering more of the patient's own stem/progenitor cells may improve tissue repair. The Center staff is doing research on the basic biology of adult stem/progenitor cells and developing procedures for using the cells in patients with devastating diseases. The Center is recognized as a world leader in production and characterization of adult stem/progenitor cells. The Center's expertise was reflected in 2003 by its being awarded a \$4.3 million grant by the National Institutes of Health to establish the first laboratory for the preparation and distribution of adult stem/progenitor cells from bone marrow stroma to academic scientists at other research centers in this country and abroad. In 2007, 184 (119 human, 51 mouse, 14 rat) shipments comprising 418 (345 human, 55 mouse, 18 rat) samples of human and rodent cells were distributed to 90 scientists at 74 research centers worldwide.

The Center staff's interest in adult stem/progenitor cells began after they and others had identified mutations in collagen genes that cause severe brittle bone disease in children (osteogenesis imperfecta) and severe forms of dwarfism (chondrodysplasia). Similar mutations in collagen genes were found in a subset of women with osteoporosis, in a subset of people with osteoarthritis, and in a subset of patients with aortic aneurysms.

Identifying the mutations that cause the diseases led to developing new therapies with stem/progenitor cells. Results from a collaborative clinical trial carried out at St. Jude Children's Research Hospital in Memphis, indicate that the adult stem/progenitor cells will be useful in treating osteogenesis imperfecta ("brittle bone disease in children") and perhaps will enable treatment of osteoporosis, collagen diseases (or inherited connective tissue disorders) and a number of other common diseases. Recent studies in various disease models suggest that adult stem/progenitor cells may be of use in treatment of spinal cord injury, cardiologic diseases, diabetes, pulmonary diseases and graft versus host disease.

## **STUDIES IN PROGRESS:**

### **Adult Stem/Progenitor Cells**

Characterization of the biological properties of adult stem/progenitor cells is essential for a better understanding of their normal function in adults as well as for revealing their potential in treating disease. Stem/progenitor cells are so named because they are like the stems on a plant that can produce new leaves and flowers each year. Each stem/progenitor cell has the remarkable property that it can divide so as to produce a perfect copy of itself together with a second cell that can become a "workhorse" cell of the body such as a bone cell or a nerve cell. Because the stem/progenitor cell produced by the division is a perfect copy of the original stem/progenitor cell, stem/progenitor cells seem to be able to divide and live indefinitely. Understanding

stem/progenitor cells and their potential for treating disease is now one of the most important challenges of biology.

The Center is working on a special class of adult stem/progenitor cells from bone marrow referred to as mesenchymal stem/progenitor cells or multipotential stromal cells (MSCs). The Center staff is at the forefront of research on these cells. Recently, research by scientists in our center and elsewhere has demonstrated that MSCs, in addition to functioning as stem/progenitor cells, have the remarkable ability to home to injured tissues and repair them by several different mechanisms, including transfer of mitochondria and stimulating the stem-like cells found in many tissues to proliferate and thereby repair the tissues. They have developed new procedures that make it possible to begin with a small sample of adult marrow stromal stem/progenitor cells from a patient's bone marrow and rapidly grow extremely large numbers of the cells in the laboratory. The ability to grow the cells rapidly, in turn, makes it possible to gene engineer them with simple techniques that do not involve use of a virus.

To test the cells' potential for therapy of patients, the Center is using the adult MSCs to treat animal models of human diseases. Similar experiments are being performed in non-human primates at the nearby Tulane National Primate Research Center, the largest National Institutes of Health sponsored primate center in the country.

In one series of experiments, cells are transplanted into mice that undergo repeated spontaneous bone fractures because of a genetic defect. The aim of these experiments is to determine if the stem/progenitor cells can travel to the site of a bone fracture, strengthen the bone and prevent further fractures. Results from these studies should define the most effective ways the cells can be used to treat human bone diseases, such as osteogenesis imperfecta and osteoporosis.

In other experiments, Center staff are pursuing their discovery that adult MSCs can differentiate into cells that make up the brain. Therefore, the cells are being transplanted directly into the brains of mice that exhibit progressive neurodegeneration due to lack of a critical protein. The aim of these experiments is to determine if the stem/progenitor cells can replace the missing protein and reverse the degeneration of the brain. If the experiments succeed, they will suggest that the cells can be used to treat serious neurological diseases in children, such as Tay-Sachs disease.

Other studies are evaluating if the marrow stromal stem/progenitor cells can replace or enhance repair of cells that are damaged in common diseases of adults. Promising preliminary results were recently obtained in a rat model for Parkinsonism. Similar experiments have provided promising results on the effectiveness of the cells in models for Alzheimer's disease, spinal injury, heart disease and diabetes.

Procedures for experiments in animal models are being developed so as to conform to reporting requirements of the Food and Drug Administration and other agencies in order that the therapies can be introduced as clinical trials in patients as soon as possible. With the development of the pilot cGMP facility for the production of clinical grade stem/progenitor cells, the Center is planning for clinical trials. The plans include a clinical trial in which stem/progenitor cells will

be administered to patients with spinal cord paralysis that will be conducted at the Shepherd Catastrophic Care Center in Atlanta, a clinical trial in which stem/progenitor cells will be administered to patients with graft-versus-host disease that will be carried out at the Minnesota Medical Center in Minneapolis, and a clinical trial in which stem/progenitor cells will be administered to patients with chronic heart disease and diabetes that will be carried out in the Tulane hospitals. Recently, we have begun exploring the potential for use of MSC in treatment of diabetes. In most of these trials, small samples of bone marrow from patients will be shipped to the pilot cGMP laboratory, stem/progenitor cells will be isolated, the cells will be grown to produce several million of the cells, and then the cells will be shipped to the hospitals for administration to the same patients.

## **Genetic Deficiencies**

Another interest of the Center is to identify the genetic causes of common diseases of connective tissues such as bone and cartilage. The Center staff was among the first to show that collagen genes can carry mutations causing diseases of bone and cartilage. Their interest in collagen genes was based on a large background of work they and others had done on the structure and function of the proteins and their biosynthesis.

Members of the Center staff and previous associates isolated the first gene for a series of human collagens. They then used the genes to find mutations that caused osteogenesis imperfecta and severe disorders of cartilage that cause dwarfism and associated problems (Stickler syndrome, spondyloepiphyseal dysplasia, achondrogenesis Type II and Kniest syndrome). They went on to find the mutations in collagen genes that caused the defects in a subset of patients with osteoporosis, a subset of patients with early onset osteoarthritis, and a subset of patients with aortic aneurisms that were prone to rupture.

More recently, one of the Center's faculties found mutations in collagen genes that cause sciatica because of a degeneration of intervertebral disks. The genes in which these mutations have been found are complex and the identification of the mutations has, in part, depended on technology developed by Center staff for rapid scanning of genes for mutations, a technology known as conformation sensitive gel electrophoresis (CSGE). The Center also developed a DNA test to identify mutations causing the Marfan syndrome, a disease that makes individuals unusually tall and prime to sudden death. The Marfan syndrome has been seen in many athletes and Abraham Lincoln may have had a form of the Marfan syndrome. Currently, the Center is performing DNA diagnostic tests for over 800 patients per year.

The DNA diagnostic tests for these and other diseases are being developed for several reasons. One is that a definitive diagnosis of cause of a disease is frequently an important guide as to which existing therapies or changes in lifestyle may help the patient. The second reason is that knowing the exact cause of a disease is frequently the first step in developing new therapies, such as gene or cell therapy, that may provide a cure for previously untreatable diseases. The results of the DNA tests are provided to requesting physicians and medical geneticists who use the data for genetic counseling of patients and their families.

## **GENE THERAPY DIVISION OF THE TULANE NATIONAL PRIMATE RESEARCH CENTER**

The Center for Gene Therapy also maintains a significant presence at the Tulane National Primate Research Center (TNPRC). The TNPRC is composed of seven Divisions of research focus, including a Division of Gene Therapy. Bruce A. Bunnell, Ph.D. is the Chair of the Division of Gene Therapy at the TNPRC. The mission of the Division is two-fold. The primary mission of the TNPRC Division of Gene Therapy has been to establish a strong independent research program. In addition, the division's mission encompasses collaborative studies with investigators outside the TNPRC. The Division has grown to include 10 full-time TNPRC employees that work in Dr. Bunnell's laboratory. The staff includes 2 postdoctoral fellows, 3 graduate students, 4 research assistants, 1 administrative assistant, and Dr. Bunnell. Dr. Phinney also has a research program at the TNPRC, consisting of a research assistant and himself.

The division was rated as excellent in a recent external review by Scientific Advisors to the TNPRC for their significant scientific progress.

## FACULTY

### **Darwin J. Prockop, M.D., Ph.D.**

Professor of Biochemistry  
Clinical Professor of Neurosurgery  
Director

Dr. Prockop is acknowledged worldwide for his expertise and leadership in the characterization, recovery, and potential clinical uses of adult stem/progenitor cells. Currently, his major research interests are: (a) isolating and characterizing different sub-populations of adult stem/progenitor cells from bone marrow; (b) comparing the efficiencies with which the different sub-populations engraft and differentiate into various tissues in chick embryos and rodents; (c) defining the signals that are produced by injured tissues that cause adult stem/progenitor cells to home to injured tissues and repair them; (d) defining in detail how adult stem/progenitor cells repair injured tissues; (e) testing the effectiveness of different sub-populations of adult stem/progenitor cells in animal models for spinal cord injury, lung diseases, cardiac diseases, bone diseases, parkinsonism and Alzheimer's disease; and (f) developing the trained staff, protocols and facilities necessary to begin clinical trials with adult stem/progenitor cells in spinal cord injury and other diseases.

### **Brian T. Butcher, Ph.D.**

Research Professor of Medicine  
Associate Director for Operations

Dr. Butcher's role as associate director for operations of the Center is to ensure the smooth day-to-day running of the Center and to work with members to ensure that all needs are met. Dr. Butcher also oversees collection of bone marrow samples from volunteers and helps ensure that the cell culture facilities produce the cells which are used for research and which are distributed to academic researchers worldwide. Dr. Butcher assists with the MSC isolation and distribution.

