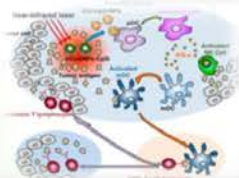
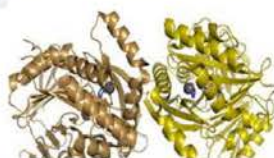
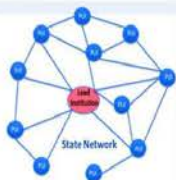
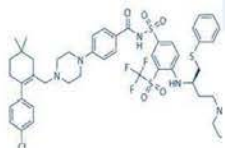




IDeA Networks of Biomedical Research Excellence (INBRE)

INBRE Directory



2018



Institutional Development Award (IDeA) Program

Division for Research Capacity Building (DRCB)

National Institute of General Medical Sciences

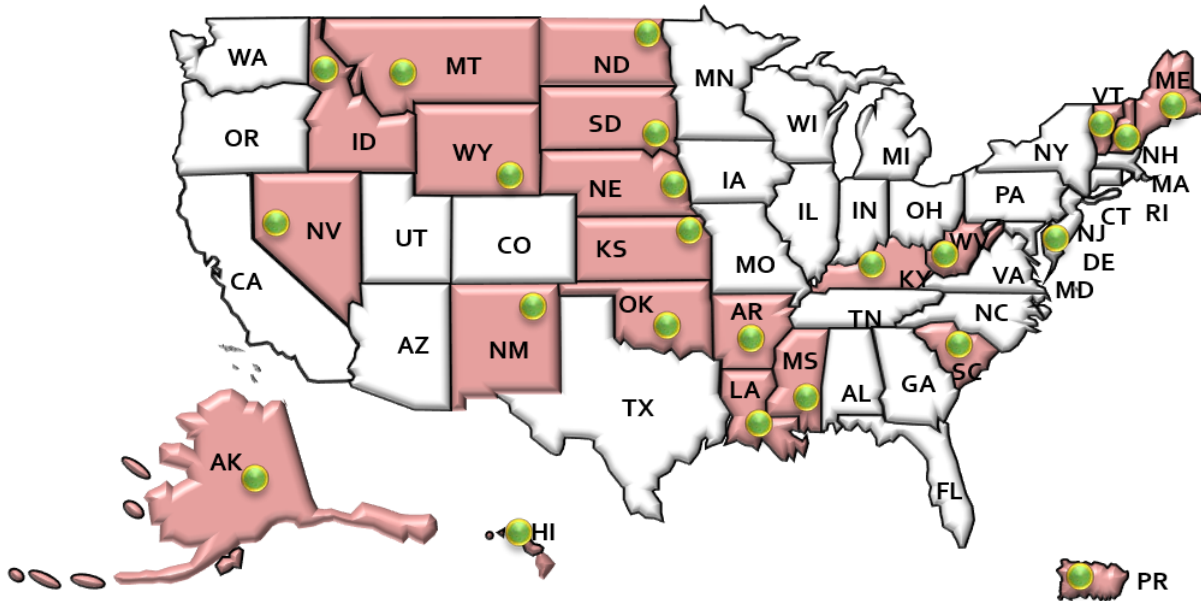
National Institutes of Health

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Location of INBRE Lead Institutions



IDEA Networks of Biomedical Research Excellence (INBRE) provides an opportunity to augment and strengthen the statewide biomedical research capacity. The goals of the program are to: 1) establish multi-disciplinary research network to strengthen biomedical research expertise and infrastructure; 2) build and increase the research base and capacity by providing support to faculty, postdoctoral fellows and graduate students at the participating institutions; 3) provide research opportunities for students from primarily undergraduate institutions, community colleges, and Tribal Colleges and Universities (TCUs), and serve as a "pipeline" for these students to continue in health research careers within IDEa states; 4) enhance science and technology knowledge of the state's workforce. Green circles are the locations of the INBRE lead institutions.

