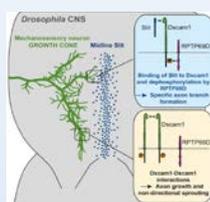
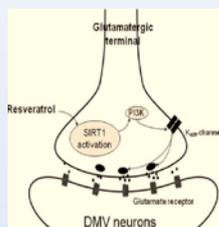
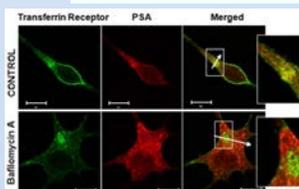
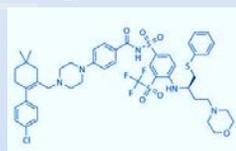
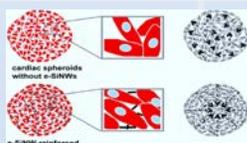


Centers of Biomedical Excellence (COBRE)

COBRE Directory of Active Awards by State



2015



Institutional Development Award (IDeA)

Center for Research Capacity Building
National Institute of General Medical Sciences
National Institutes of Health

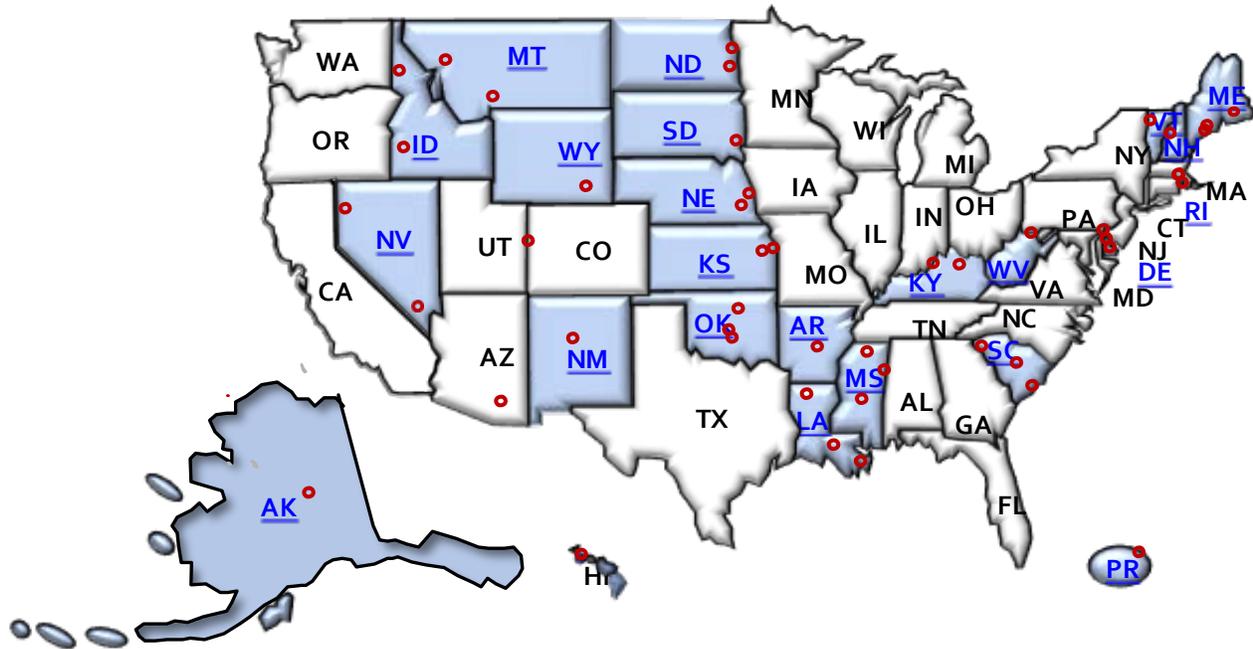
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Location of COBRE Lead Institutions



Click on 2-letter state name to follow link to the list of principal investigators.

Centers of Biomedical Research Excellence (COBRE). The COBRE program strengthens biomedical or behavioral research capacity in institutions from IDeA states. COBRE phase 1 provides support to develop research infrastructure and to foster independence of junior investigators. COBRE phase 2 continues the progress toward building an independent research center that is competitive for receiving research support from NIH or other funding agencies. The COBRE Phase 3 awards (Transitional Centers) are intended to (1) provide support for maintaining COBRE research cores developed during phases I and II that are essential for the continuing conduct of basic, clinical, translational research and/or community based research at the institution, and (2) sustain a collaborative, multidisciplinary research environment for research pilot projects and mentoring and training components. Red circles (●) are zip locations of [COBRE lead institutions](#).

P30GM103325- Phase 3

Investigating Obesity and Chronic Disease-Related Risk Factors of Alaska Natives
University of Alaska Fairbanks

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Thematic Scientific Focus

Obesity and chronic disease-related risks, youth suicide and substance abuse of Alaska Natives

Pilot Studies

- Development of a computerized adaptive testing program for Alaska Natives
- Exploring how Alaska Native cultural values are interconnected with cancer
- Attitudes toward alcohol misuse programs among Alaska Native college students
- Cultural adaptation of an intervention to reduce body weight in Yup'ik women
- Disruptive link: obesity and diabetes in Alaska Native Yup'ik people
- Validating carbon isotope ratio of breath CO₂ as biomarker of recent added sugar
- Prenatal preventive health in interior AK: impacts of maternal stress and health

Research Resources

- Experimental design, biostatistics and data services core
- Community engagement and clinical support core
- Nutrition and physical activity core

Index Terms

Alaska Native, obesity, metabolic disease, suicide, substance abuse, community-based participatory research

P30 GM110702- Phase 3
Center for Translational Neuroscience
University of Arkansas for Medical Sciences

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Thematic Scientific Focus

Translational neuroscience research

Pilot Studies

- Transcranial magnetic stimulation as treatment for acutely suicidal inpatients
- Leptin signaling pathways regulating translation of neuropeptide receptor mRNAs
- Anti-inflammatory therapeutics for neuropathology in models of FASD
- Small molecule inhibitors of glioblastoma cancer stem cell self-renewal
- Cerebrovascular TRPC3 Channel and Status Epilepticus

Research Resources

- Human Electrophysiology core
- Animal Electrophysiology core
- Image Analysis
- Transcranial Magnetic Stimulation (TMS) core
- Molecular Biology core
- Behavioral core
- Telemedicine core

Index Terms

obesity, neurological disorders, psychiatric disorders, epilepsy, FASD

P20GM109005- Phase 1
Center for Studies of Host Response to Cancer Therapy
University of Arkansas for Medical Sciences

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Thematic Scientific Focus

Conducting research into the mechanisms of side effects of cancer therapy and developing strategies to prevent them

Research Projects

- The Role of Tetrahydrobiopterin (BH4) in Radiation-Induced Skin Injury
- Molecular Mechanisms of C/ebp delta in Ionizing Radiation Response
- Epigenetic Alterations Caused by Low-Dose Ionizing Radiation
- Development of Novel Tocotrienol-based Radioprotective Agents

Pilot Studies

- Effects of Methotrexate and Cytosine arabinoside on Cognition
- miRNA Biomarkers of Cisplatin Nephrotoxicity in Genetically Sensitive Subjects
- Prevention of Doxorubicin Cardiomyopathy in Cancer Treatment

Research Resources

- Administrative Core
- Cellular and Molecular Analytic Core
- Irradiation and Animal Core

Index Terms

cancer survivors, uncomplicated cancer cures, cancer therapy toxicity, radiation toxicity, chemotherapy toxicity, radiation protectors

**P30GM103450- Phase 3
Center for Protein Structure and Function
University of Arkansas at Fayetteville**

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Thematic Scientific Focus

Structure and function of bacterial, viral and membrane-associated proteins, drug discovery and design

Research Resources

- NMR core
- X-ray crystallography core
- Mass spectrometry core
- Large-scale protein production facility
- High-throughput synthesis core

Index Terms

NMR, structural biology, mass spectrometry, x-ray crystallography, drug design, protein targeting

P20GM103625- Phase 1**University of Arkansas for Medical Sciences****Center for Microbial Pathogenesis and Host Inflammatory Responses****Principal Investigator*****Mark S. Smeltzer, Ph.D.****Department of Microbiology and Immunology**University of Arkansas for Medical Sciences**4301 W. Markham, Mail Slot 511**Little Rock, AR 72205**Tel: 501-686-7958**Fax: 501-686-5359**E-mail: smeltzermarks@uams.edu**Web: <http://cmphir.uamsonline.com>***Thematic Scientific Focus**

Microbial pathogen-human host interaction and the disease process

Research Projects

- Myxoma virus as oncolytic agents
- Role of CD4 T cells in chlamydial genital infection
- Plasma cells as antigen-presenting cells during malaria
- Mechanisms of reovirus cell killing for enhanced oncolytics

Pilot Studies

- Mechanisms for Rhinovirus induced airway hyper-responsiveness in human lung
- Dysbiosis induced impairment of immune surveillance
- Identifying genes contributing to pathogenesis of *Borrelia turicatae*
- Microbial induced intestinal epithelial cell pyroptosis and barrier dysfunction

Research Resources

- Administrative and scientific development core
- Research and technical advancement core
 - ❖ DNA sequencing core
 - ❖ Flow cytometry core
 - ❖ Cellular imaging core
 - ❖ Molecular biology core

Index Terms

Infection, pathogenesis, innate immunity, adaptive immunity, bacteria, viruses, parasites, malaria, reovirus, herpesvirus, oncolysis, inflammation, host response

P30GM103333- Phase 3
Osteoarthritis: Prevention and Treatment
Delaware Rehabilitation Institute, University of Delaware

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Thematic Scientific Focus

Prevention and treatment of osteoarthritis

Research Projects

- There are no major research projects in COBRE Phase 3 awards

Pilot Studies

- Improving rehabilitation after total hip arthroplasty
- Acceleration-based assessment of limb loading asymmetry during daily living

Research Resources

- Patient-specific modeling core
- Cytomechanics core
- Clinical research core

Index Terms

biomechanics, orthopedics, physical therapy, magnetic resonance imaging, ultrasound, electromyography, elastography, confocal microscopy, tissue engineering, gait analysis

**P30GM104316 Phase 1
COBRE on Discovery of Chemical Probes and Therapeutic Leads
University of Delaware**

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Thematic Scientific Focus: This COBRE will create new libraries for high-throughput screening, provide new perspectives on innate immune response and neurodegenerative disease, enable new screening technology and advance the state of the art in virtual screening.

Research Projects:

- Development of an immunostimulatory small molecule library
- *In vitro* neural disease models for high throughput drug screening
- New synthetic methods for diverse small molecule library preparation
- Electrochemical Chemiluminescent Arrays and Emitters for Rapid Chemical Probe Identification
- Realizing the Predictive Promise of High Throughput Virtual Screening
- Synthesis of anticancer natural products

Pilot Studies

- Ultrafast Spectroscopy of Photosensitizers for Photodynamic Therapy
- Development of a nanoparticle-based theranostic agent to treat IBC metastasis

Research Resources

- High throughput synthesis
- Rapid purification of molecular libraries
- Chip-based printing and assaying of molecular libraries
- High throughput assessment of cellular response to small molecules
- Computational core for high-throughput virtual screening and molecular structure optimization

Index Terms

chemical probe, drug discovery, virtual screening, molecular discovery

P20GM103653- Phase 1
Delaware Center for Neuroscience Research
Delaware State University

Principal Investigator

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Thematic Scientific Focus

Lifetime brain development and neuronal plasticity

Research Projects

- Co-transmission of glutamate and dopamine in *C. elegans* habituation
- Fetal Alcohol Syndrome model: structure and function of prefrontal cortex
- Lasting epigenetic influence of early-life adversity on the BDNF gene
- Changes in cholinergic signaling and aging investigated in *Drosophila*
- Effects of *in utero* alcohol exposure on the immune cells of the developing brain

Pilot Studies

- The role of glia in the development of synchronized bursting behavior in neuronal networks in culture
- The roles of glucocorticoid receptors and phosphoinositol-3 kinase signaling in mediating extinction memory deficits in the SPS model
- Assessing mechanisms of Lithium as a potential therapeutic compound in Parkinson's disease
- Regulatory role of microRNA-124 in neurogenesis and pattern formation in sea urchin development

Research Resources

- Rodent housing facility
- Imaging core

Index Terms

neuroscience, developmental biology, epigenetics, molecular neuroscience, fetal alcohol spectrum disorder, invertebrate models of learning, models of aging

**P30GM10351- Phase 3
COBRE on Membrane Protein Production and Characterization
University of Delaware**

Principal Investigator

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Thematic Scientific Focus

Production and functional characterization of membrane proteins

Research Resources

- Protein production and purification core
- Biophysical characterization core
- Structural biology core
- Bioimaging core

Index Terms

membrane proteins, mitochondria, transport proteins, gluconeogenesis, metabolic flux analysis, systems biology, diabetes, proteomics, mass spectrometry, proteolysis, G-protein coupled receptor, molecular simulation, drug receptor, adenosine receptor, Parkinson's disease, schizophrenia, allostery, signaling pathways, protein folding, ligand binding, osteoporosis, bone morphogenic protein, stem cell differentiation, osteoblast, osteoclast, phosphorylation, oxidative stress, lipid oxidation, protein expression, selenium, platelet aggregation, co-immunoprecipitation, prion, amyloid, fibrillation, neurodegenerative disease

**P30GM110758 – Phase 3
Molecular Design of Advanced Biomaterials
University of Delaware**

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Thematic Scientific Focus

Molecular design of advanced biomaterials

Pilot Studies

- Perfusion driven angiogenesis in a microfluidic biomaterial
- Computational Design of Polymer-Polypeptide Based Biomaterials for Delivery
- TeNA-aptamer hydrogels for bio-responsive drug delivery
- Pathogen-derived biosensors for detection of phosphoinositides in mammalian cells

Research Resources

- Mass Spectrometry and Surface Characterization (MSSC) Core
- Nuclear Magnetic Resonance (NMR) Core
- Microscopy and Mechanical Testing (MMT) Core
- Computational Modeling Core

Index Terms

biomaterial, biopolymer, biomimetic, hydrogel, protein, DNA, PNA, surface, surface analysis, molecular design, materials science, engineering, chemistry, biochemistry, chemical engineering, nanomaterials, organic chemistry, protein patterning, surface patterning, synthetic chemistry, photochemistry, NMR, XPS, TOF-SIMS, AFM, PCR, molecular modeling, drug delivery, drug payload