### **Bruce A. Bunnell, Ph.D.**

Professor of Pharmacology  
Chair, Gene Therapy Division, Tulane National Primate Research Center

Dr. Bunnell is interested in the development of stem cell and gene therapy of lysosomal storage diseases (LSDs). To this end, his research efforts are focused on the treatment of the genetic disorders, Sandhoff's and Krabbe's disease. His long-term goals are to utilize a combination of stem cells and gene therapy for the therapeutic intervention in these diseases. To this end, his research group at the Health Sciences Center is using mouse models of both of these diseases to investigate stem cell based therapies.

In addition to LSD treatment, Dr. Bunnell is funded to perform studies aimed at the regeneration of large portions of bone using mesenchymal stem cells and biocompatible matrices. The technologies generated from these ongoing studies could play a significant role in the treatment of massive wounds generated in soldiers upon explosion of Improvised Explosive Devices in Iraq and Afghanistan.

Dr. Bunnell is Chairman of the Division of Gene Therapy at the TNPRC and serves on the Executive Faculty Committee that oversees the scientific mission of the center. The mission of the Division of Gene Therapy is two-fold. The primary mission of the Division of Gene Therapy has been to establish a strong independent research program. In addition, the division's mission encompasses collaborative studies with investigators outside the TNPRC. The Division has grown to include 11 full-time TNPRC employees that work in Dr. Bunnell's laboratory. The staff includes 2 postdoctoral fellows, 4 graduate students, 4 research assistants, 1 administrative assistant, and Dr. Bunnell. The Division is currently performing novel research in the areas of stem cell biology and recombinant virus vector mediated gene transfer in the nonhuman primate model. A significant portion of Dr. Bunnell's research efforts are directed to the characterization and application of stem cells of rhesus macaques (*Macaca mulatta*) for the treatment of disease. Dr. Bunnell's team is focused on adult stem cells from the bone marrow and adipose tissue, neural stem cells from the brain, and embryonic stem cells. At present, his lab is the only lab in Louisiana to have a research focus on embryonic stem cells from higher order mammals. The stem cell research efforts are focused on the opportunity to perform preclinical transplantation studies and therapeutic interventions in a nonhuman primate model of Krabbe's disease, which is the only genetic disease model in the world that has been captured in nonhuman primates. Dr. Bunnell has NIH funding to understand the biochemistry and disease pathology in this primate model.

For the past three years, Dr. Bunnell has also served as the Chairman of the Scientific Advisory Committee for the National Tay Sachs and Allied Diseases (NTSAD) organization. NTSAD is a patient and family advocacy group focused on the lysosomal storage diseases. Dr. Bunnell's mission is to oversee the entire scientific research program for the organization and to advise NTSAD on how to invest the funds they raise to sponsor scientific research into lysosomal storage diseases and therapies.

**Donald G. Phinney, Ph.D.**

Professor of Microbiology

Associate Director for Research

Research in Dr. Phinney's lab is focused on examining the basic biology of bone marrow-derived mesenchymal stem cells (MSCs) and evaluating their therapeutic efficacy in various experimental animal models of disease. Dr. Phinney's laboratory was the first to develop a reliable method based on immunodepletion to enrich MSCs from murine bone marrow as well as catalogue the transcriptome of murine and human MSCs using a transcript profiling method known as serial analysis of gene expression (SAGE). Interrogation of these SAGE databases has revealed new insight into the molecular mechanisms that regulate self-renewal vs. lineage

commitment in MSCs and as such may better define the nature of the bona fide mesenchymal stem cell. These analyses have also identified a number of novel MSC subpopulations that are discriminated based on their expression of proteins that regulate angiogenesis, hematopoiesis, immunity and defense, and neural activities. Identification of these subpopulations has provided new insight into the therapeutic action of MSCs. For example, Dr. Phinney's lab pioneered the direct intracranial transplantation of MSCs for the treatment of neurological disorders. Ongoing pre-clinical studies in non-human primates being conducted at the Tulane National Primate Research Center have demonstrated that MSCs engrafted within the brain localize over time to specific anatomical structures. The identification of unique MSC subpopulations that express receptor proteins known to regulate tangential migration of interneurons in response to expressed guidance cues provides a mechanism to explain the migratory ability of MSCs in brain. Dr. Phinney's lab was also the first to publish that MSCs are efficacious in treating chronic lung injury. Recent discovery of a novel MSC subpopulation that secretes high levels of the anti-inflammatory protein interleukin 1 receptor antagonist (IL1RN) has provided a mechanism for the anti-inflammatory effect of MSCs in lung and possibly other tissues. Efforts in the laboratory are focused on better characterizing these novel subpopulations, deciphering their function in bone and marrow, and developing methods to exploit their unique biology to treat disease.

**Carl A. Gregory, Ph.D.**

Assistant Professor of Medicine

Dr. Gregory's interest in the investigation of the role of canonical Wnt signaling in osteogenesis by human MSCs *in vitro* has demonstrated that osteogenesis proceeds in response to molecules such as BMP2 and is sustained by canonical Wnt signaling. In the presence of Dkk-1, an inhibitor of canonical Wnt signaling, the cascade is disrupted, resulting in inhibition of osteogenesis. Anti-Dkk-1 strategies are clinically relevant since high serum Dkk-1 is thought to contribute to osteolytic lesion formation in multiple myeloma, and more recently, systemic Dkk-1 levels have been linked to aggressive osteosarcoma by his group. These bone lesions result in intractable pain, fracture, and provide a growth environment that permits rapid tumorigenesis. Systemic Dkk-1 detection may therefore lead to a new and powerful diagnostic tool for these diseases but it may also represent a molecular target for therapy. To this end, peptide mapping studies by the group have resulted in functional peptide Dkk-1 agonists and the opportunity for the production of blocking antibodies and cancer vaccines. Furthermore, drugs that inhibit glycogen synthetase kinase 3 beta (GSK3b) and peroxisome proliferator activating receptor gamma (PPARg) mimic canonical Wnt signaling also block the action of Dkk-1. Thus, blocking Dkk-1 antibodies and other inhibitors may provide the promising opportunities for the enhancement of bone repair in a variety of human diseases such as multiple myeloma, osteosarcoma and even osteogenesis imperfecta. The group have at their disposal rodent models of osteosarcoma, multiple myeloma, osteogenesis imperfecta and calvarial trauma, and they are currently optimizing a model of osteoporosis. Dr. Gregory's group collaborates with investigators at the Tulane Cancer Center, Tulane Uptown Campus, St Jude Children's Hospital and Louisiana State University. He also works on more efficient modes of MSC administration

involving solid gel constructs of species specific serum and novel methods for the molecular phenotyping of MSCs.

**Radhika Pochampally, Ph.D.**

Assistant Professor of Pharmacology

The general focus of Dr. Pochampally's research is to understand the survival properties of serum deprivation resistant MSCs (SD-MSCs) and their therapeutic potential in various disease models. SD-MSCs are the most primitive subpopulation in the heterogeneous population of mesenchymal stem/progenitor cells from bone marrow stroma. Current projects to further characterize the SD-MSCs include studying the role of (a) epigenetic regulation (b) micro-RNA regulation and (c) post translational regulation in the survival of the cells. The engraftment and therapeutic potential of MSCs, SD-MSCs and the secreted factors in the conditioned media are being examined in mouse atherosclerotic models and in a chick embryo model. In addition Dr. Pochampally is isolating osteosarcoma cancer stem cells and understanding the role MSCs in osteosarcoma initiation and progression. Dr. Pochampally has active collaborations with Yale University, University of Minnesota, Louisiana State University and several within Tulane University collaborations. As the Director of Adult Stem Cell Core facility of the Louisiana Cancer Research Consortium, Dr. Pochampally oversees the supply of MSCs for investigators studying MSCs and cancer cell interactions.

**Malwina Czarny-Ratajczak, Ph.D.**

Research Instructor of Pediatrics

Dr. Czarny-Ratajczak is investigating genetic factors that predispose some humans to osteoarthritis and bone dysplasias (inherited disorders of cartilage). Osteoarthritis is the most common of all joint disorders and multiple mechanisms are implicated in the development of this disease, in which a complex genetic background appears to interact with environmental factors. The severe primary forms of osteoarthritis and bone dysplasias are caused by mutations in the genes encoding structural proteins of the cartilage. Dr. Czarny-Ratajczak is using wide-genome scan to identify novel potential loci for primary osteoarthritis and bone dysplasias. She is also interested in mutation analysis and genotype-phenotype correlations in osteoarthritis, bone dysplasias and overlapping osteoarthritis/multiple epiphyseal dysplasia phenotype.

**Roxanne L. Reger, M.S.**

Research Instructor of Medicine

Ms. Reger and her collaborators are investigating the potential therapeutic use of adult mesenchymal stem/progenitor cells (MSCs) from bone marrow in spinal cord injury. Ms. Reger is also interested in gender differences in spinal cord injury models and the potential role of estrogen in mediating these differences. Her group is employing methods including immunohistology to assess the phenotype of MSC implants and 3D reconstruction of the

implants and lesion areas to assess integration, along with behavioral analyses of sensorimotor function. They are also developing methods of delivering MSCs to the damaged spinal cord that would minimize damage to intact areas of the cord and yet maximize cell engraftment, survival and, ultimately, functional recovery of motor and sensory losses. The optimization of the MSC delivery system includes work on non-human primates at the Tulane National Primate Research Center. Ms. Reger is also involved in designing a clinical trial using a patient's own MSCs as a therapy for acute spinal cord injuries. Ms. Reger also serves as process development for the cGMP laboratories and supervises the cell culture research core.

**Margaret R. Wolfe, M.S.**

Research Instructor of Medicine

Ms. Wolfe's research interests include culture and characterization of MSCs, translation of research procedures used in MSC culture and characterization into cGMP processing of MSCs for use in the clinical arena. Also, she is interested in standardizing culture techniques and characterization procedures for MSCs and collection of data on large scale preparations of human MSCs in order to establish an inventory of standardized human MSCs for distribution to researchers, both national and international, for use in their research studies. She collaborates on the characterization and production of MSC samples for distribution of MSCs to researchers worldwide.