Link: <https://www.nigms.nih.gov/research/drcb/IDEA/Pages/INBRE.aspx>

Alaska

P2oGM103395

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Partner Institutions

University of Alaska Anchorage (UAA)
University of Alaska Southeast (UAS)

Outreach Institutions

-extended campuses and learning centers in the UA Statewide Network

UAA

Kodiak College
Kenai Peninsula College
Kachemak Bay Campus
Prince William C.C.
Matanuska Susitna Campus
Chugiak-Eagle River Campus

UAF

Interior-Aleutians Campus
Chukchi Campus
Northwest Campus
Kuskokwim Campus
Bristol Bay Campus
College of Rural and Community Development
Community and Technical College

UAS

Juneau Campus
Sitka Campus
Ketchikan Campus

Program Goals

- Expand the multi-disciplinary research and teaching network to support biomedical research expertise, infrastructure, and translational capacity.
- Support faculty, postdoctoral fellows, and graduate students through competitive pilot grants aimed at building our capacity for extramural funding and the development of the basic to translational research endeavors.
- Provide undergraduate research opportunities and support the pipeline leading toward biomedical and health careers.
- Enhance science and technology knowledge to build the state's workforce.
- Enhance biomedical research in the western IDeA states with inter-state pilot grants, student research experiences, scientific meetings and workshops, and a regional resource exchange to maximize the effectiveness of individual INBRE programs through collaboration.
- Enlarge and sustain an inter-campus network for one health of humans, other animals, and the environment.
- Enhance science knowledge of the Alaskan workforce and expand the undergraduate student pipeline into health careers, with attention to Alaska Native students.
- Form a core research team consisting of recently recruited faculty members.
- Feature bioinformatics as an integral part of the program.

Research Projects

- Novel human RNA binding proteins target innate immunity to influenza
- Public health-related viral infectious diseases in Alaska
- Copper status and dietary sugars: roles in inflammation, dyslipidemia and NAFLD
- Role of structural flexibility in epitope selection by HLA-DR
- Ecological to molecular comparative cardiac physiology
- Coevolution and virulence of host-symbiont associations
- Molecular basis of muscular atrophy, osteoporosis prevention in hibernating mammals
- Targeted drug delivery to reprogram immunosuppressive cells in breast tumors
- Phytoremediation for cleanup of diesel-contaminated soils in rural Alaska
- Virus populations harbored by bats in Alaska
- Chronic inflammation and high incidence of gastric cancer in Alaska Natives
- Functional significance of altered HCN channel expression in the turtle pacemaker

Resources

- DNA Core Laboratory (with MiSeq for NGS applications)
- Vivarium
- Biological Research and Diagnostics (BiRD) Facility
- Electrophysiology
- Cell culture
- Flow cytometers
- Central animal facilities
- Scanning and transmission electron microscope facilities
- Public Health Laboratory
- Applied Science and Engineering Technology (ASET) Laboratory

Index Terms

molecular toxicology, infectious agents, zoonotic diseases, minority outreach, public health, influenza, innate immunity, adaptive immunity, rural health care, environmental biology, hepatitis B, cancer, liver disease, epidemiology, minority education, rabies, bio-behavioral health, copper, endocrine disruption, nicotine, addiction, pulmonary function, metabolic syndrome, tumorigenesis, cardiac, anoxia, NAFLD, dyslipidemia

Arkansas

P20GM103429

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Lead Institutions

University of Arkansas for Medical Sciences
University of Arkansas
University of Arkansas at Little Rock

Partner Institutions

Arkansas State University
Hendrix College
John Brown University
Ouachita Baptist University
University of Arkansas at Pine Bluff
University of Central Arkansas

Outreach Institutions

Arkansas Tech University
Central Baptist College
Harding University
Henderson State University
Lyon College
Philander Smith College
Southern Arkansas University
University of Arkansas at Fort Smith
University of Arkansas at Monticello
University of the Ozarks

Program Goals

- Expand and strengthen the biomedical research infrastructure of lead, partner, and affiliate institutions through a multidisciplinary network.
- Increase the Arkansas biomedical research base by providing research support to select faculty at partner and affiliate institutions and augmenting their efforts to obtain independent extramural funding.
- Provide undergraduate research opportunities, thereby serving as a “pipeline” that encourages students to choose health research careers.
- Sponsor specialized outreach activities for faculty and students not currently receiving research support from the Arkansas INBRE, thereby preparing other investigators for future INBRE support.
- Enhance the science and technology base of Arkansas’s future workforce by developing a cadre of trained scientists (i.e., with biomedical research/bioinformatics expertise) and providing resources to stimulate growth of biotechnology industries in Arkansas.