P30GM114736-Phase 3
Center for Pediatric Research
Alfred I. duPont Hospital for Children

Principal Investigator

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Thematic Scientific Focus

Pediatric disorders, therapies, neurological disorders

Research Projects

- Developmental mechanisms of undescended testis
- Molecular mechanisms in Pelizaeus Merzbacher disease
- Peripheral nervous system in cerebral palsy
- Extracellular matrix remodeling in cardiovascular diseases
- Mechanisms of cell death in spinal muscular atrophy
- Oxygen and barotrauma effects on human airway epithelium
- Mechanistic biomarkers of endocrine disruption
- The medial olivocochlear bundle and speech-in-noise deficits
- Temporal regulation of localized mRNA translation in regenerating axons
- Prognostic synovial biomarkers in juvenile rheumatoid arthritis
- Probing the mechanism of TCR antigen recognition using atomic force microscopy

Pilot Studies

- Evaluation of mechanical ventilation strategies on neonatal tracheal mechanics
- Trajectories of change in BMI status in early childhood
- Using dynamic elbow ultrasound to identify the effect of pitching on the structural and functional anatomy of the ulnar collateral ligament in youth baseball players
- Multi-component beta-hairpin hydrogels for stem cell therapy of spinal cord injury
- IGF-1R inhibition indices EGFR expression in osteosarcoma and Ewing sarcoma through a noncanonical EGFR/MAPK signaling pathway-mediated by an Sp1-based transcriptional mechanism

Research Resources

- Clinical research services
- Cell science core
- Biomolecular core
- Bioinformatics core
- High-Throughput Screening and Drug Discovery Laboratory

Index Terms

pediatric diseases, neuroscience, therapy, prevention

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P20GM109021- Phase 1

**The Delaware Comprehensive Sickle Cell Research Center
Alfred I. Du Pont Hospital for Children of the Nemours Foundation
and Delaware State University**

Principal Investigator

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Thematic Scientific Focus

The research focus of this Center of Biomedical Research Excellence spans basic and translational science and addresses some of the major clinical aspects of sickle cell disease.

Research Projects

- Gene editing of the beta globin gene using TAL effector nucleases and single stranded oligonucleotides.
- Phase 1/2 clinical trial of the n-3 omega fatty acids in pediatric sickle cell disease related pain and inflammation
- Screening for psychosocial risk in pediatric sickle cell disease using the Psychosocial Assessment Tool (PAT)

Pilot projects

- Genetic risk and markers of early kidney disease in children with sickle cell disease
- *In vitro* growth of Stem cells on nanofiber scaffolds
- Re-expression of fetal hemoglobin by gene editing as a therapy for sickle cell disease

Research Resources

- Clinical and Data Management Core
- Clinical Research Services
- Access to the Gene Editing Core
- Center for Translational Cancer Research, the Helen F Graham Cancer Center, Christiana Care Health System, DE
- Access to Bioinformatics and Cell Science Cores of companion COBRE at Alfred I duPont Hospital for Children

Index Terms

sickle cell disease, hemolytic anemia, hemoglobinopathy, pain crisis, vasocclusive crisis, pediatric disease, complications of Sickle cell disease, gene editing, omega3 Fatty Acids, psychosocial assessment tool, renal disease chronic, stem cell growth *in vitro*, sickle cell clinical trials in sickle cell disease

P30GM10334- Phase 3
COBRE Center for Cardiovascular Research
University of Hawaii

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Thematic Scientific Focus

Molecular and cellular mechanisms underlying human cardiovascular diseases

Research Projects

- Developmental biology of cardiac fibroblasts
- mTOR signaling in the heart
- Immunologic contributions to atherosclerosis
- The role of the transcription factor, Hypoxia Inducible Factor, in the heart
- Microbubble-mediated delivery of gene therapy

Pilot Studies

- The Role of MicroRNA 302a in HDL metabolism and atherosclerosis
- ABCC6 transporter deficiency causes vascular calcification and atherosclerosis
- Characterization of biomarkers associated with coronary artery dilation and doxycycline treatment in Kawasaki disease

Research Resources

- Genomics Core (now coordinated and coalescing with the Cancer Center Genomics Core)
- Histology and Microscopy Core (now co-sponsored by our RCMI program)
- Mouse Phenotyping Core

Index Terms

cardiovascular disease, receptor-mediated signaling, fibroblast, atherosclerosis, hypoxia-inducible factor-1, gene expression, microbubble

P20GM103457- Phase 2
Institute for Biogenesis Research: COBRE
University of Hawaii at Manoa, John A. Burns School of Medicine

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Thematic Scientific Focus

Fertilization and early development

Research Projects

- Regulation of polarized exocytosis during epithelial differentiation
- The impact of assisted reproductive technologies on the long-term epigenetic regulation of neurodevelopmental genes associated with autism
- Linking maternal obesity and offspring cancer risks through integration of cord blood stem cell methylome and transcriptome
- The placenta-specific glucose transporter modulation: obesity, metabolic effects and fetal well-being

Research Resources

- Transgenic Mouse
- ICSI
- IVF Core

Index Terms

fertilization, embryo, early development, gametes, sperm, egg, stem cells, obesity, cancer

P30GM1114737- Phase 3
Pacific Center for Emerging Infectious Diseases Research
University of Hawaii at Manoa

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Thematic Scientific Focus

Emerging infectious diseases in the Asia-Pacific region

Pilot Studies

- Notch Signaling during Human B-cell development and activation
- Potential triggers of severe dengue disease progression
- Characterization of SLFN4-dependent neuroimmune response associated with WNVE
- Pathogenesis of Irukandji syndrome

Research Resources

- ABSL-3/BSL-3 Biocontainment Core
- Bioinformatics Core
- Molecular and Cellular Immunology Core

Index Terms

emerging infectious diseases, tropical medicine, health disparities, pathogenesis, dengue virus, West Nile virus, Zika virus, Chikungunya virus, Ebola virus, hantavirus, Plasmodium falciparum, Burkholderia pseudomallei

P30GM103324- Phase 3
Institute of Bioinformatics and Evolutionary Studies
University of Idaho

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Thematic Scientific Focus

Research on the evolution of pathogens and parasites that affect human health through the development and spread of drug resistance, vaccine failures, pathogen host switching and the emergence of new diseases.

Pilot Studies

- Directed evolution of the molecular chaperone Hsp90 and its clients
- A novel system for the genetics of inflammation and cancer

Research Resources

- Computational Resources Core
- Genomics Resources Core
- Optical Imaging Core

Index Terms

evolutionary biology, molecular biology, structural biology, microbial ecology, computational biology, statistics, genomics, proteomics

P20 GM109095- Phase 1
Center of Biomedical Research Excellence in Matrix Biology
Boise State University

Principal Investigator

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Thematic Scientific Focus

Extracellular matrix in development and disease

Research Projects

- Potential MGP negative feedback loop mediated by BMP, Notch and Runx2
- Computational and experimental study of wound repair in ligament
- AhR signaling during myofibroblast differentiation and fibrosis
- OSM promotes breast tumor cell-ECM disruption resulting in invasion and metastasis

Pilot Studies

- *Staphylococcus aureus* surface adhesins as key vaccine candidates to prevent interaction with the host extracellular matrix
- 2D crystals as extracellular matrix for cell growth and differentiation

Research Resources

- Biomolecular Research Core
- Biomedical Research Vivarium
- Imaging
- Mass Spectrometry
- Idaho Microfabrication Lab

Index Terms

extracellular matrix, collagen, liver fibrosis, cancer metastasis, ligament repair, cardiovascular disease, biomaterials, regenerative medicine, tissue engineering

P20 GM104420- Phase 1
Center for Modeling Complex Interactions
University of Idaho Moscow

Principal Investigator
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Thematic Scientific Focus

The Center for Modeling Complex Interactions focuses on biomedical problems that are complex and require too diverse a skill set to be tackled by lone specialists. It brings together empirical scientists and modelers to address problems across all levels of biological organization, from biophysical to ecological. The initial focus of the Center will be on viral co-infection.

Research Projects

- Disease severity during viral co-infection
- Multi-level dynamics of viral co-infection
- Agent-based modeling of viral co-infection

Pilot Studies

- Modeling variability in persistence induced from within by a toxic metabolite
- Multi-scale model of interaction between lung and pulmonary ventilation

Research Resources

- Mathematical Modeling Core Facility

Index Terms

mathematical modeling viral co-infection, agent based modeling, respiratory virus, *Drosophila* virus

P20GM104936 – Phase 2
Molecular Regulation of Cell Development and Differentiation
University of Kansas Medical Center, Kansas City

Principal Investigator

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Thematic Scientific Focus

Mechanisms of cell and tissue development

Research Projects

- Cell biology of ERK-cilium crosstalk
- Intra-oocyte protein synthesis and reproductive aging
- Oxygen sensing and endothelial metabolism in ischemic kidney injury
- The role of NKG2D in autoimmune diabetes

Pilot Studies

- Molecular regulation and differentiation of iPSCs into cardiomyocytes
- Protective role of tight junctions in glomerular podocytes

Research Resources

- Transgenic, Gene Targeting, and Genotyping Core
- Molecular Profiling Core
- High Resolution Imaging Core

Index Terms

aging, ciliopathy, claudins, development, diabetes, differentiation, hypoxia inducible factor (HIF), intraflagellar transport (IFT), oogenesis, organogenesis

**P30 GM110761- Phase 3
Protein Structure and Function
The University of Kansas Lawrence**

**Principal Investigator
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Thematic Scientific Focus

Health-related basic research in protein structure and function

Pilot Studies

- Atomic structure of a multi-domain redox enzyme Ncb5or implicated in diseases
- Effect of methionine substitution and oxidation on the structure-function of COMT
- Engineering human NRMT1 for its substrate profiling
- Defining the hydrophobic and electrostatic interactions between CYP3A and CYPb5
- Role of BCL9 in STAT3 signaling and DCIS invasive progression

Research Resources

- Protein Production Core Laboratory
- Protein Structure Core Laboratory
- Biomolecular NMR Core Laboratory

Index Terms

protein purification and production, protein structure, protein-protein interactions, protein X-ray crystallography, bio-molecular NMR spectroscopy, fragment-based drug design, antimicrobials based on protein targets, vaccines through protein stabilization

**P20GM103459- Phase 2
Nuclear Receptors in Liver Health and Disease
University of Kansas Medical Center**

Principal Investigator

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Thematic Scientific Focus

Nuclear receptors and their role in liver health and disease

Research Projects

- JARID1 lysine demethylases in circadian control of metabolic homeostasis
- An emerging role for hyaluronan in the pathogenesis of hepatic fibrosis
- Nuclear receptor SHP in the pathogenesis of NASH

Pilot Studies

- Heat shock proteins and mitochondrial function in the prevention of NAFLD
- Novel strategies to suppress inflammation and tumor progression in liver
- The role of PRMT1 in the susceptibility of bacterial infection in cirrhosis
- Development of a liver-on-chip technology for study of liver disease

Research Resources

- Cell Isolation Core
- Analytical Core
- Histopathology Core

Index Terms

bile acids, nuclear receptors, biomedical research, liver, liver dysfunction, liver function, liver repair, fatty acid glycerol esters, glucose, lipids, OCT1, ligand binding, metabolic syndrome, Type 2 diabetes, sortilin 1, diabetic dyslipidemia, alcohol, hepatic fibrosis

P20GM103638- Phase 1
Molecular Analysis of Disease Pathways
University of Kansas

Principal Investigator

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Thematic Scientific Focus

Genetic, biochemical and physical analysis of disease

Research Projects

- A non-canonical quorum sensing regulator of virulence in *Burkholderia pseudomallei*
- Alternative functions for $\gamma\delta$ T cells in the immune response to *Mycobacterium*
- Understanding the mechanobiology of stem cells in a microengineered 3D cardiac tissue environment with cardiomyopathy
- Microfluidic single-cell analysis of cancer exosomes

Research Resources

- Microfabrication and Microfluidics Core
- Molecular Probes Core
- Genome Sequencing Core

Index Terms

imaging, genomics, sequencing, zebrafish, *C. elegans*, model organisms, microfluidics, molecular probes, microfabrication, microfluidics, sensors, cancer, pulmonary disease, neurological disorders, genetic diseases, molecular biology, bioengineering, bioanalytical chemistry, neuroscience

P30GM103326- Phase 3
Novel Approaches for Control of Microbial Pathogens
University of Kansas Medical Center

Principal Investigator

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Thematic Scientific Focus

Novel molecular mechanisms for controlling infectious agents and host antigens

Pilot Studies

- Viral and host factors regulate HSV-1 infection
- Alternate mechanisms behind AtIA-dependent biofilm formation in *S. aureus*
- The role of NKG2D in immunosurveillance of spontaneous lymphoma
- Airway Epithelium Response to *Parvovirus* Infection

Research Resources

- X-Ray Crystallography Core
- Fermentation and Screening Core
- Flow Cytometry Core
- Luminex Core
- Signal Transduction Core
- Writing Core

Index Terms

pathogens, microbial infection, molecular structure, protein X-ray crystallography, mechanism-based enzyme inhibitors, drug development, cell mediated immune responses, development of the immune system

P30GM103495- Phase 3
Center for Cancer Experimental Therapeutics
University of Kansas, Lawrence

Principal Investigator

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Thematic Scientific Focus

Bioactive compounds as new cancer therapeutic agents

Research Resources

- High throughput screening (HTS) and target identification core
- Medicinal chemistry core

Index Terms

medicinal chemistry, combinatorial chemistry, bioassays, molecular library screening, drug design, cancer, oncology, cell biology, molecular biology, retrovirus, high-throughput screening

P20GM103492- Phase 2
Center of Excellence in Diabetes and Obesity Research
University of Louisville

Principal Investigator

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Thematic Scientific Focus:

Molecular, cellular, experimental, epidemiological, and clinical investigations into the cardiovascular causes and consequences of diabetes and obesity.