## EDUCATIONAL ACTIVITIES

A major role of the Center is the training of new scientists. Annually, the Center mentors undergraduate and graduate students. Each student has a specific project that is a part of the overall aim of characterizing adult stromal cells or evaluating their potential for treatment of diseases. Alternatively, the students can work at discovering mutations that cause human disease. Students have regular mentoring meetings, as well as regular seminars and journal clubs. In 2007, there were 20 graduate students in the Center. Two earned PhD degrees. In addition, two M.D./Ph.D. candidates from Russia carried out research in the Center under auspices of grants provided by the Russian Academy of Sciences.

The Center also conducts an active program for postdoctoral fellows. Over the years, more than 30 former students and postdoctoral fellows mentored by Dr. Prockop or his associates have become tenured professors and over 15 have become heads of their own departments. The Center is dedicated to continuing this tradition. In 2007, 12 postdoctoral students were members of the Center staff. One of the postdoctoral fellows was sponsored by a grant from the Chinese government.

As part of its educational activities, the Center also organizes educational tours for high school student classes and makes available a limited number of intern positions available for summer students to work in the laboratories. In 2007, the Center hosted two exchange students from University of Manchester, U.K., and 3 summer interns. It also hosted a visiting scientist from India who was supported, in part, by a grant from the Indian government.

## STUDENTS

### Graduate

Matthew Abrams, M.P.H. (Graduated with PhD)  
Gregory Block, M.S.  
Mette Flaata, M.S.  
Rebecca Foltz, M.S.  
Jessica Foraker, B.S.  
Christine Gagliardi, B.S.  
William Gunn, B.S.  
Wen-Tzu Lai, M.S.  
Benjamin Larson, B.S.  
Scott Olson, B.S. (Graduated with PhD)  
Adam Oskowitz, M.S.  
Bindiya Patel, B.S.  
Anthony Perry, B.S.  
Charla Poole, B.S.  
Cynthia Ripoll, B.S.  
Andrew Robinson, M.Sc.  
Julie Semon, B.S.  
Brooke Stoutenger, M.S.  
Susan Tom, B.A.  
Mandolin Whitney, B.S.  
Joni Ylostalo, B.S.  
Suzanne Zeitouni, B.S.

### Postdoctoral

Hosoon Choi, Ph.D.  
Scott Davis, Ph.D.  
Charles Foltz, Ph.D.  
Reza Izadpanah, D.V.M., Ph.D.  
Ulf Krause, M.D.  
Xiaoling Kuai, M.D.  
Ryang Hwa Lee, Ph.D.  
Harris McFerrin, Ph.D.  
Hirokazu Ohtaki, Ph.D.

Shinya Okouchi, M.D., Ph.D.  
Cecilia Sanchez, Ph.D.  
Makoto Shoji, M.D., Ph.D.  
Jason Smith, Ph.D.  
Wuling Zhu, M.D., Ph.D.

### Medical

Christopher Malone, B.S.

### Undergraduates

Trivia Frazier  
James Woltman  
Lauren Nagy

### Summer Interns

Jessica Butler  
Aaron Boonjindasup, B.S.  
David Cai, B.A.  
Philip Smoltz, B.S.

### Exchange Students

(University of Manchester, UK)  
Michael Harris  
Daniel Ryan

### Visiting M.D./Ph.D. Candidates

(Moscow Medical Academy, Russia)  
Nickolay Bazhanov, M.D.  
Andrey Pulin, M.D.

### High School Students

Kinshasha Rushing  
Tong Chen  
Khai Hoan Tram

## ADMINISTRATION AND TECHNICAL STAFF

**Office Manager:**

Linda Ledet

**Senior Department Administrator:**

Linda Dodenhoff, M.B.A., C.P.A.

**Executive Secretaries:**

Deborah Williams

Anne Bennett

Elise Legrande

**Accountant 1:**

Vanessa Martin

**Procurement Coordinator:**

Tamala Lannes

**Records Coordinator:**

Rosalind Jase

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Anna Szyller, B.S., M.T. (A.S.C.P.)

**cGMP Quality Manager:**

Scott Hughes, B.S.

Lisa Musso, B.S., M.T. (A.S.C.P.)

**cGMP Regulatory Affairs Manager:**

Leslie Royal Gay, B.B.A.

**cGMP Document Specialist:**

Linda Aymami

**Computer Operations Manager**

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**Laboratory Supervisors:**

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Christine Robinson, M.S.

Alan Tucker, B.S., M.T.

**Medical Research Specialists:**

Dina Gaupp, B.S.

Claire Llamas, B.S.

Justin Manges, B.A.

Joni Ylostalo, M.S.

**Research Scientists:**

Michelle Cheramie, B.S.

Maria DuTreil, B.S.

Iryna Isakova, Ph.D.

Denise Totaro, B.S., M.T.

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**Laboratory Technician Specialist:**

Cynthia Trygg, B.A.

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Jonathan Dendy, B.S.E.

Loy Ernst III, B.S.

Jeanne Fisher, B.S.

Stacey Haseman, B.S.

Jay Hood, M.S.

John Brady Imms, B.S.

Monica Lobo-Trojack, B.S.

Marjorie McCants, B.A.

Patrice Penfornis, M.S.

Min Jeong Seo, M.S.

**Medical Research Technicians:**

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Bindiya Patel, B.S.

**Medical Technician:**

Like Tonggu, B.S.

**Laboratory Aides:**

Aaron Boonjindasup, B.S.

David Cai, B.A.

Mary Nguyen

## **CORE LABORATORIES AND SERVICES PROVIDED**

The Center has established a series of core laboratories that provide critical research support for the faculty and members of the Center. The services are also available to other faculty of Tulane University and to other institutions in the region. The Center faculty are also involved in numerous collaborations with colleagues in the greater scientific research community.

### **Morphology and Related Cores**

**DNA Diagnostic Core.** The core provides DNA diagnostic tests that define the exact mutations in genes that cause a series of important human diseases. The DNA diagnostic services began as research projects carried out by the Center staff. Because a large number of mutations, such as the mutations in Type I collagen that cause osteogenesis imperfecta, have already been discovered, some of the DNA diagnostic activities of the core are no longer supportable by research funds. Therefore, the tests are now offered on a fee-for-service basis. All the tests offered by the Center were developed by Center staff. The Core currently provides DNA tests for osteogenesis imperfecta, Marfan syndrome, and chondrodysplasias. The core is unique in that no other laboratory in the world currently provides DNA tests for all of these diseases. In 2007, the DNA Diagnostic Core processed 1,034 samples.

**DNA Sequencing Core.** In association with its DNA Diagnostic Core, the Center has developed a highly efficient DNA Sequencing Core that rapidly defines the exact DNA sequence of genes from any source. The facility includes the latest automated micro-capillary based instruments for DNA analyses. Also, the Core staff provide expert advice in preparing DNA samples for analysis and in interpreting the data. The Core is widely used by faculty from Tulane and other institutions. The DNA Sequencing Core processed 69,505 samples in 2007. In addition to the 66,858 submitted by the Center, 2,393 were submitted by faculty from other departments at Tulane, and 254 from outside institutions.

**Cell Sorting Core.** The Center has established a service for cell analysis and sorting by fluorescence activated cell sorting (FACS). The instrument can rapidly scan millions of cells and deposit them in separate tubes based on small differences in size, shape, or proteins they contain. The facility also includes a closed-stream flow cytometer for rapid analysis of cells. In 2007, the Core performed 2,138 tests for Center members, 506 for other Tulane departments, and 316 for other outside institutions. In addition, the Core supervisor has provided advisory services to cell sorting departments within Tulane and at other outside institutions.

**Microscopy Core.** The Core supplies access to a series of microscopes that include visible light microscopy and fluorescence microscopy. The microscopes available include a deconvolution microscope that makes it possible to collect sharply focused images through sections and then reconstruct them in three dimensions. The images can then be rotated and examined in all three dimensions. Another microscope is equipped with a computerized stage and environmental chamber that makes it possible to follow the growth and differentiation of cells in culture in real

time. It can take photographs of cells at very frequent intervals to follow their growth and movement. This Core also has a laser dissecting microscope that permits isolation of single cells or even cellular sub-components for further testing. The Core also has an Olympus BX51-DSU spinning disk confocal microscope that allows for rapid visualization of multiple labels within a biological specimen, colocalization of fluorescent labels in 3D space, high resolution seamless image montages, and accurate measurements of objects (including size, shape, and number) using design-based stereology.

**MicroPET Core.** This core has the capability to perform positron electron tomography on small animals, including rodents and small non-human primates. The Core will enable scientists to follow the progression of stem/progenitor cells administered therapeutically in animal models of disease. The microPET instrument makes it possible to follow the growth and movement of previously labeled cells that are infused into an animal in real-time without the need to sacrifice the animal. (The instrument was purchased with funds provided by the Tulane Primate Center, and the Louisiana Gene Therapy Research Consortium through the Tulane Gene Therapy Center and the Gene Therapy Center of LSUHSC, New Orleans).

**Histology Core.** This core provides a variety of histological services including tissue processing and embedding in paraffin or plastic resins, sectioning of frozen, paraffin, or plastic embedded tissues and analysis of tissue sections using a variety of specialty stains. The core can also provide technical advice for performing immunostaining and or fluorescent in situ hybridization. The core currently houses two Leica TP1020 tissue processors, a Micron HM505E computerized cryostat, a Micron HM340E rotary microtome, a Leica EG1140H embedding center, a Leica EG1140C cold plate, a Lynx Eo microscopy tissue processor, a Mopex rotodry oven, a Boecko Scientific 240000 slide moat and a TBS Sure/Mark slide labeler. The facility is staffed by a full-time, certified Medical Technology Specialist. In 2007, the Core processed 2,923 tissue samples, producing 18,126 slides. 750 of these tissues were from the Center and resulted in 10,188 slides; 2,173 tissue samples from other departments within Tulane were processed, producing 7,938 slides.