Research Projects

- The effect of high-LET radiation on genomic instability under microgravity
- The role of protein kinase c substrates during *Coxiella burnetii* infection
- Virtual arthroscopic tear diagnosis & evaluation platform for rotator cuff surgery
- Cannabinoids: targeted therapy for Ewing's sarcoma
- A two-way street: retinoid regulation of immune cell adhesion and proliferation
- Proteomic and transcriptomic analysis of DNA repair in bdelloid rotifers
- Scorpion sodium beta toxin structural, genomic, and electrophysiological studies
- Roles of cap1 and its phosphor-regulation in pancreatic cancer
- Antimicrobial production by nutrient-limited bacteria

Summer Research Projects

- Investigation of the impact of environment on PEP-19's conformational ensemble
- Nutrient availability vs consumption regulates longevity via steroid signaling
- Cancer cells growth inhibition by targeting XC-obligate exchanger protein
- Biophysical studies of three-way DNA junctions
- Gap junction connectivity in *C. elegans* head movement
- Evaluating collagen as a driver of tumorigenicity in papillary thyroid cancer
- Modified rifamycins to target multi-drug resistant mycobacterium tuberculosis

Resources

- UAMS Proteomics Facility
- UAF Proteomics Facility
- UAMS Bioinformatics Center
- UALR Bioinformatics Center

Index Terms

Cancer, cell signaling, cell biology, genomics, microarray, proteomics, microscopy, bioinformatics, neurobiology, developmental biology

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Partner Institutions

University of Delaware
Christiana Care Health Services, Inc.
Delaware State University
Delaware Technical Community College
Alfred I. DuPont Hospital for Children of the Nemours Foundation
Wesley College

Outreach Institutions

Delaware BioScience Association
HOSA Future Health Professionals of America

Program Goals

- Foster a statewide Network to create a strong, sustainable biomedical research capability in Delaware.
- Develop independent and inter-dependent researchers and institutions that thrive within the Network.
- Institutionalize DE-INBRE initiatives by transitioning programs into the partner institutions.
- Enhance the biomedical science and technology knowledge of the state's workforce.

Research Projects

- **Cancer**
 - The role of epigenetic therapy in reversing adhesion mediated drug resistance in leukemia
 - Deciphering the mechanism of Down Syndrome Leukemia (DS-AML) biogenesis using iPSC lines and CRISPR/Cas9 technology
 - Targeted nanoparticles to deliver APC tumor suppressor protein for treatment of colon cancer
 - ALDH isoforms in ALDH+ colon cancer stem cells that drive tumor growth
- **Cardiovascular Health**
 - Appetite regulation and food intake: novel mechanisms linking marital distress to cardiovascular risk
- **Neurosciences:**
 - Development of a comprehensive evaluation of postural control in children with cerebral palsy
 - High-resolution brain MR elastography in children with cerebral palsy
 - High-frequency, low-magnitude vibration, muscle performance and physical activity in children with cerebral palsy
 - Project noninvasive brain stimulation to improve motor learning post-stroke
 - Role of the CLHM-1 ion channel in *C. elegans* neurons
 - Novel flexible sensors in functional fabrics for performance monitoring