Research Projects

- Local regulation of calcium influx in the vasculature during hyperglycemia
- Effects of particulate matter on insulin resistance and endothelial progenitor cells
- Innate immunity in the diabetic heart
- Metabolomic analysis of atherothrombosis

Research Resources

- Flow Cytometry Core
- Pathology and Bioanalytical Core
- Imaging and Physiology Core
- Animal Models and Phenotyping Core

Index Terms

diabetes, obesity, cardiovascular, carnosine, heart, immunity, lipid metabolism, oxidative stress, particulate matter, nitric oxide, endothelial progenitor cells, atherothrombosis, atherosclerosis

P20 GM103527- Phase 2
Center of Research in Obesity and Cardiovascular Disease
University of Kentucky

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Thematic Scientific Focus

Mechanisms linking obesity to cardiovascular diseases

Research Projects

- Role of adipocyte prorenin receptor in obesity and hypertension
- Molecular imaging of early heart failure
- Skeletal muscle in rheumatoid arthritis
- Role of bioactive lipids in the protective pathways of obesity in ischemic cardiomyopathy
- Obesity and abdominal aortic aneurysms

Pilot Studies

- Unique functions of angiotensinogen on obesity and diabetic complications.
- Linking obesity-related microvascular dysfunction with hypercholesterolemic dysregulation of neutrophil adhesivity by fluid shear stress
- Role of Adipocyte SR-BI in obesity and metabolic disease

Research Resources

- Administrative Core
- Analytical Core
- Physiologic Core
- Pathology Core

Index Terms

obesity, diabetes, inflammation, hypertension, coronary artery disease, thrombosis, myocardial infarction, atherosclerosis

P30GM110788-- Phase 3
Center for the Biologic Basis of Oral/Systemic Diseases
University of Kentucky, College of Dentistry

Principal Investigator:

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Thematic Scientific Focus

Biology of oral-systemic disease relationships

Research Resources

- Clinical Research Core
- Translational Diagnostics Laboratory Core
- Pilot Project Core

Index Terms

oral infections, inflammation, translational research, atherosclerosis, gestational diabetes, pregnancy, chronic pain, innate immunity, inflammatory bowel disease, genetics, periodontal disease

P30GM110787-01 - Phase3
COBRE in the Molecular Basis of Human Disease
University of Kentucky

Principal Investigator

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Thematic Scientific Focus

Altered gene and protein expression in human disease

Pilot Projects

- Molecular mechanisms of cardiac dysfunction
- MiR-29/Hsp47 axis regulates ECM transcription network in breast cancer
- Determining the molecular interactions within CFTR that result in Cystic Fibrosis
- Carbohydrate Metabolism as a drug target against *Toxoplasma gondii* cysts
- PERK inhibition for traumatic brain injury therapeutics

Research Resources

- Protein Analytical Core
- Organic Synthesis Core
- Genetic Technologies Core

Index Terms

protein production, protein x-ray crystallography, viral production, molecular cloning and engineering, small molecule synthesis, protein analysis and characterization, recombineering

**P30GM110787- Phase 3
COBRE in Molecular Targets
University of Louisville**

Principal Investigator

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Thematic Scientific Focus

Novel molecular targets for cancer therapy

Previous Research Projects (continuing)

- Leukotriene B4 receptor agonists and antagonists for cancer immunotherapy
- A broad spectrum lung cancer stem cell vaccine
- The development of novel Ras antagonists to inhibit cancer
- Targeting Phosphoserine Aminotransferase (PSAT1) in the treatment of lung cancer
- Targeting 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase-4 in lung cancer

Research Resources

- Microsequence Array Facility
- Molecular Modeling Facility
- Computational Resources
- NMR /Metabolomics Facility
- Comprehensive Protein Expression and Purification Laboratory
- Biophysics Facility

Index Terms

neoplastic transformation, cancer, molecular targets, drug development, cytokines, growth factors, kinases

P30GM103507- Phase 3
Mechanisms of plasticity and repair after SCI
University of Louisville

Principal Investigator

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Thematic Scientific Focus

Central nervous system injury, repair and therapeutic rehabilitation

Pilot Studies

- Development and feasibility assessment of an underwater treadmill system that provides locomotion movement assistance
- Direct mechanical stimulation for bone preservation after SCI
- Effects of LT on trunk motor control and pulmonary function in children with SCI
- A mouse model of mild TBI, role of hyperfibrinogenemia
- The role of PAF signaling in functional recovery after the SCI
- The potential therapeutic effects of cannabidiol on spinal cord injury
- Targeting ribosome biogenesis as a new strategy for improving recovery after spinal cord injury
- Intestinal dysbiosis and neurogenic bowel in disordered glucose metabolism in SCI
- Effect of stromal vascular fractions on cerebrovascular permeability after TBI
- Endothelial dysfunction in chronic spinal cord injury

Research Resources

- Cell Culture and Molecular Biology Core
- Animal Surgery Core
- Animal Behavior and Electrophysiology Core
- Microscopy Core
- Human Locomotor Core

Index Terms

neurobiology, cell culture, molecular biology, surgery, behavior, electrophysiology, microscopy, apoptosis, immunology, signaling, central nervous system, spinal cord injury, stroke, Parkinson's disease, Alzheimer's disease, locomotor, traumatic brain injury, stem cells, human, rodent, kinematic, gait analysis

P30GM103340- Phase 3

Mentoring Neuroscience in Louisiana: A Biomedical Program to Enhance Neuroscience
Louisiana State University Health Sciences Center, New Orleans

Principal Investigator

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Thematic Scientific Focus

Cellular and molecular approaches to brain and retina function, including synaptic physiology, metabolomics, synaptic transmission, neuroinflammatory signaling, mediator lipidomics, omega 3 fatty acids and docosanoids, and genetic studies. Focus on epileptogenesis, experimental stroke, traumatic brain injury, Alzheimer's, age-related macular degeneration, Parkinson's disease and other neurodegenerative diseases as well.

Research Projects

- Neuroprotection by DHA in experimental stroke
- Selective molecular species of phosphatidylcholine as target in age-related macular degeneration and very long chain-polyunsaturated fatty acids
- Modulation of auditory cortical circuitry by prefrontal cortex
- Synaptic mechanism of inhibitor-2 in the escalated anxiety in alcohol disorder

Research Resources

- Mediator-Lipidomics Core
- Multiphoton Microscopy Core
- Imaging Core
- Computational Neuroscience Core

Index Terms

mediator lipidomics, omega-3 fatty acids, epileptogenesis, traumatic brain injury, experimental ischemic stroke, retinal degenerations, synaptic plasticity, neurodegenerative diseases, Parkinson's disease, Alzheimer's disease, Usher's syndrome

P20GM103518- Phase 2
Mentoring a Cancer Genetics Program
Tulane University of Louisiana

Principal Investigator

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Thematic Scientific Focus:

Genetics of the cancer process; identification of targets for novel therapeutics.

Research Projects

- The role of L1 elements in cancer origins and progression
- Circadian rhythm signatures in gene expression regulatory elements
- Somatic variations of the human DNA polymerase genes polB, poln and polk and prostate cancer
- The role of cytokine receptor interleukin-17RC in initiation of prostate cancer
- Glyceollins as novel targeted therapeutics for the treatment of metastatic triple negative breast cancer
- TNF receptors, ulcerative colitis and colon cancer

Research Resources

- Fluorescence-activated cell sorting, digital PCR, confocal microscopy
- Next generation sequencing bioinformatics
- Tumor biospecimen bank

Index Terms

cancer, mobile elements, genetic instability, inflammation, gene regulation, epigenetics

P20GM103528- Phase 2
Mentoring Obesity & Diabetes Research in Louisiana
Pennington Biomedical Research Center

Principal Investigator:

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Thematic Scientific Focus

Metabolic Disease, Obesity, and Diabetes

Research Projects

- Gene-environment interactions and high-density lipoproteins: an integrated genomic, biological and behavioral approach
- The effects of oncostatin M on the adipose tissue extracellular matrix
- Thermoregulatory circuit mapping of preoptic leptin receptor neurons
- Dynamic regulation of β -cell function and mass by SGK1
- Role of FGF-21 in mediating the metabolic effects of dietary methionine restriction

Pilot Studies

- P&F Program will begin in August 2016 with initiation of Phase 3 COBRE

Research Resources

- Cell Biology and Bioimaging Core
<http://cobre.pbrc.edu/cores/cell-biology-and-bioimaging/>
- Genomics Core
<http://cobre.pbrc.edu/cores/genomics/>
- Transgenics Core
<http://www.pbrc.edu/research-and-faculty/core-services/?serviceid=74>

Index Terms

insulin resistance, diabetes, obesity, metabolic syndrome, adipose tissue, adipogenesis

P20GM103629- Phase 1
Mentoring Research Excellence in Aging and Regenerative Medicine
Tulane University of Louisiana

Principal Investigator

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Thematic Scientific Focus

Aging and regenerative medicine

Research Projects

- Effect of donor age on mesenchymal stem cell-dependent angiogenesis
- Spatial attention networks and cognitive aging
- Genetics and epigenetics of healthy aging in twins
- The role of Sirtuin 1 and 3 in the prevention and pathogenesis of pulmonary fibrosis
- The effect of age-related microvascular patterning alterations on network resistance in spontaneously hypertensive rats

Pilot Studies

- Age-related differential modulatory effects of acetylcholine on cortical synaptic connectivity
- Inflammatory mechanisms in age-related cardiac dysfunction
- Role of human cytomegalovirus in adipose metabolism and age-related pathologies

Research Resources

- Genomics and Biostatistics Core
- Bioinformatics Core at Tulane Cancer Center

Index Terms

genetics, molecular and cell biology, signaling, immunology, stem cells, cardiovascular biology, cognitive aging, biology of aging, fibrosis, twins, inflammation, metabolism, synaptic connectivity

P30GM106392- Phase 3
Mentoring in Cardiovascular Biology
Louisiana State University Health Sciences Center-New Orleans

Principal Investigator

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Thematic Scientific Focus

Cardiovascular biology and cellular and molecular mechanisms involved in cardiovascular disease states

Pilot Projects

- Metabolic modulation as a therapeutic for vascularization-associated diseases
- Serotonin 5-Ht2A receptor activation as a novel therapeutic target for atherosclerosis
- Susceptibility to obesity: inflammation and vascular function
- Endothelial microparticles: pulmonary hypertension biomarker in scleroderma
- Nitrite therapy protects cardiac function through inhibiting NF-kappa B signaling

Core Research Resources

- Cell and Molecular Analysis Core
- Imaging and Histology Core
- Cardiac and Vascular Function Core

Index Terms

cardiovascular disease, atherosclerosis, hypertension, heart failure, ischemic heart damage, oxidative stress, inflammation, cell signaling and trafficking, G protein-coupled receptors, acute/chronic renal failure, central nervous system, obesity, pulmonary function

P30 GM110760-01 – Phase 3
Center for Experimental Infectious Disease Research
Louisiana State University

Principal Investigator

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Thematic Scientific Focus

Immunological and pathogenetic basis of infectious diseases

Pilot Projects

- RNA based nairovirus reverse genetic system
- Chikungunya viral pathogenesis models for inflammatory arthritis
- Comparative analysis of the spotted fever group *Rickettsia* proteome
- Inflammasomes are critical in host protection against bacterial UTI
- Mechanism of granuloma persistence by *Mycobacterium tuberculosis* - role of IDO
- Mucosal Response in human *Metapneumovirus* infection
- Sca1+ lung mesenchymal stem cell based intervention in bacterial pneumonia
- Novel models of axonal degeneration in Lyme Neuroborreliosis
- Modulation of anti-*M. tuberculosis* adaptive immune response – role of ido
- High-throughput screening of CRISPR-Cas9 sgRNA library for host factors essential for HSV-1 replication

Research Resources

- Genelab core
- The protein core laboratory
- Microscopy immunopathology core

Index Terms

infectious diseases, non-human primate models, retrovirus, SIV, RSV, UTI, HSV, Nairoviruses, chikungunya, *Mycobacterium*, pathogenesis, host response, NextGen, RNASeq, sequencing, bioinformatics

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P30GM103337- Phase 3**COBRE Phase 3: Translational Research in Hypertension and Renal Biology
Tulane University School of Medicine****Principal Investigator*****Luis Gabriel Navar, Ph.D.****Tulane Health Science Center, School of Medicine**Department of Physiology, SL39**1430 Tulane Avenue New Orleans, LA 70112**Tel: 504-988-2594**Fax: 504-988-2675**E-mail: navar@tulane.edu**Web: <http://www.som.tulane.edu/centprog/htn>***Thematic Scientific Focus**

Factors contributing to development of hypertension and subsequent consequences on renal and cardiovascular function

Research Projects

- Angiotensin in distal nephron ontogeny
- Angiotensin receptors in renal microvascular physiology
- Beneficial effects of physical activity on blood pressure among African-American females
- Citrate transport in the proximal tubule
- Distal nephron renin and prorenin receptor in angiotensin II-dependent hypertension
- Endothelial dysfunction, adipocytokines, inflammation and chronic kidney disease
- Functional role of pro-renin receptor in the collecting duct to the development of hypertension
- Regulation of inhibitory circuits in the RVLM by angiotensin II
- Role of p53 in nephron progenitor cell renewal and differentiation
- The effect of microvascular patterning alterations on network resistance in spontaneously hypertensive rats
- Transcriptional control of ureteric bud growth and branching
- Tubular renin-angiotensin system in hypertension
- PDGF receptor blockade reverses the renal functional and morphological changes that occur in angiotensin ii-dependent hypertension
- Angiotensinogen expression and regulation in renal proximal tubules during the development of angiotensin II-dependent hypertension
- Prorenin receptor in collecting duct development
- Non-coding RNA in diabetes mediated enhanced intimal thickening during early atherosclerotic plaque development
- Histone deacetylases 1 and 2 in kidney development
- Estrogen-dependent activation of guanylyl cyclase/natriuretic peptide receptor A gene expression via estrogen receptors ER α and ER β
- Roles of TNF- α receptors in high salt induced exaggerated hypertensive and renal injury responses to angiotensin II
- Roles of TLRs and ROS in contrast-induced nephropathy and new therapeutic strategies

Research Resources

- Molecular, imaging and analytical core
- Transgenic and gene-targeted animal core
- Mouse phenotyping core
- Clinical and translational core

Index Terms

hypertension, blood pressure, renal, angiotensin, cardiovascular disease, kidney disease, nephropathy, kidney development, renal injury, TNF- α receptors, microvascular