### **Stem/Progenitor Cells/Vector Cores**

**Micro-Array Analysis Core.** The Core provides for the analysis of mRNAs with the latest micro-array technology. The technology makes it possible to define the expression of over 30,000 genes in cells and tissues. The microchips and other equipment are continually updated to include assays of most defined genes as well as thousands of other genes whose functions are still not yet defined. In 2007, the Core assayed 216 samples, 113 from members of the Center, and 103 from other departments within Tulane University. In addition to providing data, the Core assisted scientists in analyzing and interpreting the data.

**Proteomics Core.** The instrumentation in this Core includes a mass spectrometer for analysis of proteins by SELDI-TOF. The instrumentation can rapidly analyze as little as 5 picograms of protein. Peptides can be identified in terms of molecular weight with an accuracy of one Dalton while larger proteins are usually analyzed with an accuracy of 5-10 Daltons. By analysis of both the intact molecule and its tryptic peptides, it is possible to identify most proteins in the protein

data bank. The core also includes a biosensor for real time studying of protein-protein binding and the kinetics of this binding. In addition, the core includes a Jasco J-810 circular dichroism spectropolarimeter for studying the secondary structures and stabilities of the proteins. In 2006, the Core was enlarged with the purchase of a Beckman-Coulter PF2D automated two-column system for separation and isolation of protein. About 0.1-5.0 milligrams of protein can be fractionated using the first dimension chromatofocusing column based on the isoelectric points of proteins. The fractions can then be run on the second dimension reverse phase column that separates proteins based on their hydrophobicity. One run results in over 800 fractions that can be used for further analysis such as protein identification by mass spectrometer.

**Cell Culture and Repository Core.** The Core provides a series of sterile laboratories and facilities for preparation and expansion of cell cultures. The cell repository in the Core contains almost 2,000 samples of cells from patients with a variety of diseases. Well characterized stem/progenitor cell preparations are distributed to academic researchers worldwide.

**Real-Time PCR Core.** The Core currently houses an Applied Biosystems 7700 Sequence Detector for real-time PCR analysis. These instruments are equipped with multiple lasers, which cover a broad area of the electromagnetic spectrum. They use mathematical algorithms to deconvolve the spectra of each fluorochrome used for detection. This provides greater flexibility with regard to experimental design and allows for multiplexing of samples. Additionally, the core provides assistance to first time users with regard to primer design, instrumentation training and data analysis.

**Micro Fluidics Core.** The Core features the Applied Biosystems 7900HT Fast Real-Time PCR easy-to-use tool that facilitates high throughput quantitative gene expression analysis using gold-standard 5' nuclease assay technology. Results provide accurate, quantitative real-time gene expression of mRNAs from over 300 genes on a single customized assay.

**cGMP Laboratory.** The Current Good Manufacturing Practices (cGMP) Laboratory is a necessary facility for a goal of the Center to develop and advance new cellular therapies for several illnesses, including spinal cord injury, diabetes, end-stage cardiovascular disease, graft versus host disease, and chronic pulmonary fibrosis. With the development of these new research programs, and the emergence of clinically targeted stem/progenitor cell therapies, the creation of such a facility to manufacture and utilize these materials is critical. The cGMP Laboratory adheres to federal regulations for Current Good Manufacturing Practice for Finished Pharmaceuticals and Biological Products utilizing Standard Operating Procedures (SOPs).

The cGMP laboratory is located on the 21<sup>st</sup> floor of the Tulane Tidewater Building on Canal Street, in the downtown area of New Orleans, Louisiana. The cGMP laboratory occupies approximately 2,400 sq. ft., of which almost 1,000 sq. ft. is dedicated to aseptic manufacturing. This area of the laboratory is a traditional non-unidirectional turbulent airflow cleanroom with HEPA-filtered air and established positive pressure gradients between adjacent rooms and the outside of the facility. The facility has controlled access for entrance and enforces unidirectional traffic flow patterns for personnel, materials, products, and waste. The manufacturing area houses four dedicated Production Suites located off of a shared corridor and contains a Gown-

in Room and Materials Transfer Room which also serves as the main exit from the facility. Each of the Production Suites contain 8 water jacketed incubators, two Biological Safety Cabinets, a refrigerator, a centrifuge with a 4-place swinging bucket rotor, and a Nikon phase contrast microscope. The remaining space is partitioned amongst administrative offices, Materials Storage and Quarantine Area, Shower and Change rooms, a Freezer Room, a Mechanical Room which contains the air handling units, and a modern QC laboratory, equipped with incubators, rapid endotoxin detection plate reader, a flow cytometer for cell counting, pH meter, and various other pieces of laboratory equipment.

The objective of the cGMP laboratory is to produce and distribute MSCs for use in approved clinical trials. As such it is critical that these materials be of the highest quality, be safe, and possess the strength, identity, purity, and potency that they purport to have. To achieve this, all cGMP operations are designed to conform to federal regulations for Current Good Manufacturing Practice for Finished Pharmaceuticals (cGMP) and Biological Products. All operations or procedures are conducted according to authorized Standard Operating Procedures (SOPs) for personnel, raw materials, the facility, equipment, production techniques, and quality control assays.

The staff has conducted several process development experiments to ensure that stem/progenitor cells can be produced and prepared according to the proposed procedure. This work has culminated with an official Manufacturing Process Validation Study. A Drug Master File contains a concise summary of the facility with floor plans showing locations of major equipment, flow patterns for movement of personnel and materials, and describes maintenance, cleaning, and calibration programs, the facility's organizational chart, personnel responsibilities, and the types of products manufactured.

The cGMP is designed to produce up to 200 preparations per year of stem/progenitor cells (MSCs).

## UNIVERSITY COMMITTEES AND RESPONSIBILITIES

**Darwin J. Prockop, M.D., Ph.D.**

**Committees:**

Member, Executive Faculty Committee

Member, Dean's Staff

Member, Senior Vice President/Dean of Tulane Health Sciences Center/Medical School Search Committee.

Member, Graduate Student Thesis Committee, Matthew Abrams, Neuroscience, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Gregory Block, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Jessica Foraker, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Grady Gunn, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Benjamin Larson, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, James Munoz, Neuroscience, Tulane University Health Sciences Center, Tulane University.

Chairman, Graduate Student Thesis Committee, Scott Olson, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Adam Oskowitz, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Anthony Perry, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Charla Poole, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Roxanne Reger, Neuroscience, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee; Andrew Robinson, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Julie Semon, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Brook Stoutinger, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee; Mandolin Whitney, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Joni Ylostalo, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Suzanne Zeitouni, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University.

**Teaching:**

Genetics course for 2<sup>nd</sup> year medical students (1 hr).

Genetics course for graduate students in genetics (1½ hrs).

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**Brian T. Butcher, Ph.D.**

**Committees:**

Member, Tulane University Health Sciences Center Committee on Use of Human Subjects (IRB).

Alternate Member, Executive Faculty Committee.

Medical Student Applicant Interviews, Tulane University Health Sciences Center.

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**Bruce A. Bunnell, Ph.D.**

**Committees:**

Voting Senator, Tulane University Senate.

Member, Personnel and Honors Committee, Tulane University Health Sciences Center

Member, MRI Exploratory Committee, Tulane University Health Sciences Center.

Member, Grievance Committee, Tulane University Health Sciences Center.

Member, Graduate Studies Committee, Department of Pharmacology, Tulane University.

Member, Institutional Animal Care and Use Committee (IACUC), Tulane National Primate  
Research Center.

Member, Institutional Biosafety Committee, Tulane University.

Member, Executive Committee, Tulane National Primate Research Center.

Primary Advisor, Cynthia Ripol, Ph.D. Program, Department of Pharmacology, Tulane  
University Health Sciences Center, Tulane University, New Orleans, LA.

Primary Advisor, Bindiya Patel, Ph.D. Program, Department of Pharmacology, Tulane  
University Health Sciences Center, Tulane University, New Orleans, LA.

Primary Advisor, Mette Flatte, Ph.D. Program, Department of Biochemistry, Tulane University  
Health Sciences Center, Tulane University, New Orleans, LA.

Member, Graduate Student Thesis Committee, Gregory Block, Molecular and Cellular Biology  
Program, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Suzanne Zeitouni, Molecular and Cellular  
Biology Program, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Scott Melton, Molecular and Cellular Biology  
Program, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Dissertation Committee, Amanda Beethem, Master's Program,  
Department of Pharmacology, Tulane University Health Sciences Center, Tulane  
University, New Orleans, LA.

Member, Graduate Student Dissertation Committee, Cassandra Stewart, Master's Program, Department of Pharmacology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, Graduate Student Dissertation Committee, Snehal Patel, Master's Program, Department of Pharmacology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, Graduate Student Dissertation Committee, Scott Friedmann, Master's Program, Department of Pharmacology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, Graduate Student Thesis Committee, Brooke Stoutenger, Neuroscience Program, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Julie Semon, Molecular and Cellular Biology Program, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Scott Olsen, Molecular and Cellular Biology Program, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, James Munoz, Neuroscience Program, Tulane University Health Sciences Center, Tulane University.

Member, Graduate Student Thesis Committee, Anthony C. Perry, Molecular and Cellular Biology Program, Tulane University Health Sciences Center, Tulane University.

**Teaching:**

Basic Human Genetics, GENE 231, Stem Cells (2.0 hours)- LSUHSC.

Pharmacological Research, Pharm 750, Use of Animals in Research (2.0 hours).

Pharmacological Research, Pharm 750, Gene Transfer Technology (2.0 hours).

Principles of Pharmacology, GPHR 724, Proteomics (2.0 hours).

Principles of Pharmacology, GPHR 724, Inhibition of Gene Expression (2.0 hours).

Graduate Neuroscience, NSIP 711, Lysosomal Storage Diseases and the CNS (1.0 hours).

Gene Therapy- Tapping the womb- *In Utero* Gene Therapy (1.0 hour)-LSUHSC.