Resources

- Bioinformatics/Biostatistics
- Bioimaging and Microscopy
- Biomolecular Core Laboratory (Sanger sequencing; fragment analysis; Ion PGM; Real-Time PCR; 3D PCR; Microarray)
- Cardiovascular Research Core
- Cell Science
- Center for Biomedical & Brain Imaging (Functional and structural MRI, spectroscopy, diffusion-weighted imaging)
- Center for Outcomes Research CTCR Core Facility (Flow cytometry/cell sorting, real time PCR, microirradiator, QPCR, Cytometers, Cell Culture, Colorimetric and Fluorescent end-point assay)
- Drug Discovery Lab/High-throughput Screening
- DNA Sequencing and Genotyping
- DSU OSCAR Imaging Facility (Imaging, microscopy, spectroscopy and Image analysis)
- Flow Cytometry
- Genome Customization (Genetic Engineering)
- Gene Editing
- Genomics
- Histochemistry and Tissue Processing Core
- Histology and Pathology
- Magnetics
- Medical Imaging
- Nuclear magnetic resonance imaging
- Primer/Oligo synthesis
- Proteomics and Mass Spectrometry
- Shared Lab Equipment
- Statistics
- Translational PET Imaging Core
- Value Institute
- X-ray Diffraction
- **STRiDE** – Supporting Translational Research in Delaware

Index Terms

biomedical translation, bioinformatics, computational biology, biotechnology, cancer, colorectal cancer, breast cancer, public health, underrepresented minority education, sickle cell anemia, lymphoblastic leukemia, bone cancer, bioengineering, neuromuscular disease, lung cancer, drug delivery system, drug synthesis, immune response, protein-protein interaction, virtual surgery, infectious diseases, women's health, anti-neoplastic agents, tumor detection, prostate tumors, cardiovascular disease, biomedical imaging, virtual surgery training, biochemistry, electron microscopy, light microscopy, atomic force microscopy, confocal microscopy, computer resources, Sanger sequencing, Next-Gen sequencing, real-time PCR, digital PCR

Hawaii Statewide Research & Education Partnership (HiSREP) University of Hawai'i, Manoa

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Partner Institutions

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Hawaii Pacific University, Kaneohe
University of Hawai'i at Hilo, College of Pharmacy, Hilo
University of Hawai'i, West Oahu

Outreach Institutions

Kapi'olani Community College, Honolulu
Leeward Community College, Pearl City
UH Maui College, Kahului
Windward Community College, Kaneohe
Hawai'i Community College, Hilo
Kauai Community College, Lihue

Program Goals

- Enhance the science and technology knowledge of Hawaii's workforce by creating a statewide pipeline of research opportunities including training and education experiences for young investigators and inquisitive students to inspire interest in developing biomedical research careers.
- Expand and develop competitive research capacity in Hawaii by building on the institutional network foundation begun under BRIN and previous cycles of INBRE.
- Develop multi-disciplinary research projects that explore basic biological processes, drug discovery and aspects of natural product discovery and activities.
- Establish teams consisting of local senior investigators, mentors and junior investigators at the partner institutions, as well as expanded opportunities for undergraduate and community college students.
- Provide outreach activities to undergraduate institutions and community colleges.
- Foster the development of individual investigator careers and of institutional research capacity.
- Sponsor training and mentoring workshops and seminars.
- Provide academic/research work force development.

Research Projects

- The hybrid approach for nicotinic acetylcholine receptor (nAChR) ligands
- Role of c-myc in the tumor promoting actions of oxidized lipids in the colon
- MYCN-induced calcium signaling promotes the malignant progression of neuroblastoma
- Formation of dynamic membrane structures in activating mast cells
- Characterization of Arc-regulated neuronal trafficking of AMPA receptors
- Remodeling the fetal membranes: a new way to examine mechanisms of rupture
- Hawaiian fungal metabolites as a source for the treatment of high-grade serous ovarian cancer

Pilot Projects

- Biochemical analysis of centralspindlin, a key motor complex to regulate cytokinesis
- Development of macrocyclic hexapeptide wollamide B analogs as new antituberculosis agents
- Characterizing the role of pyruvate dehydrogenase in breast cancer etiology

Resources

- Bioinformatics/Biostatistics/Molecular Modeling Core
- Imaging facilities (fluorescence microscopy; confocal microscopy; electron microscopy; immunoblot imaging)
- Molecular Biology facilities (DNA sequencing)
- Vivarium at the John A. Burns School of Medicine
- Tissue culture facilities
- Genomic research facilities (microarrays; RNAseq)
- Proteomics facility
- Animal MRI research facilities