P30GM110703- Phase 3
COBRE Center for Molecular and Tumor Virology
Louisiana State University Health Sciences Center

Principal Investigator

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Thematic Scientific Focus

Molecular and tumor virology

Pilot Projects

Regulation of TGF-beta by HPV16 E7 and its role in tumor-stromal interactions

Potential of *Mycobacterium* phage as candidates for phage therapy

Roles of the UL148 glycoprotein in human cytomegalovirus cell tropism

Role of Th17/Treg immunoregulatory axis in a viral model for multiple sclerosis

Research Resources

- Administrative Core
- Molecular Analysis Core
- Bioinformatics Core
- Genomic/DNA Array Core

Index Terms

virology, infectious agents, molecular pathogenesis, viral oncology

P20GM103501- Phase 2
Mentoring Translational Researchers in Louisiana
Louisiana State University Health Sciences Center

Principal Investigator

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Thematic Scientific Focus

Immunobiology of disease with emphasis on chronic inflammation and tissue damage

Research Projects

- Fatty acid oxidation as a promoter of inflammatory asthma and as a therapeutic target
- MicroRNA profiles in obesity patients before and after weight loss treatment

Pilot Studies

- Myeloid-derived suppressor cells in patients with HIV/AIDS
- Polycyclic aromatic hydrocarbons and malignant transformation of neural progenitors

Research Resources

- Cellular Immunology and Immune Metabolism Core
- Translational Genomics Core
- Molecular Histopathology and Analytical Microscopy
- Grants and Development Core

Index Terms

inflammation, host defense, immune response, T cells, chronic disease, cancer

**P30GM103392-Phase 3
COBRE in Vascular Biology
Maine Medical Center Research Institute**

Principal Investigator:

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Thematic Scientific Focus:

Vascular biology, remodeling, angiogenesis and disease mechanisms

Pilot Projects:

- Role of Wnt-10b in the activation of cardiac endothelial cells by myeloid cells
- Role of alpha10beta1 integrin in angiogenesis

Research Resources:

- Structural Biology Core (Proteomics, DNA Sequencing, Confocal Microscopy)
- Transgenic Mouse and Small Animal Imaging Core
- Viral Vector Core

Index Terms:

structural biology, molecular biology, molecular genetics, angiogenesis, cell signaling, vascular biology, cancer, inflammation, endothelial cell, vascular smooth muscle cell, atherosclerosis, restenosis, FGF, Notch, TGF-beta, IGF, IGFBPs, integrins, cryptic epitopes

P20GM103643- Phase 1
Interdisciplinary Center of Excellence for the Study of Pain and Sensory Function
University of New England

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Thematic Scientific Focus

The neurobiology of chronic pain and sensory function

Research Projects

- Interaction between calcitonin-gene-related-peptide and CD40 on CNS glial cells in neuropathic pain
- Genes involved in antinociception in *Drosophila melanogaster*
- Function of the transcription factor Sox11 in regulating the plasticity of nociceptive neurons after nerve injury
- Peripheral mechanisms of cancer-induced ongoing and breakthrough pain

Pilot Studies

- Resident DRG macrophages: Impact on nociceptor response
- Primary cilia in nociceptive DRG neurons: Potential links to acute and chronic pain
- Effects of early life pain on subsequent fear conditioning and sensory function
- Chronic pain, motor output and motor learning in knee osteoarthritis
- Mechanisms of infection-mediated pain

Research Resources

- Histology and Imaging Core
- Behavioral Core

Index Terms

pain, nociception, neurobiology, sensory, behavior, neuropathology

P20GM104318- Phase 1
Comparative Biology of Tissue Repair, Regeneration and Aging
Mount Desert Island Biological Laboratory

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Thematic Scientific Focus:

Mechanisms underlying natural tissue repair, regeneration and aging

Research Projects

- Genetic analysis of natural reprogramming during regeneration
- Regeneration of cutaneous axon regeneration by wound derived H₂O₂
- The role of germ granules in maintaining self-renewal and totipotency
- Stress, genomic instability and loss of regenerative capacity with age

Research Resources

- Comparative Functional Genomics Core
- Animal Core

Index Terms

regeneration, aging, development, tissue repair, stem cells, totipotency, pluripotency, bioinformatics, microRNA, comparative biology, health span, cellular plasticity, gene expression, stress biology

P30 GM106391- Phase 3
COBRE in Stem & Progenitor Cell Biology and Regenerative Medicine
Maine Medical Center

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Thematic Scientific Focus

Stem and progenitor cell biology and damaged tissue repair

Research Resources

- Progenitor Cell Analysis Core
- Molecular Phenotyping Core
- Histopathology Core
- Physiology Core

Index Terms

stem and progenitor cell biology, cytokine signal transduction, skeletal development, leukemogenesis, bone remodeling, nephrogenesis, adipogenesis, hematopoiesis and erythropoiesis

P20GM104932- Phase 2
Center of Research Excellence in Natural Products Neuroscience
University of Mississippi

Principal Investigator

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Thematic Scientific Focus

Identification and characterization of psychoactive natural products

Research Projects

- Sigma receptors and the endocannabinoid system
- Delta-8-tetrahydrocannabinol in the management of glaucoma
- Fluorinated derivatives of anthocyanin natural products for brain neurodegeneration
- Intranasal delivery of ziconotide using muco-similar vehicles

Research Resources

- Sourcing, Acquisition and Isolation Core
- Chemistry Core
- *In Vitro* Pharmacology Core
- *In Vivo* Pharmacology Core
- Biopharmaceutics-Clinical and Translational Core

Index Terms

natural products, dietary supplements, drug discovery, drug development, drug delivery, drug abuse, cancer, opioid, cannabinoid

P20GM104357-Phase 1
Obesity, Cardiorenal, Metabolic Diseases Research Center
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Thematic Scientific Focus:

Prevention, treatment and mechanisms of obesity, cardiorenal and metabolic diseases

Research Projects

- Differential control of metabolic and cardiovascular functions by leptin
- The role of matrix metalloproteinases in the progression of diabetes-induced renal injury

Pilot Projects

- Elucidating mechanisms responsible for the pathogenesis of preeclampsia using the Dahl salt sensitive rat as a novel model of preeclampsia
- Renal sinus fat, hypertension and altered renal hemodynamics
- A novel proangiogenic therapy for preeclampsia
- Reduced uterine perfusion in the mouse: developmental programming of cardiovascular and metabolic disease
- Placental dysfunction and vertical sleeve gastrectomy induced intrauterine growth restriction
- Degenerins and pregnancy mediated cerebrovascular abnormalities

Research Resources

- Administrative, Mentoring and Education Core
- Bioanalytical, Mass Spectroscopy, Imaging and Histology Core
- Molecular/Genomics and Genetically Engineered Animal Models Core

Index Terms

cardiovascular, kidney, hypertension, obesity, metabolic syndrome, diabetes, genetics, central nervous system

P20GM103646- Phase 1

**Center for Biomedical Research Excellence in Pathogen-Host Interactions
Mississippi State University**

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Thematic Scientific Focus

Pathogen-host interactions, systems biology

Research Projects

- Role of stress response in bile resistance of *Listeria monocytogenes*
- Functional analysis of deubiquitinating enzymes in enteric infections
- Identifying polyamine dependent mechanisms in pneumococcal pneumonia
- Molecular mechanisms of immunosuppression induced by superantigens
- Receptors determining influenza host and tissue tropisms using systems biology approaches

Pilot Studies

- Role of the PUMA gene product in pathogenicity of *Streptococcus pneumonia*
- Regulation of experimental autoimmune encephalitis by T cells induced by low doses of Staphylococcal toxins

Research Resources

- Omic Core Facility (Core B)
- Cellular Purification and Analysis Core (Core C)

Index Terms

pathogen, host, proteomics, *Listeria monocytogenes*, *Yersinia enterocolitica*, *Shigella flexneri*, *Influenza virus*, *Staphylococcus aureus*, polyamines, superantigen, deubiquitinase, bile

P30GM103328- Phase 3
Center for Psychiatric Neuroscience
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Thematic Scientific Focus

Pathology of psychiatric, neuropsychiatric and degenerative neurological disorders including disorders of mood, alcohol and substance dependence

Pilot Projects

- Circadian regulation of drug reward: Diurnal rhythms in mesolimbic neural firing and drug-seeking
- HELLP Syndrome
- ShRNA-mediated suppression of gap junction protein Connexin 43
- Long-term consequences of in utero methamphetamine exposure
- The moderating role of genetics in the relation between PTSD and trauma cue-evoked cocaine attentional bias among cocaine dependent patients

Research Resources

- Postmortem Brain Collection Core
- Animal Behavior Core
- Imaging Core
- Molecular and Genomics Core

Index Terms

psychiatric neuroscience, depression, alcohol, psychoactive substance use disorders, schizophrenia, bipolar disorder, postmortem brain tissue, imaging, confocal microscopy, laser capture microdissection, deep sequencing, genomics, behavior, antidepressant medications, chronic stress, neurotrophic factors, angiogenic factors, serotonin, glutamate, transcription factors

P20GM104417- Phase 1
Center for Health Equity in Rural Montana
Montana State University - Bozeman

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Thematic Scientific Focus

Rural and native health equity

Research Projects

- Increasing access to oral health care: Evaluating the outcomes of a community health worker program
- Sexual health project on a Montana reservation
- Increasing environmental health literacy in a Native American community

Faculty Startup Projects

- The Fort Peck substance abuse and resilience project
- Rural Montana victim needs assessment
- Intensive measurement of alcohol use and alcohol-related problems among rural Montanans
- Maternal mental health, child temperament and biological markers of anxiety risk as interactive predictors of anxiety risk in young children
- Prisoner reentry and recidivism in Montana

Research Resources

- Community Engagement Core

Index Terms:

native health, rural health, health disparities, health equity, oral health, reproductive health, health literacy

P30GM103338- Phase 3
Center for Environmental Health Sciences
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Thematic Scientific Focus

Environmental agents on immune and neurological outcomes in human health and disease

Research Resources

- Inhalation and Pulmonary Physiology Core
- Molecular Histology and Fluorescent Imaging Core
- Fluorescent Cytometry Core

Index Terms

environmental health, toxicology, immunology, development, nanomaterials, asbestos, wood smoke, oxidative stress, carcinogenesis, receptor signaling, innate and adaptive immunity

P30GM110732- Phase 3
Center for Zoonotic and Emerging Infectious Diseases
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Thematic Scientific Focus

Infectious disease pathogenesis and development of novel therapeutic treatments

Research Resources

- Cellular Analysis Core
- Animal Models Core

Index Terms

zoonotic diseases, infectious agents, bacterial pathogenesis, innate immunity, adaptive immunity, bone marrow failure, viral spreading, CRISPR

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P20GM103546- Phase 1
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Thematic Scientific Focus

Biophysical, structural and mathematical approaches in understanding health and disease

Research Projects

- Catalysis with non-covalent interactions
- Ligand-specific dynamics and biased agonism in PPAR signaling
- Biomimetic transition-metal catalysts for selective aliphatic hydrocarbon functionalization
- Functional and pharmacological properties of GluN3A—containing NMDA receptors
- Synthesis of potent inhibitors of molecular pathways associated with the mesenchymal epithelial transition
- Defining how AhR ligands alter the phenotype and function of innate lymphoid cells

Research Resources

- Macromolecular X-Ray Diffraction and Protein Expression Core
- Macromolecular NMR Spectroscopy Core
- Molecular Computation Core
- Biospectroscopy Core

Index Terms

biophysics, structural biology, structural studies, pathogens, mammals, fractionation, functional analysis, genetic polymorphisms, P-glycoprotein, drug transporter, catalysis, non-covalent interactions, organometallic chemistry, germ granules, mRNA, silencing, stem cells, cancer, diffraction, disease, isotopes, oxygen, glycoprotein, biological processes, crystallization, spectroscopy, biospectroscopy, spectrometry, cellular biology, pharmacology, neurobiology, biochemistry, synthetic chemistry, macromolecular X-ray crystallography, nuclear magnetic resonance spectroscopy, NMR, mass spectrometry, molecular computation

P30GM103335- Phase 3
Redox Biology Center
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Thematic Scientific Focus

Reduction-oxidation biology in growth, development and health

Research Projects

- Emerging regulatory paradigms in glutathione metabolism during cancer
- Therapeutic control of redox-related cellular process
- Thiol metabolism in prokaryotes
- New anti-superbug strategy-using small molecule signaling factors to increase the susceptibility of bacteria to existing antibiotics
- Peroxidase-mediate nitration of the *Pseudomonas aeruginosa* quinolone signal compound

Research Resources

- Metabolomics and Proteomics
- Spectroscopy and Biophysics
- NMR Metabolomics
- Electron Paramagnetic Resonance Spectroscopy
- Macromolecular Crystallography
- Bio-Imaging

Index Terms

redox biology, oxidative stress, redox signaling, reduction-oxidation, metabolism, redox regulation, mitochondria, reactive oxygen species, metal ion homeostasis, cancer, Parkinson's disease, aging, cataracts, cardiovascular disease, neurodegeneration

P20GM103480 – Phase 2
Nebraska Center for Nanomedicine
University of Nebraska Medical Center

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Thematic Scientific Focus:

Nanotechnology in the development of diagnostic and therapeutic agents for human disease

Research Projects

- Development of metabolically-active linkers (MALS) to improve diagnostic and radiotherapeutic HPMA copolymers
- MUC4 based vaccine for pancreatic cancer
- Renal drug targeting for the treatment of lupus nephritis
- Role of nanoformulated redox enzymes in reducing systemic hypertension in obesity
- Multifunctional nanofiber skin graft for extensive skin replacement therapy

Pilot Studies

- Local sustained co-delivery of 25-hydroxyvitamin D₃ and parathyroid hormone-related peptide for prevention of surgical site infection
- Stable SERS-based multiplex nanosensors for early detection of cancer biomarkers
- Combination nanomedicines based on CXCR4 and microRNA inhibition to treat cholangiocarcinoma
- Synthesis of novel self-assembling biomaterials with antibacterial properties

Research Resources

- Nanomaterials Core Facility
- Bioimaging Core Facility

Index Terms

nanotechnology and engineering, biomaterials, polymer therapeutics, macromolecular prodrugs, radiopharmaceuticals, drug delivery, vaccines, neuroscience, oxidative stress, cancer, lupus, obesity