Gene Therapy- Nonhuman Primates as Models in Gene Therapy (2.0 hour)-LSUHSC.

Cellular Control Mechanisms, GPHR 705- Cell Cycle Control Mechanisms (2.0 hours).

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**Donald G. Phinney, Ph.D.**

**Committees:**

Institutional Animal Care and Use Committee (IACUC)

Voting Senator, Tulane University Senate

Member, Committee on Committees, Tulane University Senate

Member, Immunology Search Committee, Tulane University Health Sciences Center

Judging Committee, Tulane Research Days

Member, Neuroscience Faculty Group, Tulane University Health Sciences Center

Member, Graduate student thesis committee, Matt Abrahams – Neuroscience, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, Graduate student thesis committee, William G. Gunn – Biomedical Sciences, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, Graduate student thesis committee, Suzanne L Tomchuck - Biomedical Sciences, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, Graduate student thesis committee, Joni Henrik Ylostalo – Biomedical Sciences, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Mentor, Rebecca F. Foltz - Graduate program in Neuroscience, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Mentor, Wen-Tzu Lai – Graduate program in Microbiology and Immunology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

**Teaching:**

Molecular Medicine in Disease (Genetics 246), (Spring, 2 hrs).

Graduate Neuroscience (NSCI 711) (Fall, 1.25 hrs)

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**Carl Gregory, Ph.D.**

**Committees**

Chair, graduate student thesis committee, Mandolin Whitney, Biomedical Sciences, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, graduate student thesis committee, Ben Larson, Biomedical Sciences, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, graduate student thesis committee, Grady Gunn, Biomedical Sciences Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, graduate student thesis committee, Elizabeth Norton, Biomedical Sciences, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Mentor, Brian Ford, Tulane University, undergraduate

Mentor, Samy Abdelghani, Tulane University, undergraduate

Mentor, Daniel Ryan, University of Manchester, UK, undergraduate

Mentor, Andy Lee, University of Manchester, UK, undergraduate

Mentor, Angela Green, University of Manchester, UK, undergraduate

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**Radhika R. Pochampally, Ph.D.**

**Committees:**

Member, graduate student committee, Baiying Chen, Pharmacology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, graduate student committee, Sandeep Koka, Pharmacology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, graduate student committee, Lyndsay Vanhoy, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member - Mentor, graduate student committee, Adam Oskowitz, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, graduate student committee, Gregory Block, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Member, graduate student committee, Carolyn Marsden, Molecular and Cell Biology, Tulane University Health Sciences Center, Tulane University, New Orleans, LA.

Mentor, Aaron Boonjindasup, Graduate Student Program, Department of Pharmacology. Tulane University, 2006-2007.

Mentor, David Cai, Graduate Student Program, Department of Pharmacology Tulane University, 2006-2007.

Mentor, Elizabeth Hoy, Graduate Student Program, Department of Pharmacology Tulane University, 2006-2007.

Mentor, Christopher Malone, Tulane University – Medical

Mentor, Trivia Frazier, Biochemical Engineering, Tulane University, undergraduate

Mentor, Daniel Ryan, University of Manchester, UK, undergraduate

Mentor, Kinshasha Rushing, Tong Chen and Khai Tram – summer interns.

**Teaching:**

Pharmacology research (3 hours).

Cell control (2 hours).

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**Malwina Czarny-Ratajczak Ph.D.**

**Teaching:**

Skeletal dysplasias. Lecture for Graduate Students, Genetics course, Nov. 29, 2006 (1-hour oral presentation).

Connective Tissue Disorders. Lecture for Graduate Students, Genetics course, Dec. 7, 2006 (1-hour oral presentation).

Instructor and director of the SPHU 202 course “Genetics and Human Health”, Tulane University. Spring Semester Lectures:

- Human gene structure and expression (3 hours)
- Human genome & Mutations in the human genome (3 hours)

- Methods of molecular biology used in genetic testing & Polymorphisms (3 hours)
  - Cancer genetics (3 hours)
  - Gene therapy (2 hours)
  - Therapeutic and reproductive cloning & Pharmacogenetics (3 hours)
  - Genetics, public health and infectious diseases (2 hours)
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## EXTRAMURAL ACTIVITIES

**Darwin J. Prockop, M.D., Ph.D.**

### Committees and Workshops:

NIH Workshop on Stem Cells in Aging (NIA).

NIH Workshop on Specialized Clinical Centers of Research (NHLBI).

Ehlers-Danlos National Foundation, Medical Advisory Board.

National Marfan Foundation, Scientific Advisory Board.

American College of Medical Genetics, Affiliated Doctoral.

Molecular Medicine Society, Charter Member.

International Society for Stem Cell Research, Charter Member, Member of Finance Committee.

International Society for Cytotherapy, Member, Committee on Non-Hematopoietic Stem Cells.

Cystic Fibrosis Foundation and NIH/NHLB Workshop on Adult Stem Cells, Lung Biology and Lung Diseases, Co-organizer.

International Society for Gene Therapy, Member, Program Committee.

### Editorial Boards:

*Cell Stem Cells*, 2007-present

*Human Mutation*, 1991-present

*International Journal of Biochemistry*,  
1994-present

*Molecular Medicine*, 1994-present

*Molecular Therapy*, 2005-present

*Osteoarthritis and Cartilage*, 1997-present

*Stem Cells*, 2003-present

### Journal Review:

*American Journal of Pathology*

*Blood*

*Bone*

*Cell Stem Cells*

*Circulation*

*Brain Research*

*Cytotherapy*

*Experimental Cell Research*

*Gene Therapy*

*GLIA*

*Human Mutation*

*International Journal of Biochemistry &  
Cell Biology*

*International Journal of Cancer*

*Journal of Bone and Mineral Research*

*Journal of Cellular Biology*

*Journal of Cellular Physiology*

*Journal of Molecular Biology*

*Nature*

*Nature Medicine*

*Proceedings of the National Academy of  
Sciences*

*Stem Cells*

*The American Journal of Human Genetics*

*The FASEB Journal*

*The Journal of Neuroscience*

*Tissue Engineering*

### Grant Reviews:

Chair, NIA MSD/NIH ad hoc Study Section on Connective Tissue Diseases.

NIH Clinical Neuroplasticity and Neurotransmitter Special Emphasis Panel

National Marfan Foundation.

NIH Special Emphasis Panel on Applications of Therapeutics Delivery for Neurodegenerative Diseases  
Institute of Medicine of the National Academies, 37<sup>th</sup> Annual Meeting, 10/27/07, Washington, DC.

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**Brian T. Butcher, Ph.D.**

**Extramural Committees:**

Member, Board of Trustees, Scleroderma Foundation.  
Member, Executive Committee, Scleroderma Foundation.  
Vice Treasurer, Executive Committee, Scleroderma Foundation .  
Chair, Research Committee, Scleroderma Foundation.  
Member, Board of Directors, Louisiana Veterans Research Corporation, New Orleans, LA.  
Member, Program Review Committee, Division of Nutrition and Chronic Disease, Pennington Research Center, Baton Rouge, LA

**Journal Review:**

*J Amer Acad Allergy, Clin Immunol, & Immunother.*

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**Bruce A. Bunnell, Ph.D.**

**Extramural Committees**

Member, Planning Committee, NINDS-NIH Workshop on Glycosphingolipids and Disease.  
Ad Hoc Reviewer for Nonhuman Primate IACUC Protocols for the University of Miami School of Medicine.  
Chair, Scientific Advisory Committee, National Tay-Sachs and Allied Disease Foundation.  
Member, Lung Gene Therapy Committee, American Society of Gene Therapy.

**Journal Review**

*Stem Cells*  
*Proceedings of the National Academy of Sciences*  
*Stem Cells and Cloning*  
*FASEB Letters*  
*Human Gene Therapy*  
*Molecular Therapy*  
*Journal of Biological Chemistry*  
*FASEB Journal*  
*BMC Genomics*

*Blood*  
*American Journal of Pathology*  
*Matrix Biology*  
*Haematologica*  
*Journal of Biological Chemistry*  
*FASEB Journal*  
*Nature Protocols*  
*Stem Cells*  
*Experimental Hematology*  
*Brain Research*  
*BMC Cell Biology*

**Grant Review:**

Reviewer, Grant Proposals, Kentucky Science and Engineering Foundation, University of Kentucky, Lexington, KY.  
Member, NIH/NHLBI Special Emphasis Panel, ZHL1CCT-ZC1, NHLBI Gene Therapy Program, Bethesda, MD.  
Member, National Gene Vector Laboratory Review Panel, NCRR/NIH, Bethesda, MD.  
Reviewer, Respiratory Stem Cell Repair Program Pilot Proposals, Australian Stem Cell Center, Monash University, Clayton, Victoria, Australia.  
Member, NIH/NINDS Special Emphasis Panel, ZNS1-SRBE-16, Centers for Excellence in Stem Cell Research, Washington, DC.  
Member, NIH/NICHD Special Emphasis Panel, ZHD1-DRG-D, Pluripotent Stem Cells in Development and Disease, Bethesda, MD.  
Member, NIH/NIDDK Special Emphasis Panel, ZDK1GRB-R, AAV and Genetic Abnormalities, Bethesda, MD.  
Reviewer, Pilot Proposals, Southwest National Primate Research Center, San Antonio, TX.

**Editorial Boards:**

*Molecular Therapy*, 2005-present  
*Stem Cells*, 2006-present

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**Donald G. Phinney, Ph.D.**

**Committees:**

Invited reviewer: Physiology and Pathobiology of Organ Systems–Fellowships 2 (ZRG1 F10-H), National Institutes of Health.  
Expert Witness, Drinker, Biddle and Reath Law Offices, Berwyn, PA.  
External Scientific and Program Advisory Board, NDICR Research Infrastructure Development Program, College of Dental Medicine, Medical University of South Carolina.  
Associate Editor, *Stem Cells* (AlphaMed Press; [stemcells.alphamedpress.org/](http://stemcells.alphamedpress.org/))  
Co-Editor, *Stem Cells* (as of January 1, 2008)

**Journal Review:**

<i>Am. J. Physiol</i>	<i>J. Cell. Physiol.</i> ,
<i>Biotechnology Progress</i>	<i>J. Exp. Med.</i> ,
<i>BMC Genomics Differentiation</i>	<i>Neuroscience</i>
<i>Cell Proliferation</i>	<i>Stem Cell Dev.</i> ,
<i>Cytotherapy</i>	<i>Stem Cell Research</i> ,
<i>Exp. Hematol.</i>	<i>Stem Cells.</i>
<i>Expert Opin. Biol Ther</i>	

**Grant Review:**

The Wellcome Trust (Research Training Fellowship).  
Lung Injury, Repair and Remodeling (LIRR) Study Section, National Institutes of Health.

Invited Reviewer, Clinical Neuroplasticity and Neurotransmitter Special Emphasis Panel (ZRG1 BDCN B02S), NINDS, National Institutes of Health.

Invited reviewer, Clinical Neuroplasticity and Neurotransmitter Study Section (CNNT), NINDS, National Institutes of Health.

The Wellcome Trust Research Training Fellowships.

Invited Reviewer, Agency for Science, Technology and Research's (A\*STAR), Biomedical Research Council (BMRC), Singapore, Philippines.

**Editorial Boards:**

Associate Editor, *Stem Cells* (AlphaMed Press).

Editorial Board, *Open Biotechnology* (Bentham Science Publishers Ltd.).

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**Carl A. Gregory, Ph.D.**

**Journal Review:**

*Biotechnology Progress*

*Experimental Cell Research*

*Journal of Biological Chemistry*

*Journal of Bone and Mineral Research*

*Leukemia and Lymphoma*

*Regenerative Medicine*

*Stem Cells*

*Tissue Engineering*

**Grant Review:**

Agency for Science, Technology and Research (A\*STAR), Singapore.

Biomedical Research Council (BMRC), Singapore.

Canadian Space Agency (CSA) Life Science Program

National Science Foundation, USA.

Ohio Cancer Research Foundation, USA

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**Radhika R. Pochampally, Ph.D.**

**Journal review:**

*Stem Cells*

*FASEB J*

*Cytherapy*

*Regenerative Medicine*

*Endocrinology*

**Grant Review:**

US Civilian Research and Development Foundation.

Agency for Science, Technology and Research (A\*STAR), Singapore.

Biomedical Research Council (BMRC), Singapore.

Maryland Stem Cell Program

## INVITED LECTURES, PRESENTATIONS, AWARDS AND HONORS

### Darwin J. Prockop, M.D., Ph.D.

- 04/04/07 Stem Cell Therapy/School of Public Health
- 04/17/07 Lecture to Department of Biochemistry students, Tulane University
- 04/19/07 Special Renewal Seminar Series, *The Characteristics and Potential Therapeutic Uses of Adult Stem/Progenitor Cells from Bone Marrow*, Tulane University
- 04/25–27/07 Stem Cells and Renal Diseases Symposium, Brazil
- 04/28–30/07 AAA Annual Meeting (Keynote Speaker), Washington DC, *Adult Stem/Progenitor Cells that Repair Tissues. Characterization and Potential Therapeutic Uses.*
- 06/05–07/07 ILSI-BIOMED Israel 2007, Tel-Aviv, Israel,
- 07/30–08/1/07 Speaker and co-organizer, Stem Cells and Cellular Therapy in Lung Biology and Lung Diseases, Burlington, VT
- 08/27-29/07 *The Reparative Power of Multipotent Stromal Cells from Bone Marrow*, Adult Mesenchymal Stem Cells in Regenerative Medicine Meeting, Cleveland, Ohio
- 10/08/07 *Potential therapeutic uses of stem/progenitor cells in healing tissues*, American College of Surgeons Meeting, New Orleans, LA
- 10/ 26–28/07 *The Reparative Power of Multipotent Stromal Cells from Bone Marrow*, Mesenchymal Stem Cells – Toward Cell therapy for Immune-Mediated Disorders Symposium, Geneva, Italy
- 12/13-15/07 *The Reparative Power of Multipotent Stromal Cells from Bone Marrow*, Inaugural "Regeneration Project" Meeting, Amelia Island Plantation Resort, Amelia Island, Florida
- 12/17/07 *Activation of Adult Stem/Progenitor Cells from Bone Marrow (MSCs) by Apoptotic and Ischemic Tissues*, NHLBI Stem Cell Seminar Series, Bethesda, MD
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**Bruce A. Bunnell, Ph.D.**

10/19/07 *Comparative Analyses of Mesenchymal Stem Cells Isolated from the Bone Marrow and Adipose Tissue, The Role of Adipose Tissue in Regenerative Medicine.* International Fat Applied Technology Society (IFATS), Indianapolis, IN.

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**Donald G. Phinney, Ph.D.**

11/30/07 *Biochemical Heterogeneity of MSC Populations: Insights Into Their Therapeutic Potential.* Hayward Genetics Center, Tulane University Health Sciences Center, New Orleans, LA..

11/15/07 *Mesenchymal stem cells: genomics to cell therapy.* Department of Microbiology and Immunology, State University of New York (SUNY) Medical Center, Brooklyn, NY.

08/01/07 *Alterations of the local lung environment by stem cells.* Stem Cells and Cellular Therapies in Lung Biology and Lung Diseases, University of Vermont, Burlington, VT.

06/25/07 13<sup>th</sup> Annual Meeting of the International Society of Cell Therapy (ISCT), *Mesenchymal stem cells administered to the CNS of rhesus macaques exhibit enhanced engraftment but a similar anatomical distribution in neonatal vs. adult recipients.* Sydney, Australia.

05/14/07 *A SAGE View of Mesenchymal Stem Cells.* The Department of Physiology, Tulane University Medical School, New Orleans, LA.

03/26/07 Louisiana House of Representatives Special Committee on Cellular Technologies,. *Translating Stem Cell Science into Cell-Based Therapies.* Pennington Biomedical Research Center, Baton Rouge, LA

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**Carl A. Gregory, Ph.D.**

11/15-16/07 *From Culture to Clinic: Promises and Challenges of Biotherapeutics Using Mesenchymal Stem Cells.* 2007 Genostem Symposium, Montpellier, France.

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**Radhika Pochampally, Ph.D.**

8/9/07        *Isolation of Tumor Initiating cells or Cancer Stem Cells from Bone Cancers,*  
Louisiana Cancer Research Consortium, Louisiana State University Health  
Science Center

8/23/07       *Nutrient deprivation of Mesenchymal Stem Cells Activates Survival Pathways*  
*including Autophagy and Secretion of Anti-apoptotic Factors,* Louisiana State  
University Health Science Center,

## DEPARTMENTAL SEMINAR SERIES 2007

- 01/11/07 Mervin C. Yoder, M.D., Indiana University School of Medicine, *Redefining circulating human endothelial progenitor cells,*
- 03/15/07 Fiona M. Inglis, Ph.D. Assistant Professor, Tulane University, New Orleans, LA, *Learning to walk: motor neurons, dendrites and glutamate receptors.*
- 09/06/07 Jacob Tolar, M.D., Ph.D., Assistant Professor, Pediatric Blood and Marrow Transplantation, University of Minnesota, *Host Factors in Stromal Stem Cell Transplantation.*
- 10/16/07 Jeffrey Gimble, M.D., Ph.D., Professor, Pennington Biomedical Center, Louisiana State University, Baton Rouge, LA, *Time Matters.*
- 11/08/07 Robert J. Deans, Ph.D., Senior Vice President of Regenerative Medicine, Athersys, Inc. Cleveland, Ohio, *Adult Stem Cells for Treatment of Ischemic Tissue Injury:Pre-clinical and Regulatory Perspective.*
- 12/06/07 Daniel A. Peterson, Ph.D., Associate Professor and Executive Director Center for Stem Cell and Regenerative Medicine, Rosalind Franklin University of Medicine and Science, Chicago, Illinois, *Properties of Stem Cells in the Aging Brain.*

## PUBLICATIONS

### **Darwin J. Prockop, M.D., Ph.D.**

Iso Y., Spees JL, Serrano C, Bakondi B, Pochampally R, Song Y-H., Sobel BE, Delafontaine P and Prockop DJ. Multipotent human stromal cells improve cardiac function after myocardial infarction in mice without long-term engraftment. *Biochemical and Biophysical Research Communications*. *Biochem Res Commun* March 16:354:700-706 (2007)

Prockop DJ and Olson SD. Clinical trials with adult stem/progenitor cells for tissue repair: let's not overlook some essential precautions. *Blood* April 15,109:3147-3151 (2007)

Hung SC, Pochampally RR, Hsu SC, Sanchez C, Chen SC, Spees J and Prockop DJ. Short-term exposure of multipotent stromal cells to low oxygen increases their expression of CX3CR1 and CXCR4 and their engraftment *in vivo*. *PLoS ONE* 2:e416 (2007)

Pochampally RR, Ylostalo J, Penforinis P, Matz RR, Smith JR and Prockop DJ. Histamine Receptor H1 and Dermatopontin: New Downstream Targets of the vitamin D receptor. *J. Bone Miner Res* June 4 [Epub ahead of print] (2007)

Prockop DJ. "Stemness" does not explain the repair of many tissues by mesenchymal stem/multipotent stromal cells (MSCs). *Clinical Pharmacology and Therapeutics* 82:241-243 (2007)

Hung SC, Pochampally RR, Chen SC, Hsu SC and Prockop DJ. Angiogenic effects of human multipotent stromal cell conditioned medium activate the P13K-Akt pathway in hypoxic endothelial cells to inhibit apoptosis, increase survival, and stimulate angiogenesis. *Stem Cells* Sept. 25: 2363-70 (2007).

Phinney DG and Prockop DJ. Concise Review: Mesenchymal Stem/Multi-Potent Stromal Cells (MSCs): the State of Transdifferentiation and Modes of Tissue Repair – Current Views. *Stem Cells*. 25: 2896-902 (2007).