P20GM109023- Phase 1
Center for Perception and Communication in Children
Father Flanagan's Boys' Home

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Thematic Scientific Focus:

Speech, language, and vestibular issues that are related to hearing loss in children

Research Projects

- The impact of mild hearing loss on auditory perception in complex environments
- The impact of hearing loss on speech communication by Spanish-English bilinguals
- Perception and production of audiovisual speech in children with hearing loss
- Temporal resolution in children with hearing loss
- Gaze stability in children with hearing and vestibular loss

Pilot Studies

- Cortical auditory event-related potentials in patients with auditory brainstem implants

Research Resources

- Administrative Core
- Technical Core
- Clinical Measurement Core

Index Terms

acoustics, auditory system, centers of research excellence, child, childhood, clinical, clinical data, cognitive function, communication, computerized data processing, development, evoked potentials, hearing, hearing aids, hearing impairment, language, language development, language perception, learning, measurement, perception, performance, peripheral, relating to nervous system, sound, speech, speech perception, translational research, visual, visual process, visual processing

P30 GM106397 - Phase 3
Nebraska Center for Cellular Signaling
University of Nebraska Medical Center

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Thematic Scientific Focus

Signal transduction in cell biology and cancer biology

Pilot Grants

- Biochemical investigation of oxidative DNA damage response
- Interferon Response Factor-3 and the immune response to melanoma
- Prostaglandin E desensitization via phosphodiesterase-4 up-regulation in chronic obstructive pulmonary disease
- CD59 down-regulation as a strategy for cancer treatment
- Androgen Receptor promotes TRAIL resistance in breast cancer
- Targeting Rac1 for sensitization of breast cancer to radiation therapy
- Free fatty acids promote inflammation and dynamic regulation of lipid droplets
- Role of Ment in lymphomagenesis
- YAP as a novel regulator in pancreatic cancer metastasis
- Modeling the role of the Hippo/YAP pathway in ovarian high grade serous carcinoma
- Role of endocytic regulatory proteins in mitochondrial fission and Parkinson's disease
- Targeting proteostasis for cancer treatment
- Dissecting the roles of EHD1 and EHD4 in the renal tubular epithelium

Research Resources

- Advanced Microscopy Core
- Tissue Sciences Core
- High Throughput Screening Facility
- Flow Cytometry Core
- Biostatistics Core
- Human Tissue Bank
- Protein Structure Core Facilities
- Translational Mouse Model Core
- Transgenic Mouse Facility
- Rapid Autopsy Program for Pancreatic Cancer

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- Small Animal Imaging
- Epigenomics and DNA Methylation Analysis
- Mass Spectrometry and Proteomics

Index Terms

signal transduction, DNA methylation, DNA damage, endocytosis, cell adhesion, prostate cancer, oral cancer

P30GM110768- Phase 3
The Molecular Biology of Neurosensory Systems
University of Nebraska Medical Center

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Thematic Scientific Focus

Neurosensory and neurodevelopmental disorders and interventions

Research Projects

- Role of miR-1290 in neurodevelopment
- Regulation of hippocampal synapses by glutamate delta-1 receptor
- Analysis of the capacity of redox metabolism, via C terminal binding protein, to regulate cell fate in regenerative and nonregenerative sensory epithelia

Research Resources

- Mouse Genome Engineering Core
- Histology and Imaging Core
- DNA Microarray and Sequencing Core
- Auditory Physiology Core

Index Terms

neurosensory disorders, central nervous system, inner ear development, developmental neuroscience, neurodevelopmental disorders, inflammation, hearing loss, vision loss, Usher syndrome, ototoxicity, autism

P20GM109090- Phase 1
Center for Research in Human Movement Variability
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Thematic Scientific Focus

Center for Research in Human Movement Variability

Research Projects

- Gait variability in peripheral arterial disease
- The effects of virtual reality on gait variability after stroke
- Breathing and walking coupling variability in chronic obstructive pulmonary disease
- Development of postural control variability in autism

Faculty Recruits' Research

- Temporal variability of daily ambulatory activity as a non-invasive biomarker for Parkinson's disease
- Push-off mechanics and gait variability in persons with a lower limb amputation

Pilot Project Mechanism Research

- Novel use of environmental temperature to treat and prevent motor related disorder
- Understanding movement variability among patients on ART for HIV
- Infant physical activity and postural control variability in relation to obesity
- Nonlinear analysis and pattern recognition of variability in physical activity after stroke
- Movement variability, cortical activation and cognitive load in ankle instability
- Older adults' gait control: impact of cognition and context while dual-tasking

Research Resources

- Motion analysis laboratory
- Virtual reality laboratory
- Motor development laboratory
- Machine Shop
- Acoustics laboratory
- Balance and strength laboratory

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- Robotics laboratory
- Digital motion capture systems
- Split-belt treadmills
- Gait-o-Gram
- Body weight support systems
- Audiometer
- Speech analysis system
- Data analysis software
- Force platforms
- Isokinetic Dynamometer
- Spirometer
- Biostatistical support
- Eye-tracking
- Oxymeter
- Inmotion upper extremity robot
- Neurocomm Balance Master
- Staircase instrumented with force platforms
- fNIRS system
- Pressure mats
- Pressure insoles
- Ultrasound system

Index Terms

Peripheral Arterial Disease, visual perception, gait variability, locomotor adaptation, kinematics, muscle activation, kinetics, Chronic Obstructive Pulmonary Disease, breathing, typically developing infants, Autism Spectrum Disorder, postural sway, Stroke, biomechanics, coupling biorhythms, posture, human movement, complexity, nonlinear dynamics, fractals, mathematical chaos, motor control, motor learning, motor disorders, movement dysfunction

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P30GM103509- Phase 3
Nebraska Center for Virology
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Thematic Scientific Focus

Mechanisms and regulation of the replicative cycle of viruses and host responses in disease pathogenesis

Research Resources

- Microscopy Core
- Flow Cytometry Core
- Bioinformatics Core

Pilot Project

- Evaluation of algal viruses in mammals and the association with serious psychiatric

Index Terms

virus, pathogens, bioinformatics, microscopy, structural biology, HIV, neurodegenerative diseases, apoptosis, herpes, inflammatory disease, signaling, immunology, humanized mouse model, neuropharmacology, electrophysiology, stress, trauma, antiviral, prion diseases

P20GM104320- Phase 1

**Nebraska Center for the Prevention of Obesity Diseases through Dietary Molecules
University of Nebraska Lincoln**

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Thematic Scientific Focus

Nutrient signaling in the prevention of obesity and obesity-related diseases

Research Projects

- Palmitoleate signaling, miRNAs and lipoapoptosis
- Redox signaling, endoplasmic reticulum stress, high-fat diet and metabolic syndrome
- Bioinformatics-guided discovery of dietary microRNA signals in obesity
- Gut microbe signaling, epigenetics and inflammatory processes
- Regulation of white adipocyte browning by dietary fatty acids

Pilot Studies

- A novel cecum cannulated human gut microbiota associated pig gastrointestinal model to study signals produced by the gut microbiome that interact with host gene expression leading to a lean or obese phenotype
- Identification of surface proteins that mediate the uptake of milk exosomes
- Matrix based liver models to study obesity-related liver disease
- The role of chronic inflammation in fetal origins of obesity and metabolic dysfunction

Seed Grants

- Molecular characterization of human miRISC complexes following treatment with cow milk exosome miRNAs
- Biomarkers of progressive fatty liver
- Mechanism of 3-hydroxy fatty acid-induced placental trophoblast and hepatocyte lipoapoptosis

Research Resources

- Bioinformatics
- Biostatistics
- Computer Center
- Body Composition Analysis in Humans and Small Animals
- Live Animal Imaging
- Mouse Phenotyping

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- Molecular Biology
- Gene Expression Analysis
- Metabolomics and Proteomics
- Gnotobiotic Mouse Facility

Index Terms

obesity, nutrient signaling, diabetes, heart disease, microbiome, non-alcoholic fatty liver disease, microRNA, cholangioapoptosis, brown adipose tissue, apoptosis, fatty acids, diet, nutrition, tissue engineering, RNA biology

**P20GM109025- Phase 1
COBRE Grant
Cleveland Clinic Foundation**

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Thematic Scientific Focus

Neurodegeneration and Translational Neuroscience; neuroimaging, immune biomarkers of neurodegenerative disease

Research Projects

- The relationship between neuropsychological testing and MRI, PET and blood biomarkers in Alzheimer's and Parkinson's disease(PD)
- Cross-sectional and longitudinal MRI analysis of the functional and structural brain networks underlying mild cognitive impairment in PD
- Immune markers linking pathogenesis in animal models and human neurodegenerative disease

Research Resources

- CNTN Administrative Core
- Clinical and Translational Research Core
- Data Management and Statistics Core
- Magnetic Resonance Imaging and PET/CT Imaging
- Behavioral Neuroscience Laboratory, Animal Facility, Genomics Core and Confocal and Biological Imaging Core at the University of Nevada Las Vegas

Index Terms

neurodegenerative, human subjects, animal models, vertebrate animals, Alzheimer's Disease, Parkinson's Disease

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P30 GM110767- Phase 3
COBRE: Smooth Muscle Plasticity
University of Nevada, Reno

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Thematic Scientific Focus

Smooth muscle plasticity in response to changing stimuli or microenvironments

Research Resources

- Molecular Expression and Transgenic Core
- Protein Expression and Analysis Core
- Dynamic Imaging Facility

Index Terms

smooth muscle biology, smooth muscle plasticity, integrins, calmodulin, smooth muscle proteomics, stretch-activated potassium channels, bowel obstructions

P20GM103554- Phase 1
Cell Biology of Signaling Across Membranes
University of Nevada, Reno

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Thematic Scientific Focus

Neuroscience, cell biology of signaling across membranes, neuron-glia interactions

Research Projects

- Neurotrophic signaling in *Drosophila*
- Secretion of signaling molecules
- The roles of glia and neural activity in the development of neuromuscular synapses
- Modulation of mitochondrial quality control and function by serine/threonine kinases and phosphatases in neurons
- Mitochondrial dynamics and synaptic vesicle recycling

Research Resources

- Imaging Core
- Tissue Culture Core
- Electron Microscopy Core
- Seahorse XF analyzer for measurement of oxygen consumption
- Super-Resolution Microscopy Core
- COBRE program evaluation/assessment of faculty development

Index Terms

cell biology, molecular biology, neuroscience, signaling, glycobiology, neurodegeneration, mitochondrial biology

P20GM103650- Phase 1
Integrative Neuroscience COBRE
University of Nevada, Reno

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Thematic Scientific Focus:

Integrative neuroscience; mechanisms of normal brain function and neural deficits

Research Projects

- Understanding the neural basis of working memory to improve WM function
- Behavioral and neural investigations of spatiotemporal form integration in healthy and brain-injured persons
- Temperature control of the *C. elegans* circadian clock
- Engineering magnetofluorescent nanoparticles for neurological disease diagnosis
- The role of DOMINO in regulation of circadian rhythms in *Drosophila*
- Mechanisms of 3'UTR lengthening and its function in axon guidance

Pilot Studies

- Comparing cognition, behavior and neural responses to real objects versus images
- A novel biotinylation approach for RNA binding protein studies
- Circular RNA: mechanism and function in the aging brain

Research Resources

- Neural imaging resources core
- Special populations database - study participant registry

Index Terms

cognitive neuroscience, cellular neuroscience, genetics, neuroimaging, traumatic brain injury, neural disorders

P20GM103534- Phase 1
Quantitative Biology Research Institute
Dartmouth College

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Thematic Scientific Focus

Bioinformatics

Research Projects

- Immunogenomic analysis of gene-environment interaction in zebrafish
- Computational identification of disease-associated regulatory programs
- Computational prediction of regulatory motifs in environmental response genes
- Bayesian network analysis of gene-environment interaction in human populations

Pilot Studies

- Tissue specific gene set testing
- Joint modeling for improving lung cancer screening on early diagnosis and prevention

Research Resources

- Integrative Biomedical Sciences Core
- Zebrafish and Model Organisms Core (Developing)

Index Terms

bioinformatics, biostatistics, genomics, genetics

P30GM103415- Phase 3

**Center for Molecular, Cellular and Translational Immunology
Department of Microbiology and Immunology
Dartmouth Medical School**

Principal Investigator

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Thematic Scientific Focus:

Immunology in the prevention, diagnosis and treatment of human diseases

Research Resources

- Educational, Mentoring and Administrative (EMAd) Core
- Immune Monitoring and Flow Cytometry Shared Resource
- The Transgenic and Humanized Immune System Mouse Facility
- DartMouse™, The Mouse Speed Congenic Core Facility at Dartmouth

Index Terms

immunology, speed congenics, transgenics, humanized mice, autoimmune disease, immune monitoring, immunoassays, genetic construct

P20GM104416 - Phase 1
Center for Molecular Epidemiology
Geisel School of Medicine at Dartmouth

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Thematic Scientific Focus:

Molecular Epidemiology

Research Projects

- Early risk factor related epigenetic alterations in breast cancer pathogenesis
- Neonatal microbiome, exposures and infection
- Relation between *in-utero* vitamin d and immune function in early childhood
- Assessing maternal-fetal exposure pathways using bio-imaging
- Functional studies of the developing infant gut microbiota using metabolomics

Research Resources

- Biorepository Core

Index Terms

molecular epidemiology, biomarkers of exposure, disease susceptibility and pathogenesis

P30GM106394- Phase 3

**Dartmouth Lung Biology Center for Molecular, Cellular and Translational Research
Geisel School of Medicine at Dartmouth**

Principal Investigator

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Thematic Scientific Focus

Molecular and cellular mechanisms in pathology and treatment of lung disease

Research Projects

- Development of cFLIP-calmodulin interaction inhibitors for lung cancer therapy
- Linking pulmonary acidosis to inflammation
- Autoimmunity and lung function in cystic fibrosis
- Mechanisms of regional heterogeneity of lung macrophage inflammation
- Microbial activity as a determinant of health status in cystic fibrosis

Research Resources

- Host Pathogen Interaction Core
- Live Cell Imaging Core
- Translational Research Core