Larson BL, Ylostalo J and Prockop DJ. Human Multipotent Stromal Cells (MSCs) Undergo Sharp Transition from Division to Development in Culture. *Stem Cells*; Oct. 4 [Epub ahead of print] (2007).

Kesteloot F, Desmouliere A, Leclercq I, Thiry M, Arresse JE, Prockop DJ, Lapiere CM, Nusgens BV and Colige A. ADAM metallopeptidase with thrombospondin type 1 motif 2 inactivation reduces the extent and stability of carbon tetrachloride-induced hepatic fibrosis in mice. *Hepatology*. 46:1620-31 (2007).

Lee N, Smolarz AJ, Olson S, David O, Reiser J, Kutner R, Daw ND, Prockop DJ, Horwitz EM and Gregory CA. A potential role for Dkk-1 in the pathogenesis of osteosarcoma predicts novel diagnostic and treatment strategies. *Br. J Cancer*. 97:1552-9 (2007).

Spees JL, Whitney MJ, Sullivan DE, Lasky JA, Laboy M, Ylostalo J and Prockop DJ. Bone marrow progenitor cells contribute to repair and remodeling of the lung and heart in a rat model of progressive pulmonary hypertension. *FASEB J* Nov. 2; [Epub ahead of print] (2007).

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**Bruce A. Bunnell, Ph.D.**

**Journal Articles**

Gimble JM, Katz AJ and Bunnell BA. Fat as a stem cell source. *Circ. Res.*, 100:1249-60. (2007)

Terrell K, Rasmussen TA, Trygg C, Bunnell BA and Buck WR. Molecular beacon phenotyping for Globoid Cell Leukodystrophy from hair roots in the twitcher mouse and rhesus macaque. *J. Neurosci. Methods*, 163:60-6. (2007)

Grayson W, Zhao F, Bunnell B and Ma T. Hypoxia enhances proliferation and tissue formation of human mesenchymal stem cells. *Biochem. Biophys. Res. Commun.*, 358:948-53. (2007).

Liu X, Luo M, Trygg C, Yan Z, Lei-Butters DCM, Smith C., Munson K, Guggino W, Bunnell BA and Engelhardt JF. Biologic differences in rAAV transduction of airway epithelia between human and old world non-human primate airway epithelia. (*Molecular Therapy*, in press). (2007)

Borda JT, Alvarez X, Ratterree MS, Phillipi-Falkenstein K, Lackner AA and Bunnell BA. Clinical and immunopathologic alterations in rhesus macaques affected with globoid cell leukodystrophy. (*Am. J. Pathol.*, in press). (2007)

Bunnell BA, Flaata M, Gagliardi C, Patel B and Ripoll C. Adipose-derived Stem Cells: Isolation, Expansion and Differentiation. (*Methods*, in press). (2007)

Izadpanah R, Kaushal D, Kriedt C, Tsien F, Patel B, Dufour J and Bunnell BA. Characterization of Aging Adult Mesenchymal Stem Cells. (*Cancer Research*, in press). (2007)

Wu X, Yu G, Parks H, Hebert T, Goh BC, Guilak F, Pelled G, Izadpanah R, Gazit D, Bunnell BA and Gimble JM. Circadian Mechanisms in Murine and Human Bone Marrow Mesenchymal Stem Cells Following Dexamethasone Exposure (*Bone*, submitted). (2007)

Kuai X, Gagliardi C and Bunnell BA. Differentiation of nonhuman primate embryonic stem cells along neural lineages. (*Stem Cells and Development*, submitted). (2007)

Kubisch HM, Gagliardi, C, Romero DG, Bunnell BA, Ratterree MS. Kinetics of pronuclear development and the effects of vector type and timing of injection on the efficiency of gene transfer into rhesus macaque embryos. (*Reproduction*, submitted). (2007)

Izadpanah R, Kherterpal I, Kaushal D, Kriedt C, Trygg C and Bunnell BA. (2007) Genomic and Proteomic Profiling of Bone Marrow and Adipose Tissue Derived Mesenchymal Stem Cells. (*J. Cell Biol.*, submitted)

**Articles in Books**

Izadpanah R and Bunnell BA. Gene Delivery to Mesenchymal Stem Cells. *In: Adult Mesenchymal Stem Cells*. (D Prockop, BA Bunnell, and D Phinney, eds.) Humana, Totowa, NJ. (in press). (2007)

Bunnell BA, Guilak F and Gimble JM. Differentiation of Adipose Stem Cells along Mesodermal Lineages. *In: Adipose Tissue Protocols, 2<sup>nd</sup> Edition*. Humana, Totowa, NJ (in press) (2007).

### **Books Edited**

Adult Mesenchymal Stem Cells, *Methods in Molecular Biology*. (D Prockop, BA Bunnell and D Phinney, eds.) Humana, Totowa, NJ. (2007).

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### **Donald G. Phinney, Ph.D.**

#### **Journal Articles**

Zwezdaryk KJ, Coffelt SB, Figueroa YG, Liu J, Phinney DG, Lamarca HL, Florez L, Morris CB, Hoyle GW, Scandurro AB. Erythropoietin, a hypoxia-regulated factor, elicits a pro-angiogenic program in human mesenchymal stem cells. *Exp. Hematol.*; 35:640-652. (2007).

Kang KS, Yeo JE, Kang KS, Phinney DG. Cytoplasmic extracts from adipose tissue stromal cells alleviates secondary damage by modulating apoptosis and promotes functional recovery following spinal cord injury. *Brain Pathology*; 17:263-275. (2007).

Ortiz LA, DuTreil M, Fattman C, Pandey AC, Torres G, Go K, Phinney DG. Interleukin 1 receptor antagonist mediates the anti-inflammatory and anti-fibrotic effect of mesenchymal stem cells during lung injury. *Proc. Natl. Acad. Sci. USA*; 104:11002-11007. (2007).

Phinney DG, Prockop DJ. The state of transdifferentiation and modes of tissue repair-current views. *Stem Cells*; 25:2896-2902 (2007)

Isakova IA, Baker K, Dufour J, Gaupp D, Phinney DG. Dose and age-related effects on MSCs engraftment levels and anatomical distribution in the CNS of non-human primates: Identification of novel MSC subpopulations that respond to guidance cues in brain. *Stem Cells*; 25:3261-3270 (2007)

Phinney DG. Biochemical heterogeneity of mesenchymal stem cell populations: clues to their therapeutic efficacy. *Cell Cycle* 2007; (In Press – Dec. 1<sup>st</sup> issue).

Stojkovic M, Phinney DG. Reprogramming Battle: Egg vs. Virus. *Stem Cells* 2007; Nov. 29 (Epub ahead of print).

#### **Reviews, commentaries, book chapters**

Phinney DG. Isolation of Murine Mesenchymal Stem Cells by Immunodepletion, *In Methods in Molecular Biology, Molecular Medicine and Biotechnology: Adult Mesenchymal Stem Cells*. Edited by DJ Prockop, BA Bunnell and DG Phinney, Humana Press Inc., Totowa, N.J. (In Press) (2007).

Phinney DG. Marrow Stem Cells. In Advances in Tissue Engineering. Edited by J Polak, S Mantalaris and S Harding, Imperial College Press, London. (In Press). (2007).

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**Carl A. Gregory, PhD**

**Journal Articles**

Lee N, Smolarz AJ, Olson S, David O, Reiser J, Kutner R, Daw NC, Prockop DJ, Horwitz EM and Gregory CA. (2007) A potential role for Dkk-1 in the pathogenesis of osteosarcoma predicts novel diagnostic and treatment strategies. *British J. Cancer.* 97, 1552-1559.

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Gregory CA. Mesenchymal Stem Cells: From Culture to Clinic. IN: Stem Cell Repair and Regeneration, Volume 3. Eds. Levicar, N. et al. Published by Imperial College Press, London, United Kingdom, In Press. (2007)

Gregory CA. More progress defining the crosstalk between multiple myeloma and mesenchymal stem cells of the bone marrow. *Leuk. Lymphoma.* 48, 1896-1897, (2007).

Gregory CA and Prockop DJ. (2007) Fundamentals of Culture and Characterization of Mesenchymal Stem Cells from Bone Marrow Stroma. In: Culture of Human Stem Cells, Eds. Freshney RI., Stacey G and Auerbach, JM. Published by Wiley-Liss, New Jersey, USA. (2007)

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**Radhika Pochampally, Ph.D.**

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Hung SC, Pochampally RR, Chen SC, Hsu SC, and Prockop DJ. Angiogenic Effects of Human Multipotent Stromal Cells (MSCs). Conditioned Medium Activates the PI3K-Akt Pathway in

Hypoxic Endothelial Cells to Inhibit Apoptosis, Increase Survival, and Stimulate Angiogenesis. Stem Cells. (2007).