Index Terms

Cystic fibrosis, *Pseudomonas*, *Staphylococcus*, *Streptococcus*, *Aspergillus*, *Candida*, cystic fibrosis transmembrane conductance regulator, CFTR, biofilms, microbiome, phagocytosis, cytokines, inflammation, protein engineering, drug discovery

P20GM103472- Phase 2**Multimodal Imaging of Neuropsychiatric Disorders (MIND): Mechanisms & Biomarkers
The Mind Research Network****Principal Investigator****Vince Calhoun, PhD***The Mind Research Network**1101 Yale Blvd, NE Albuquerque, NM 87106**Tel: 505-272-1817**Fax: 505-272 8002**E-mail: vcalhoun@mrn.org**Web: <http://cobre.mrn.org>**<http://www.mrn.org>***Thematic Scientific Focus**

Neuroimaging in schizophrenia, neural mechanisms of psychosis and mood disorders

Research Projects

- Discriminating schizophrenia from bipolar disorder by N-way multimodal fusion of brain imaging data
- Combined effects of SNPs and CNVs on brain structure in patients with schizophrenia and bipolar disorder
- Transcranial direct current stimulation for treatment of auditory verbal hallucinations
- Multi-modal imaging investigation of electroconvulsive therapy response in late-life depressive episodes

Pilot Studies

- Meg investigations of auditory orienting: moderating effects of schizophrenia and nicotine dependence
- Multimodal neuroimaging of corollary discharge in psychosis: MEG and fMRI
- Capturing information flow and joint sufficiency in a meta-modal framework
- Multisensory tasks to investigate mechanisms of improved cognition in schizophrenia

Research Resources

- 3 Tesla Siemens TIM Trio whole body scanner equipped with Sonata gradient subsystem (40 mT/m amplitude, 200 μ s rise time, 100% duty cycle)
- Elekta Neuromag MEG System
- High Density Electroencephalography (EEG) Lab
- An enterprise level data center with neuroinformatics tools and automated analysis capabilities
- Administrative, Clinical Assessment, And Mentoring (ACAM) Core
- Multimodal Data Acquisition (MDA) Core
- Algorithm and Data Analysis (ADA) Core
- Biostatistics and Neuro-Informatics (BNI) Core

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Index Terms

schizophrenia, bipolar disorder, depression, neuroinformatics, multimodal imaging, resting fMRI, MEG, EEG, DTI, cognition, gating

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P30GM103400- Phase 3
Integrative Program in CNS Pathophysiology Research
University of New Mexico

Principal Investigator

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Thematic Scientific Focus

Central nervous system pathophysiology

Pilot Projects

- Neurorepair following traumatic brain injury in infants: erythropoietin to reverse
- Microstructural and diffusion magnetic resonance imaging abnormalities
- Neural basis of spatial disorientation in Alzheimer's disease
- Enhancement of cerebral perfusion for the treatment of Alzheimer's disease
- MRI-based structural study to validate VLP vaccines against AD

Research Resources

- Magnetic resonance imaging
- Electron paramagnetic resonance spectroscopy and imaging
- Confocal laser scanning microscopy
- Animal surgery models
- Animal behavior tests

Index Terms

central nervous system, pathophysiology, stroke, brain injury, neuroimaging, neurological disorders

P30 GM110907- Phase 3
COBRE Center for Evolutionary and Theoretical Immunology
University of New Mexico

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Thematic Scientific Focus

Evolutionary and theoretical immunology, host-pathogen interaction

Pilot Studies

- Host transcriptomic response to acute respiratory viral infection
- How does climate change alter the activities of pathogens and symbionts to affect host health?
- The immune system of a parasite and its contribution to the defense of the host-parasite unit

Research Resources

- Molecular Biology Core
- Cell Biology Core
- Controlled Environments Core

Index Terms

evolutionary immunobiology, theoretical immunology, innate immunity, immunology, RNAi, comparative immunology, evolution, host-pathogen interaction, hepatitis C, T cell, NextGen Sequencing, Bioinformatics

P20GM1090895- Phase 1

**University of New Mexico (UNM) Center for Brain Recovery and Repair
University of New Mexico Health Sciences Center**

Principal Investigator

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Thematic Scientific Focus

Development and testing of interventions for survivors of acquired brain injuries

Research Projects

- Functional recovery from acute brain injury via human neural stem cell transplantation
- Brain stimulation in animal models of recovery from acute brain injury
- Predicting recovery of cognitive control deficits in traumatic brain injury
- Transcranial direct current stimulation for treatment of deficits after traumatic brain injury

Research Resources

- Pre-Clinical Recovery and Repair Core (PRRC), including anatomic & behavioral testing, *in vivo* electrophysiology & optogenetics
- Clinical Recovery and Repair Core (CRRC), including study coordination, neurocognitive testing, EEG, tDCS

Index Terms

Neurological disorders, traumatic brain injury, stroke, aphasia, cognitive function, mood, transcranial direct current stimulation, stem cells, EEG, neuroimaging

P30GM103329- Phase 3

COBRE in Pathophysiological Signaling in Neurodegenerative Disorders
University of North Dakota School of Medicine & Health Sciences

Principal Investigator

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Thematic Scientific Focus

Neurological disorders, traumatic brain injury and epilepsy, causes and treatments, systems biology

Pilot Projects

- Developing a motor symptom quantitative measurement prototype for patients
- Dopamine transporter antibody development and commercialization
- Epigenomic profiling of brain cancer cells using small noncoding RNAs

Research Resources

- Mass Spectrometry Core
- Imaging Core
- Edward C Carlson and Image Analysis Core Facility
Mass Spectrometry Core Facility

Index Terms

neurodegeneration, Alzheimer's disease, Parkinson's disease, traumatic brain injury, epilepsy, necrosis, apoptosis, axonal degeneration and regeneration, growth factors, phospholipid metabolism

P20GM103505-Phase 2
Center for Visual and Cognitive Neuroscience
North Dakota State University

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Thematic Scientific Focus

Empirical and theoretical analysis of human visual and cognitive performance in normal and dysfunctional states

Research Projects

- Mechanisms of own- and other-race face processing
- Neural mechanisms and processing strategies underlying brightness and lightness perception
- Testing a quantitative model for the perception of depth from motion parallax
- Vigilance and avoidance in affective visual processing

Pilot Studies

- Visual synchrony and the analysis of visual scene dynamics
- Selective attention to multimodal stimuli
- Natural image variance and contrast origin ambiguity
- Infant's use of visual information in object individuation
- Mechanistic studies on novel anti-PDGFR compound SJ001 targeting proliferative vitreoretinopathy
- Perceptual and neural sensitivity to grammatically relevant acoustic information
- Attentional and physiological correlates of interpersonal stress and mental health in childhood and early adolescence
- Embodied vision: action influences on visual processing near the hands
- Resting and task-related cortical connectivity in Schizophrenia and health

Research Resources

- High-Density EEG/Neurostimulation Core Facility
- Driving Simulator Core Facility
- High Dynamic Range Imaging Core Facility
- Immersive Virtual Reality Core Facility
- Electro-optical Instrumentation Core Facility
- Eyetracking Core Facility
- Technical Services Core Facility

Index Terms

visual processing, working memory, vision, cognition, eye movements, neural activity, EEG/ERP, attention, RT

P30GM103332- Phase 3
Center for Protease Research
North Dakota State University

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Thematic Scientific Focus

Proteases and disease, structural biology driven drug discovery

Research Projects

- Combo Therapy: targeting Kras mutant pancreatic cancer with ROS inducer & gemcitabine
- Tools for torque teno virus research
- Novel therapeutic strategy in pancreatic cancer
- Peptidomimetic RAGE inhibitors for atherosclerosis
- Epigenetic mechanisms of apoptosis silencing in prostate cancer

Research Resources

- Molecular Biology Facility
- Bioassay Facility
- Cell and Tissue Culture Facility
- Core Synthesis Facility and Analytical Services
- Mass Spectrometry Facility
- Microscopy Facility
- Nuclear Magnetic Resonance Facility
- X-Ray Crystallography Facility

Index Terms

cancer, asthma, arthritis, obesity, structural biology, reactive oxygen species, histone deacetylase, epigenetics, autophagy, synthesis of inhibitors

P20GM104360- Phase 1

**Center for Biomedical Research Excellence, Epigenomics of Development and Disease
University of North Dakota**

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Thematic Scientific Focus

Epigenomics of development and disease

Research Projects

- The roles of RNAII pausing as a dynamic epigenetic mark during neural stem cell differentiation
- Molecular mechanisms of chromatin remodeling associated with trans-differentiation: epithelial to mesenchymal transition
- Epigenomics patterning during distinct development stages associated with transgenerational inheritance patterns of addiction
- Long-lasting effects of juvenile antidepressant use on behavior and epigenetic regulation of gene expression

Research Resources

- Bioinformatics Core
- Next-generation sequencing

Index Terms

epigenetics, epigenomics, stem cells, development, cancer, neurodegeneration, environmental exposures, epithelial to mesenchymal transition, addiction

P20 GM103639- Phase 1
Mentoring Translational Cancer Research in Oklahoma
University of Oklahoma Health Sciences Center

Principal Investigator

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Thematic Scientific Focus

Tumor biology: resistance to cancer therapy and mitigating strategies

Research Projects

- HuR: role in mediating resistance to radiation
- Molecular determinants of gemcitabine transport in pancreatic cancer therapy
- Tumor resistance mechanisms to anti-VEGF therapy in ovarian cancer
- Targeted therapy against neuroblastoma

Pilot Studies

- Novel strategies for targeting cancer stem-like cells expressing hepatitis C virus
- Targeting LPA-signaling for developing ovarian cancer therapeutics

Research Resources

- Histology and Immunohistochemistry Core
- Small Animal Imaging Core
- Biospecimen Pathology Core

Index Terms

cancer, metastasis, chemotherapy, radiation-therapy, resistance, tumor cell biology

P30GM110766- Phase 3
Molecular Mechanisms and Genetics of Autoimmunity
Oklahoma Medical Research Foundation

Principal Investigator

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Thematic Scientific Focus:

Molecular and genetic basis of autoimmune diseases

Research Resources

- Genomics Core
- Quantitative Analysis Core

Index Terms

autoimmune disease, inflammatory rheumatic diseases, systemic lupus erythematosus, Sjögren's syndrome, sarcoidosis, autoantibody, autoantigen

P30 GM103510-05 – Phase 3
NIH/NIGMS COBRE
Science in a Culture of Mentoring
Oklahoma Medical Research Foundation

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Thematic Scientific Focus

Molecular and cellular immunology in the context of human health and disease

Research Resources

- Clinical, Phenotyping and Biorepository Core
- Human Immunophenotyping and Immune Function Core
- Human Monoclonal Antibody Core
- Serum Analyte and Biomarker Core

Index Terms

immunology, vaccine, signaling, inflammation, inflammatory disease, DNA microarray, imaging, proteomics, immunodeficiency, autoimmune disease, SLE, arthritis, genomics

P20GM103648- Phase 1
Oklahoma Center for Respiratory and Infectious Diseases
Oklahoma State University-Stillwater

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Thematic Scientific Focus:

Infectious diseases of the respiratory system

Research Projects

- Development of an RSV vaccine by molecular manipulation of the viral matrix protein
- A novel tissue-equivalent respiratory model to study airway reactivity to infectious agents
- Control of lung inflammation by a TLR4-interacting SPA-derived peptide
- Neutrophil-mediated acute lung injury in influenza virus pneumonia

Pilot Studies

- exploration of clpp activation to treat respiratory infections in cystic fibrosis
- β , β -carotene 9',10'-oxygenase 2 (BCO2) in influenza virus pneumonia
- Does PA0327 bind calcium and regulate *Pseudomonas aeruginosa* virulence?
- The role of angiogenic factors in the development of atherosclerosis during *Chlamydia pneumoniae* infection
- Influenza-Host protein interactions control viral infection and pathogenesis
- Develop single domain antibodies for blocking interleukin 17 receptor signaling
- *Pseudomonas aeruginosa* intra-species interactions
- Nanotherapeutic modulation of autophagy for treatment of lung pathogens
- The effect of "avirulent" rickettsial infections on Rocky Mountain spotted fever pathogenesis: aerosol and needle inoculation
- Azoreductase characterization of *Pseudomonas aeruginosa* strain FRD1, a cystic fibrosis isolate
- Photoreceptors as a novel class of virulence factors in opportunistic pathogens
- The role of glutamate in the initiation and maintenance of pleurisy
- Validation of bacterial condensins as drug targets

Research Resources

- Animal Model Core
- Immunopathology Core
- Molecular Biology Core

Index Terms

respiratory pathogens, influenza, respiratory syncytial virus, pulmonary infections, pathogenesis, tissue engineering, vaccine, lung inflammation, pneumonia

P20GM104934- Phase 2
Mentoring Diabetes Research in Oklahoma
University of Oklahoma Health Sciences Center

Principal Investigator

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Thematic Scientific Focus

Mentoring junior investigators in research of diabetes and diabetic complications

Research Projects

- Mechanisms of mitochondrial dysfunction in diabetic cardiomyopathy
- Mechanisms of impaired angiogenesis in diabetes mellitus
- Effects of rbp4 elevation on endothelium and retina
- Molecular determinants of shca gene function in diabetes
- Neural function and protection in diabetic retina

Research Resources

- Administrative Core
- Diabetes Animal Core
- Histology and Imaging Core

Index Terms

diabetes mellitus, diabetic mouse, biological assay, urine, creatinine, knockout mice, retina, renal, heart

P20GM103441- Phase 2
Interdisciplinary Research in Vascular Biology
Oklahoma Medical Research Foundation

Principal Investigator

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Thematic Scientific Focus

Vascular biology

Research Projects

- SWI/SNF-regulated postnatal angiogenesis
- Epsin-regulated VEGFR-3 signaling in lymphangiogenesis
- Mechanisms of CXCL16-mediated atheroprotection
- Obesity and aging in osteoarthritis
- Molecular mechanisms underlying lymphatic endothelial cell specification

Research Resources

- Microscopy core
- Small animal imaging core
- Flow cytometry and cell sorting core
- Cardiovascular pathophysiology core

Index Terms

host defense, inflammation, antibody, autoimmune disease, glycosylation, atherogenesis, angiogenesis, and lymphangiogenesis

P20GM103636-Phase 1
Expanding Excellent in Developmental Biology in Oklahoma
Oklahoma Medical Research Foundation,

Principal Investigator

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Thematic Scientific Focus

Developmental Biology

Research Projects

- Reactive oxygen species in the epi/pericardium regulate *Drosophila* heart physiology
- Understanding connective tissue development and disease with platelet-derived growth factor receptor (PDGFR)-driven models of fibrosis
- The roles of Hop2 and Mnd1 in mouse meiotic homologous recombination
- TopBP1 and TICCR in the chemotherapy response and embryonic development
- Development of pancreatic beta cells from human induced pluripotent stem cells

Pilot Studies

- Identification of an Anti-Apoptotic Mutation Causing Cancer Predisposition
- Role of c-Myb in CD4 lineage commitment and iNKT cell development
- Role of the mitochondrial matrix protease ClpP in mitochondrial protein homeostasis
- Exploring the potential that the thymus is an alternative site for ILC2 cell development

Research Resources

- Flow Cytometry Core
- Imaging Core
- Bioinformatics and Pathways Core

Index Terms

reactive oxygen species, *Drosophila* cardiac function, platelet-derived growth factor receptors, fibrosis, adipogenesis, lineage tracing, homologous recombination, meiosis, DNA replication, replication timing, zebra fish, Type 1 diabetes, human induced pluripotent stem cells, chromatin remodeling, lineage commitment, iNKT cells, mitochondrial homeostasis, mitochondrial matrix protease ClpP, high throughput screening, pancreatic β -cell survival, ILC 2 cells

P20GM103640- Phase 1

**Oklahoma Center of Biomedical Research Excellence (COBRE) in Structural Biology
University of Oklahoma-Norman**

Principal Investigator

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Thematic Scientific Focus

Macromolecular targets for rational drug design

Research Projects

- Structure-function studies of MsvR, a methanogen-specific transcriptional regulator
- Probing the potential of the gyrase inhibitor ParE for antibacterial applications
- Structural characterization of gamma-glutamyl transferase enzymes
- Mechanistic studies of CRISPR-mediated bacterial immunity

Research Resources

- Macromolecular Crystallography Laboratory (MCL) Core
- Protein Production Core (PPC)
- Laboratory of Biomolecular Structure and Function (LBSF) Core

Index Terms

X-ray crystallography, structure/function studies, structural biology, transcription, protein-nucleic acid interactions, cancer, antimicrobial drug targets, oxidative stress, bacterial immunity

P20GM103642- Phase 1

**Center for Neuroplasticity at the University of Puerto Rico
University of Puerto Rico Medical Sciences Campus**

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Thematic Scientific Focus

Neuroplasticity in response to spinal cord injury, alcohol exposure, and the genetic basis of plasticity at the synapse

Research Projects

- Estradiol and Tamoxifen as neuroprotective/neurodegenerative agents after spinal cord injury
- The role of sensory input to locomotion after the loss of supraspinal inputs
- Alcohol tolerance via Wnt/ β -catenin impacts BK expression and ethanol consumption
- The potassium channel Slowpoke and the molecular mechanisms of neuronal homeostasis

Research Resources

- Neuroimaging Core
- Electrophysiology Core

Index Terms

alcoholism, spinal cord injury, dopamine, synaptic homeostasis, synaptic release, pattern generators

P30GM103410- Phase 3
COBRE Center for Cancer Signaling Networks
Brown University

Principal Investigator

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Thematic Scientific Focus:

Cancer signaling networks, molecular genetics research

Research Resources

- Next-Generation Sequencing Core
- Genomics Core
- Mouse Transgenics and Gene Targeting Core

Index Terms

next-generation sequencing, genomics, genetics, gene targeting, transgenic animals, knockout mouse, flow cytometry, imaging, genetics, genomics, immunology, infection, molecular biology, virus, hepatitis, neuropathology, Alzheimer's disease, autism, aging, microvascular disease, addiction, epilepsy, stroke, signaling liver disease

**P20GM104937- Phase 2
COBRE for Skeletal Health and Repair
Rhode Island Hospital**

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Thematic Scientific Focus

Health and disease mechanisms and repair strategy in cartilage and bone

Research Projects

- Biomechanical regulation of chondrocyte differentiation
- Articular cartilage calcification in osteoarthritis
- Seeds of protein aggregation in inclusion body myositis
- Delivery of microRNA 365 for growth plate cartilage repair

Research Resources

- Bioengineering Core
- Molecular Biology and Imaging Core

Index Terms

cartilage, bone, growth plate, skeletal dysplasia, joint degeneration, osteoarthritis, chondrosarcoma, angiogenesis, tissue engineering, stem cells, bioengineering

P30GM114750- Phase 3
COBRE for Perinatal Biology
Women and Infants Hospital-Rhode Island

Principal Investigator

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Thematic Scientific Focus

The scientific aims of our COBRE have been to increase our understanding of human cardiopulmonary development, to enhance our understanding of perinatal diseases, like preeclampsia and preterm birth and to develop new opportunities for novel therapeutic strategies

Pilot Studies

- Understanding preeclampsia using Alzheimer's tools
- Role of exosomes in fetal lung development
- Role of the extracellular matrix in preterm premature rupture of fetal membranes
- PRKAG2 mutations and therapeutic approaches for hypertrophic cardiomyopathy
- Transcriptome Profiling of Extracellular Vesicles Defines Molecular Phenotypes of Preeclampsia
- Vasa dysfunction leads to abnormal chromosomal segregation and increased rates of miscarriage

Research Resources

- Molecular Biology and Imaging Core

Index Terms

perinatal biology, developmental biology, preeclampsia, preterm birth, brain development, molecular pathogenesis of *Candida* infections, premature labor, bronchopulmonary dysplasia, lung stem cells, mechanotransduction, transcriptional regulation, genetics of preterm birth, preeclampsia genetics

P20GM103468- Phase 1
Stem Cell Biology: New Directions in Clinical and Basic Research
Rhode Island Hospital

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Thematic Scientific Focus

Stem cell biology and tissue restoration in injury models. Also the biology of extracellular vesicles

Research Projects

- The role of microvesicles in pulmonary hypertension
- Determining the transcriptional regulation and cell signaling events that shape the molecular identity of dopamine neuron progenitors and specify subtypes of midbrain dopamine neurons
- Tyrosine phosphatase Shp2 in hematopoietic stem cell property maintenance
- The study of cycling hematopoietic stem cells and circadian rhythms

Pilot Studies

- The study of haploidentical and mismatched stem cell transplant in refractory leukemia/lymphoma

Research Resources

- Administrative Core
- Flow Core
- Molecular Core

Index Terms

stem cells, tissue, injury, pulmonary hypertension, signaling, dopamine, hematopoietic cells, leukemia, extracellular vesicles

P30GM110759- Phase 3
COBRE Center for Cancer Research Development
Rhode Island Hospital

Principal Investigator

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Thematic Scientific Focus

Cellular and molecular pathways leading to cancer

Pilot Studies

- The mevalonate pathway regulates drug resistance in colorectal cancer
- Interrogating the druggable targets in the Ableson Interacore 1
- The role aspartate beta hydroxylase in cholangiocarcinoma progression
- Profiling heterogeneous invasion and resistance using 3D tumor organoids

Research Resources

- Proteomics Core
- Molecular Pathology Core
- Pilot Project Core

Index Terms

cell biology, molecular biology, proteomics, cancer, signaling, angiogenesis

P20 GM104317- Phase 1
Immune-Based Interventions Against Infectious Diseases
University of Rhode Island

Principal Investigator

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Thematic Scientific Focus:

Immunology of infectious diseases, pathogen-host interactions, vaccines and immunotherapeutics

Research Projects

- Autophagy regulation of innate and adaptive immunity in dengue
- HIV exposed-uninfected infant immunity
- Novel vaccine candidate for pediatric *Falciparum malaria*
- Cellular effector mechanisms elicited by novel malaria vaccine candidate PfSEA-1

Pilot Studies

- Inhibition of *T brucei* PLK as a novel strategy for treating trypanosomiasis
- Overcoming HIV-1 latency by regulating stem-loop binding protein
- Evaluation of the IL1 β and TNF α inhibitor auranofin against staphylococcus
- Galectin-3 in neonatal host defense against disseminated candidiasis
- Do human-like T cell epitopes contained in Env protein help HIV achieve immune camouflage?
- Immunoregulatory effects of *H pylori*'s cytotoxin-associated protein A
- Characterization of a novel malaria vaccine antigen PfCDPK5

Research Resources

- Statistics and Data Management Core
- Cell Analysis and Sorting Core
- Luminex High-Throughput Analysis Core

Index Terms

infectious diseases, immunology, global health, dengue, HIV, malaria, host-pathogen interaction, innate immunity, adaptive immunity, vaccine

P20GM103652- Phase 1

Endothelial Injury and Repair: Cardiopulmonary Vascular Biology COBRE
Ocean State Research Institute

Principal Investigator

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Thematic Scientific Focus:

Heart and lung disease pathogenesis and therapies

Research Projects

- Adenosine and lung endothelial injury
- Effects of angiotensins on shock-induced acute lung injury
- Improvement of coronary vascular functions by endothelium-targeted increase in reactive oxygen species *in vivo*
- Regulation of cardiac fibroblast function by microRNAs
- Sex hormones and pulmonary vascular and right ventricular dysfunction

Pilot Studies

- Integrin Activation Regulates Neutrophil Trafficking During Respiratory Infection
- SK/IK Channel Dysregulation and Endothelial Dysfunction in Diabetic Patients

Research Resources

- The Administrative Core
- The Cell Isolation/Organ Function Core
- Cell Isolation/Organ Function Core, The Vascular Research Laboratory, Providence VA Medical Center
- Animal Physiology Studies
- Tissue Culture Equipment
- Microscopes
- Image Analysis
- Molecular Biology Equipment

Index Terms:

endothelium, cardiomyocyte, cardiac fibroblast, inflammation, pulmonary, coronary, acute respiratory distress syndrome, pulmonary hypertension, cigarette smoke, sepsis

P20GM103645 - Phase 1
COBRE Center for Central Nervous System Function
Brown University

Principal Investigator

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Thematic Scientific Focus:

Behavioral, genetic, and neural mechanisms in central nervous system functions

Research Projects

- Microcircuits for reward driven decision in *Drosophila*
- Typical and atypical (autism spectrum disorder) development of selective attention
- Neocortical mechanisms of selective attention
- Neocortical-basal ganglia interactions for attention-based associative decision processing
- Neural systems of attention-action interactions

Pilot Studies

- DRD4 contributes to negative symptoms in mental illness

Research Resources

- Design and Analysis Core
- Administrative Core
- MRI physics support
- MRI Research Facility
- Non-invasive brain stimulation facility
- Near-infrared spectroscopy
- Genomics Facility
- Proteomics Facility

Index Terms

neuroscience, attention, decision making, autism, imaging, neocortex, basal ganglia, action, genetics, neurophysiology, development, reward spatial-temporal processes

P30GM103336- Phase 3
Center for Colon Cancer Research
University of South Carolina

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Thematic Scientific Focus

Colorectal cancer biology, diagnosis, prevention and treatment

Pilot Projects

- TP53-synthetic lethal therapeutic targets for colon cancer
- Non-alcoholic fatty liver disease and potentiation of colonic neoplasia
- Synthetic lectin sensor arrays for diagnosis of colorectal cancer
- Role of HPV in rectal cancer
- Linking macrophages to gut microbiota in obesity-enhanced colon cancer
- Targeting colon cancer using miRNAs

Research Resources

- Biotechnology Core
- Mouse Experimentation Core
- Tissue Biorepository
- Biometry Core

Index Terms

colorectal cancer, diagnosis, prevention, treatment, cancer biology

P20GM109040- Phase 1
South Carolina Research Center for Recovery from Stroke
Medical University of South Carolina

Principal Investigator

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Thematic Scientific Focus

Stroke recovery research

Research Projects

- Excitatory and inhibitory rTMS as mechanistic contributors to walking recovery
- Investigating the neurobiologic basis for loss of cortical laterality in chronic stroke patients
- Microvascular function and neuroplasticity after stroke
- Optimizing transcranial direct current stimulation current and electrode montage for stroke patients
- Treating depression and enhancing locomotor recovery post-stroke

Pilot Studies

- Exploring potential roles of Hox genes in stroke recovery
- Application of ultrasound technology to enhance the quantitative measurement of post-stroke behavior and function
- Paired associative stimulation modulates motor excitability and plasticity in chronic stroke patients
- fMRI BOLD signal as a biomarker for optimal dosing of rTMS of rehabilitation in chronic stroke patients
- Sensory stimulation to enhance hand function post stroke
- Complement-dependent inflammation and experience-dependent neural plasticity after stroke
- Operant down-conditioning of the soleus H-Reflex Hemiparesis after stroke

Research Resources

- Administrative Core
- Brain Stimulation Core
- Clinical and Translational Tools and Resources
- Neuroimaging Core
- Quantitative Behavioral Assessment and Rehabilitation

Index Terms

stroke, stroke recovery, rehabilitation, multidisciplinary research, neurological disease, neurological impairment, neuroscience, occupational therapy, physical therapy, psychiatry, radiology, translational research

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P30GM103331- Phase 3
MUSC Center for Oral Health Research (COHR)
Medical University of South Carolina

Principal Investigator

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Thematic Scientific Focus

Oral and craniofacial health and disease

Research Resources

- Clinical COHR (C-COHR)
- Laboratory COHR (L-COHR)
- Gnotobiotic COHR (G-COHR)
- Training in Craniofacial and Oral Health Research (T-COHR)
- Pilot and Feasibility Program

Pilot Projects

- Mitoferrin 2 protein as a diagnostic marker to predict the efficacy of oxidative damage-based treatment in head and neck cancers
- In vitro characterization of hematopoietic stem cell derived odontoblasts and cell in the periodontal ligament
- Fibulin-1 regulation of EGFR-mediated osteogenesis and osteoclastogenesis
- Development of drug resistance mutations in *Candida albicans*
- Modifying radiation therapy response to head and neck cancer
- RNA biomarkers in the progression of premalignancy to oral and oropharyngeal squamous cell carcinoma
- The E3-ubiquitin ligase EDD enhances cisplatin resistance in squamous cell carcinoma of the tongue
- Dual peptide-mediated targeted-delivery of siRNAs into oral cancer cells
- Defining the contribution of glycation associated AGE metabolites to periodontal disease in Gullah African Americans
- High risk p53 mutations in head and neck cancer obtain their oncogenic phenotype through modulation of the TGF-beta pathway
- Biodegradable X-ray contrast polymeric nanoparticle for deep tissue imaging of oral cancer tumors