Hung SC, Pochampally RR, Hsu SC, Sanchez C, Chen SC, Spees J, Prockop DJ. Short-Term Exposure of Multipotent Stromal Cells to Low Oxygen Increases Their Expression of CX3CR1 and CXCR4 and Their Engraftment In Vivo. PLoS ONE. May 2;2:e416. (2007)

Iso Y, Spees JL, Serrano C, Bakondi B, Pochampally R, Song YH, Sobel BE, Delafontaine P, Prockop DJ. Multipotent human stromal cells improve cardiac function after myocardial infarction in mice without long-term engraftment. Biochem Biophys Res Commun. 354(3):700-6. Epub 2007 Jan 17. (2007)

**Book chapters:**

Wolfe M, Pochampally R, Swaney W and Reger R. Isolation and culture of bone marrow-derived human multipotent stromal cells (hMSCs). In: Mesenchymal Stem Cells, Methods and Protocols. Edited by DJ Prockop, DG Phinney and BA Bunnell; Humana Press. (In Press) (2007)

Pochampally R, Colony Forming Unit Assays. In: Mesenchymal Stem Cells, Methods and Protocols. Edited by DJ Prockop, DG Phinney and BA Bunnell; Humana Press. (In Press) (2007)

Joni Ylostalo, Pochampally R, Darwin J Prockop. Microarray Assays. In: Mesenchymal Stem Cells, Methods and Protocols. Edited by DJ Prockop, DG Phinney and BA Bunnell; Humana Press. (In Press) (2007)

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**Malwina Czarny-Ratajczak Ph.D.**

M. Czarny-Ratajczak, A. Kolczewska, A. Wozniak, L. Myers, A. Latos-Bielenska, I. Zimmermann-Gorska and D. J. Prockop. Thr303Met Substitution in Matrilin 3 Contributes to Idiopathic Generalized Osteoarthritis. Arthritis and Rheumatism (submitted)

M. Czarny-Ratajczak, P. Rogala, K. Kozlowski, A. Latos-Bielenska. New intermediate SEMD phenotype between MED and DD caused by compound heterozygous mutations in the *DTDST* gene. Am J Med Genet (submitted)

**Book Chapters**

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**Roxanne L. Reger, M.S.**

Wolfe M, Pochampally R, Swaney W and Reger R. Isolation and culture of bone marrow-derived human multipotent stromal cells (hMSCs). In: Mesenchymal Stem Cells, Methods and Protocols. Edited by DJ Prockop, DG Phinney and BA Bunnell; Humana Press. (In Press) (2007).

Reger RL, Tucker AH and Wolf MR. Differentiation and characterization of human MSCs. In: Mesenchymal Stem Cells, Methods and Protocols. Edited by DJ Prockop, DG Phinney and BA Bunnell; Humana Press. (In Press). (2007).

Reger RL and Wolfe MR. Freezing harvested hMSCs and recovery of hMSCs from frozen vials for subsequent expansion, analysis, and experimentation. In: Mesenchymal Stem Cells, Methods and Protocols. Edited by DJ Prockop, DG Phinney and BA Bunnell; Humana Press. (In Press). (2007).

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**Margaret Wolfe, MS**

Wolfe M, Pochampally R, Swaney W, and Reger R: Chapter 1: Isolation and Culture of Bone Marrow Derived Human Multipotential Stromal Cells (hMSCs), In: Methods in Molecular Biology, (DJ Prockop; DG Phinney; BA Bunnell, eds.) Humana, Totowa, NJ (in pre-print), (2007).

Reger R and Wolfe MR: Chapter 8: Freezing Harvested hMSCs and Recovery of hMSCs from Frozen Vials for Subsequent Expansion, Analysis and Experimentation, In: Methods in Molecular Biology, (DJ Prockop; DG Phinney; BA Bunnell, eds.) Humana, Totowa, NJ (in pre-print), (2007).

Reger RL, Tucker HA and Wolfe MR: Chapter 7: Differentiation and Characterization of Human MSCs, In Methods in Molecular Biology, (DJ Prockop; DG Phinney; BA Bunnell, eds.) Humana, Totowa, NJ (in pre-print), (2007).

**GRANT SUPPORT**

<b>Title</b>	<b>Source</b>	<b>PI</b>	<b>Status</b>	<b>Dates</b>	<b>Direct</b>	<b>Indirect</b>	<b>Total</b>
<b><u>ACTIVE GRANTS:</u></b>							
Engineered Hematopoietic Cell Self-Renewal and Death (Katrina Extension)	NIH	Bunnell	Completed	9/1/06-8/31/07	230,000	112,700	342,700
Safety of MSC Administration to the CNS of Rhesus Monkeys	HEF-Board of Regents	Phinney	Completed	1/1/02-12/31/07	628,783	22,271	651,054
Delivery of Therapeutic Enzymes and Genes to Cells in the Central Nervous System	NIH-NINDS	Bunnell	Completed	4/1/03-3/30/07	284,901	138,177	423,078
Marrow Stromal Cells for Lysosomal Disease CNS Defects	NIH	Phinney	Completed	9/1/01-8/31/07	924,000	425,250	1,349,250
Stem Cell Therapy for Pulmonary Hypertension (Co-Investigator)	NIH	Bunnell	Active	4/1/05-3/31/09	1,126,000	551,740	1,677,740
Nonhuman Primate Model for Krabbe's Disease	NIH	Bunnell	Active	9/12/06-6/30/11	850,000	552,500	1,402,500
Stem Cell Therapy for Krabbe's Disease	Tulane Enhancement	Bunnell	Active	12/1/06-11/30/09	119,000	-	119,000
Bone Tissue Regeneration from Human Mesenchymal Stem Cells	DOD-Army (subcontract)	Bunnell	Active	6/1/07-6/30/11	134,653	65,979	200,632
Agents for in vivo Control of Adult Stem Cells	NIH	Gregory	Active	4/1/06-3/31-08	200,000	97,000	297,000
Mentoring a Cancer Genetics Program (Deininger PI) - Project 7	NIH	Gregory	Active	8/1/06/7/31/09	566,093	277,386	843,479
A Novel cellular vector from bone marrow for treatment of neurological disorders	Tulane Enhancement	Phinney	Active	11/15/06-12/31/07	90,000	-	90,000
Mesenchymal Stem Cells in the Treatment of Lung Fibrosis (subcontract: U. Pitt)	NIH	Phinney	Active	7/1/05-5/31/09	200,460	97,223	297,683
Pre-Clinical Trial of MSC-Based Therapy for CNS Disease	NIH	Phinney	Active	4/1/07-3/31/11	1,354,032	795,132	2,149,164
Mesenchymal Stem Cells Provide a Niche for Osteosarcoma Stem Cells	Tulane Enhancement	Pochampally	Active	6/1/07-5/31/09	85,000		85,000
Potential Therapy of Alzheimer's Disease with Adult Stem Cells	Amon G Carter Fnd	Prockop	Active	2/1/06-12/31/08	750,000	-	750,000
Preparation and Distribution of Adult Stem Cells (Center Grant)	NIH/NCRR	Prockop	Active	6/1/03-5/31/08	3,205,872	1,554,848	4,760,720
Adult Stem Cells for Repair of Cardiac Damage	NIH	Prockop	Active	7/1/03-6/30/08	1,733,550	840,772	2,574,322
Osteoprogenitors for Potential Therapy of OI	NIH	Prockop	Active	9/21/01-10/31/07	1,500,000	727,500	2,227,500
Culture and Lung Engraftment of Mesenchymal Stem Cells	NIH	Prockop	Active	9/30/03-7/31/08	1,243,149	602,927	1,846,076
Homing and Differentiation of Adult Stem Cells to Lung (Program Project )	NIH	Prockop	Active	7/18/05-5/31/10	7,307,966	2,207,060	9,515,026

CORE facility operating expenses- thru La. Gene Therapy Research Consortium,	State of Louisiana	Prockop	Active	7/01/00-6/30/08	6,196,835		6,196,835
New Genetic Markers for Adult Stem Cells	W. M. Keck Fnd	Prockop	Active	7/1/04-12/31/07	1,000,000	-	1,000,000

<b>Total Active</b>					<b>29,730,294</b>	<b>9,068,465</b>	<b>38,798,758</b>
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**PENDING APPLICATIONS:**

Gene Transfer to Monkey Brain	NIH	Bunnell	Pending	6/1/07-5/30/12	1,592,181	1,034,918	2,627,099
Adipose Stem Cell Therapy for Krabbé's Disease	NIH	Bunnell	Pending	4/1/08-3/31/10	350,000	171,500	521,500
The Utility of WNT modulation in four in vivo models of bone damage	NIH	Gregory	pending	7/1/08-6/30/13	1,250,000	612,500	1,862,500
The Relevance and Utility of LIF expression in Mesenchymal Stem Cells	NIH	Gregory	pending	7/1/08-6/30/10	200,000	98,000	298,000
The Effect of Dkk1 expression by osteosarcoma tumors on MSCs	NIH	Gregory	pending	7/1/08-6/30/10	200,000	98,000	298,000
Adult stem cells responsive to CNS guidance cues to treat neurologic disorders	NIH	Phinney	Pending	7/1/08-6/30/10	275,000	153,150	428,150
Mesenchymal Stem Cell Therapy for Krabbé's Disease	NIH	Bunnell	Pending	12/1/07-11/30/09	350,000	171,500	521,500
Therapeutic Trials of Bone Marrow Stem/Progenitor Cells in Models for Diabetes	NIH	Prockop	Pending	4/1/08-3/31/13	2,992,754	603,582	3,596,336
Preparation and Distribution of Adult Stem Cells supplement PA-05-015	NIH	Prockop	Pending	4/1/08-3/31/09	150,212	73,604	223,816
Preparation and Distribution of Adult Stem Cells RENEWAL	NIH	Prockop	Pending	6/1/08-5/31/13	3,619,300	1,773,456	5,392,756
Experiments for IND for Use of Adult Stem/Progenitor Cells in SCI	NIH	Prockop	Pending	7/1/08-6/30/12	1,747,102	658,120	2,405,222
Wound Healing by Conditioned MSCs and their Potential To Repair Cleft Palate	NIH	Sanchez	Pending	12/1/07-11/30/11	560,489	241,639	802,128
Epigenetic Reprogramming in Bone Marrow Mesenchymal Stem Cells	NIH	Sanchez	Pending	4/1/08-3/31/11	187,353	14,987	202,340

<b>Total Pending</b>					<b>13,474,391</b>	<b>5,704,956</b>	<b>19,179,347</b>
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## Media Events

### Darwin J. Prockop, M.D., Ph.D.

01/05/07	<i>Health Day</i>	Mandy Gardner	Phone Interview:	Recent stem cell developments
03/08/07	University of Pennsylvania	Melissa Fikioris		Interviewing past distinguished graduates
04/11/07	Newport/Biotech Consultants	John Morrow		Article on biotech in New Orleans for <i>Genetic Engineering</i> .
06/11/07	<i>The Scientist</i> ,	Kelly Chi	Phone Interview	Recent stem cell developments
07/27/07	<i>City Business</i>	Robyn Shannon	Phone Interview	Dr. Prockop chosen as City Business Newspaper's Innovators of the Year Award