Index Terms

oral health, periodontal disease, cytokines, diabetes, oral cancer, genetic polymorphisms, health disparities, health education intervention

P30GM103342- Phase 3

**South Carolina COBRE for Developmentally Based Cardiovascular Diseases
Medical University of South Carolina**

Principal Investigator

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Thematic Scientific Focus

Etiology of congenital heart disease and adult cardiovascular diseases

Research Resources

- Imaging and Instrumentation Core
- Genomics and Bioinformatics Core
- Gene Function Core

Index Terms

cardiovascular disease, congenital heart malformations, acquired heart disease, proteomics, genomics, apoptosis, cell biology, DNA microarray, histology, morphology, 3D-reconstruction, confocal microscopy, fluorescence microscopy, high content screening microscopy, transgenic mice, gene targeting, next generation sequencing, RNA-seq, small RNA profiling, biostatistics, FACS cell sorting, multi-parameter cell analysis, rare event cell sorting

P20GM103641- Phase 1
COBRE Center for Dietary Supplements and Inflammation
University of South Carolina at Columbia

Principal Investigator

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Thematic Scientific Focus

Mechanisms through which dietary supplements regulate inflammation-associated diseases

Research Projects

- Diet-induced regulation of inflammation in prostate cancer
- Therapeutic potential of resveratrol in depression-cardiovascular disease
- Anti-inflammatory capabilities of plant polyphenols for the treatment of Alzheimer's disease
- Programming stem cell fate in an inflammatory microenvironment

Pilot Studies

- Prevention/treatment of *H pylori*-mediated gastritis/cancer by indole-3-carbinol
- Materials for engineering thermogenic adipose tissue
- Impacts of Δ^9 -tetrahydrocannabinol on gut microbiota and its metabolite profiles
- Garlic to reduce inflammation and oxidative stress during dengue infection

Research Resources

- Flow Cytometry and Cell Sorting Core
- Immune Monitoring Core
- Microscopy and Imaging Core

Index Terms

dietary supplements, inflammation, ginseng, plant polyphenols, catechins, flavones, theaflavins, anthocyanidins, resveratrol-derivatives, withaferin-a, panaxynol, atherosclerosis, Alzheimer's disease, cardiac remodeling, cardiac dysfunction, depression, prostate cancer, cardiovascular disease, social stress, amyloid- β protein, autophagy, NF-kB, SIRT1, Nrf2, macrophage inhibitory cytokine-1, NOD-like receptor (NLRP3), inflammasomes, blood pressure, heart rate variability, prevention, suppression, anti-inflammatory, antioxidant, COBRE

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P30GM103339- Phase 3
COBRE in Lipidomics and Pathobiology
Medical University of South Carolina

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Thematic Scientific Focus

Pathobiology of bioactive lipids in signaling and metabolic networks regulating diseases

Pilot Projects (2015-2016)

- Sphingolipidomic approach to define cytokine-mediated oligodendrocyte cell death signaling
- Mechanisms of SK1/S1P signaling in regulating T cell immunotherapy
- Mapping the functional interplay between PERK and sphingolipids

Research Resources

- Lipidomics Core
- Protein Science Translational Core
- Animal Pathobiology Core

Index Terms

sphingolipids, lipidomics, sphingolipid metabolism and signaling, ceramide, sphingosine 1-phosphate

P20 GM109091- Phase 1
Center for Targeted Therapeutics
University of South Carolina

Principal Investigator

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Thematic Scientific Focus

Discovery of drugs aimed at molecular and cellular targets that play key roles in human diseases

Research Projects

- Targeting COPZ1 in miR-152 deficient tumor cells
- Targeting inhibin in cancers lacking the type III TGF-beta receptor
- Potentiating targeted drugs in breast cancer via transcription-regulating kinases
- Dual responsive nanoparticle for brain targeted drug delivery

Pilot Studies

- Evaluation of the *Peromyscus leucopus* panel for pharmacogenomics studies
- Designing inducible CRISPR-CAS vector system for validation of COPZ1 gene as a novel target for anticancer intervention
- Mg²⁺-insensitive N-methyl-D-aspartate receptors as target in cocaine dependence

Research Resources

- Functional Genomics
- Synthetic Chemistry and Drug Discovery
- Microscopy and Flow Cytometry

Index Terms

Target identification, targeted drugs, drug discovery, functional genomics

P20GM103542- Phase 1

**South Carolina COBRE in Oxidants, Redox Balance and Stress Signaling
Medical University of South Carolina**

Principal Investigator

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Thematic Scientific Focus

Oxidative stress biology and therapeutics in acute and chronic diseases and aging

Research Projects

- Novel Therapeutic Strategy for Parkinson's Disease
- Oxidant-induced toxicity of neurotrophins in aging and disease
- VDAC Opening Small Molecules to Revert Warburg Metabolism and Induce Oxidative Stress
- The Response of Cancer Stem Cells to Oxidative Stress
- Targeting redox regulation to overcome proteasome inhibitor resistant Multiple Myeloma

Research Resources

- Cell and Molecular Imaging
- Mass Spectrometry
- Metabolomics
- Analytical Redox biochemistry

Index Terms

glutathione, oxidants, redox balance, stress signaling

P20GM103444- Phase 2

**Bioengineering Center of Regeneration and Formation of Tissues (SC BioCRAFT)
Clemson University**

Principal Investigator

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Thematic Scientific Focus

Tissue regeneration through cell-biomaterials interactions using bioengineering approaches

Research Projects

- Stem cell-myocyte electrical coupling via a laser patterned cell bridge
- Biomaterials for guided neural regeneration
- Biomechanics and mechanobiology of atherosclerotic plaque failure
- Stem cell differentiation and cardiovascular tissue engineering in diabetes
- Mechanically guided urological tissue regeneration *in vitro*
- Improved reactor control for stem cell expansion to meet therapeutic needs
- Nanoparticles for targeted delivery of neuroprotective antioxidant enzymes to CNS
- Combinatorial development of biomaterials for cardiac tissue regeneration
- Neuron-specific polymeric micelle delivery system for neural regeneration

Research Resources

- Bioengineering and Bioimaging Core
- Cell, Tissue and Molecular Analyses Core

Index Terms

biomaterials, tissue engineering, organ replacements, tissue regeneration, cardiac tissue engineering, neural tissue engineering, drug delivery

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P20GM103548- Phase 1
Center for Cancer Biology
Sanford Research

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Thematic Scientific Focus

Cancer cell biology, tumor specific target markers and antigens

Research Projects

- Autoantibody profiling as a novel method for early and personalized diagnosis for prostate cancer
- EPHRINB1: signaling ligand and regulator in head and neck squamous cell carcinoma
- The interaction between notch pathway and Atonal Homolog 1 (Atoh1) in sonic hedgehog-dependent medulloblastoma
- Exploring the origins of childhood leukemia: investigating transcriptional networks in hematopoiesis and acute leukemia

Pilot Projects

- Using BioID to reveal the NF1 interactome
- Inhibition of Mortalin-2 by Veratridine: A potential complementary strategy for colon cancer therapy
- Mechanisms of low carbohydrate diets in inhibiting cell proliferation *in vitro* and tumor growth *in vivo* during chemoradiation treatment in head and neck cancer

Research Resources

- Molecular Pathology Core
- Imaging Core
- Tumor Biology Core
- Flow Cytometry

Index Terms

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cancer biology, tumor markers, tumor specific antigens, cancer signaling pathways, cancer immunology, mouse models of cancer, breast cancer, head and neck cancer, medulloblastoma, lymphoma, cancer signaling pathways

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P20GM103620- Phase 1
Center for Pediatric Research
Sanford Research

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Thematic Scientific Focus:

Developmental processes and pediatric diseases

Research Projects:

- The cellular and molecular mechanisms regulating renal proximal tubule morphogenesis and cell fate determination
- Thioredoxin signaling during pulmonary development and perinatal oxidation injury
- Role of Nonmuscle Myosin II in membrane trafficking and organ function
- Skeletal genetic pathways in the pathogenesis of osteosarcoma
- Modeling disorders of lipid metabolism with induced pluripotent stem cells

Research Resources:

- Protein Biochemistry Core
- Imaging Core
- Molecular Biology Core
- Molecular Pathology Core

Index Terms:

developmental biology, pediatrics, childhood disease, proliferation, morphogenesis, migration, differentiation, programmed cell death

P20GM103496 – Phase 2
The Vermont Center for Immunology and Infectious Diseases
University of Vermont

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Thematic Scientific Focus

The immune response to infectious agents and their mechanism of pathogenicity

Research Projects

- Host response to arenavirus and hantavirus infection
- Regulation of the RIG-I Type I interferon pathway by viral RNA and FLIP
- Metabolic regulation of dendritic cell function

Pilot Studies

- IL-6 regulation of IL-21 in CD4 and CD8 T cells
- A Relevant Environmental Allergen Exposure Model for the Sensitization to House Dust Mite and Exacerbation of Allergic Asthma

Research Resources

- Genome Technologies and Bioinformatics Core
- Proteomics and mass spectrometry Core
- BSL3 Core

Index Terms

innate adaptive immunity, NKT and gamma/delta T cells, dendritic cells, bacterial pathogenesis, *Pseudomonas aeruginosa*, *Clostridium difficile*, *Borrelia burgdorferi*, viral pathogenesis, influenza virus, dengue virus, arenaviruses, hantavirus, coxsackievirus, parasite pathogenesis, *Cryptosporidium parvum*, *Entamoeba histolytica*, *Toxoplasma gondii*, vaccine trials, autoimmunity multiple sclerosis, rheumatoid arthritis, Lyme arthritis, genetic susceptibility, maternal/fetal immunology, metabolic regulation, immune system, bacteria

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P20GM103644- Phase 1
Vermont Center on Behavior and Health
University of Vermont

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Thematic Scientific Focus

Investigating relationships between behavior (i.e. lifestyle) and risk for chronic disease and premature death

Research Projects

- Shared mechanisms in child dysregulation, adult psychopathology, and metabolic disorders
- Incentives to improve cardiac rehabilitation participation in low-income patients
- Incentives targeting gestational weight gain in overweight/obese low-income women
- Predictors of weight loss success in overweight breast cancer survivors
- Behaviors, chronic disease and quality of life after ductal carcinoma in situ

Pilot Studies

- Smoking cessation among limb salvage patients with peripheral arterial disease
- Using financial incentives to increase STI/HIV testing among young Latinos
- Contingency management for smoking cessation among African American women

Research Resources

- Administrative Core
- Behavioral Economics and Intervention Sciences Core
- Collaboration and Dissemination Core

Index Terms

behavioral economics, risk behaviors, substance abuse, obesity, chronic disease, vulnerable populations, health disparities

P30GM103532- Phase3
Translational Research in Lung Biology and Disease
University of Vermont & State Agricultural College

Principal Investigator

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Thematic Scientific Focus

Translational research in the diagnosis and treatment of lung disease

Research Resources

- Transgenic Animal Core
- Pathophysiological Phenotyping Core
- Clinical Support Core

Index Terms

physiology, lungs, asthma, biomedical engineering, transgenic animals, signaling, inflammation, chronic obstructive pulmonary disease

P30GM103498- Phase 3
Center for Neuroscience Excellence
University of Vermont

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Thematic Scientific Focus

Stroke and neurovascular interactions, neural regulation of autonomic nervous system development, function and disorders

Research Resources

- Imaging/Physiology Core
- Cellular/Molecular Biology Core

Index Terms

autonomic neurobiology, stroke, neurodegeneration, neurodevelopment

**P30GM103488- Phase 3
COBRE for Signal Transduction and Cancer Phase 3
West Virginia University Cancer Institute**

Principal Investigator

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Thematic Scientific Focus

Cancer cell signal transduction and biology

Research Resources

- Flow Cytometry
- Microscope Imaging Facility
- Animal Models and Imaging
- Bioinformatics and Biostatistics
- Biospecimen Processing

Index Terms

flow cytometry, imaging, biospecimens, EMT, invasion, stem cells

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P20GM109098- Phase 1
West Virginia Stroke COBRE
West Virginia University

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Thematic Scientific Focus

Biomarkers, Acute Treatment and Rehabilitation for Stroke

Research Projects

- The Impact of cardiovascular function on stroke outcome
- A genomic bio-signature of post-stroke immune dysfunction
- Corticospinal control of sensorimotor synergies in health and disease
- Corticospinal control of limb dynamics in health and after stroke
- Effects of perfluoroalkyl chemicals on stroke incidence and mortality

Research Resources

- Administration Core
- Experimental Stroke Core
- Biostatistics Core
- Mitochondrial Functional Assessment Core
- Rodent Behavior Core

Index Terms

stroke, biomarkers of stroke, neuronal injury, autonomic nervous system and stroke, treatment of stroke, rehabilitation from stroke, environmental chemicals and stroke

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P30GM103503- Phase 3
COBRE in Sensory Neuroscience
West Virginia University

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Thematic Scientific Focus

Neuroscience, plasticity of sensory systems, treatments for human neurological diseases

Research Resources

- Non-Linear Optical Imaging Core
- Transgenic Animal Core
- Genomics Core
- Center for Advanced Imaging

Index Terms

neuroscience, neurons, genetics, imaging sensory disorders, hearing balance, signaling, molecular degeneration

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**P30GM103398- Phase 3
Neuroscience Center
University of Wyoming**

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Thematic Scientific Focus

Normal brain development, sensory neuroscience, synaptic plasticity and neuropathological processes

Research Projects

- Interaction between neuroinflammation and neurodegeneration studied using latent *Toxoplasma gondii* infection in a mouse model of Huntington's disease
- Activity-dependent control of olfactory sensory neuron turnover
- Lipid microdomains and synaptic function
- The role of presenilin in the developing visual system

Research Resources

- Microscopy Imaging Core (confocal and electron microscopes, calcium imaging)
- Molecular Analysis Core
- Antibody Production

Index Terms

neuroscience, neuroplasticity, nociception, somatosensory, neuroendocrine, confocal microscopy, ultrastructure, receptor signaling, development, olfaction