Index Terms

cell biology, neurobiology, immunology, reproductive biology, organic chemistry, cell signaling, imaging, molecular biology, genomics, proteomics, natural products, cancer, and aging

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Boise Veterans Research and Education Foundation, Boise
The College of Idaho, Caldwell
Idaho State University, Pocatello
Northwest Nazarene University, Nampa
Brigham Young University - Idaho, Rexberg
College of Southern Idaho, Twin Falls
College of Western Idaho, Nampa
Lewis-Clark State College, Lewiston
North Idaho College, Coeur d'Alene

Outreach Institutions

Brigham Young University - Idaho, Rexberg
College of Southern Idaho, Twin Falls
College of Western Idaho, Nampa
Lewis-Clark State College, Lewiston
North Idaho College, Coeur d'Alene

Program Goals

- Strengthen Idaho's biomedical research infrastructure and expertise by building on the established INBRE network with the scientific theme of "Cell Signaling".
- Provide support to Idaho faculty, postdoctoral fellows and graduate students to increase the research base and capacity.
- Provide research opportunities to Idaho undergraduate students and serve as a pipeline for these students to continue in health research careers.
- Enhance the science and technology knowledge of Idaho's workforce.
- Develop bioinformatics resources as research and teaching tools.
- Expand Idaho research opportunities across the western IDEA region.

Research Projects

- Development of novel antibiotics targeted to interrupt bacterial signaling
- Effect of NSAIDs on streptococcal myonecrosis
- Co-evolutionary approach to discover medicinal properties of sagebrush flavonoids
- Environmental toxicology and health implications of nanoparticles
- Molecular mechanisms of OSM-induced early state prostate cancer invasion

Pilot Projects

- Computational imaging in retinal circuit development
- Characterizing Sim-dependent DNA replication challenges
- Mutation accumulation and the physiological basis of declines in neural function
- Modeling carbohydrate metabolism in cultured uterine cells to identify factors affecting infertility
- High-impact anti-inflammatory therapeutic for the treatment and possible prevention of metastatic breast cancer
- Mechanoregulation of the cell network for tenogenic stem cell differentiation
- Investigating the impact of arachnoid trabeculae on brain tissue stresses in sports TBI

Resources

- Computational Resources Core
- Genomics Resources Core
- Optical Imaging Core (microscopy, cell separation)
- Vivarium
- Molecular Research Core Facility
- Biomolecular Research Center
- Biophysics Research Lab
- Surface Science Laboratory
- Physical Science/Microbiology/Cell Biology Teaching Labs
- Histology Laboratory

Index Terms

cell signaling, bioinformatics, non-steroidal anti-inflammatory drugs, microbe-specific nucleosidase, bioavailability, co-evolution, infectious disease, antibiotics, exotoxin, Staphylococcus, Group A Streptococcus, E. coli, quorum sensing, sagebrush flavonoids, neuronal development, retina, computational imaging, cancer, nanoparticles, DNA replication, cell differentiation

Kansas IDeA Network of Biomedical Research Excellence University of Kansas Medical Center, Kansas City

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Kansas State University, Manhattan
University of Kansas, Lawrence

Outreach Institutions

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Fort Hays State University, Hays
Haskell Indian Nations University, Lawrence
Langston University, Langston, Oklahoma
Pittsburg State University, Pittsburg
Washburn University, Topeka
Wichita State University, Wichita

Program Goals

- Build, strengthen and integrate biomedical research in Kansas.
- Establish a multidisciplinary research network with a thematic research focus in cell and developmental biology.
- Provide support to junior faculty at the participating institutions; highlight two to four investigators each year for career guidance and research support.
- Increase the workforce of biomedical researchers in Kansas by delivering special services tailored to the needs of the outreach institutions.
- Enhance science and technology knowledge of the Kansas workforce.
- Provide analytic and interpretive programs and services in bioinformatics.
- Develop new strategies for improving human health.
- Facilitate translational research via bidirectional exchange of basic and clinical scientist training opportunities.

Research Projects

- Mechanisms of sperm immunotolerance in the male reproductive tract
- Mechanisms and modulation of neuroplasticity in a rodent model of burn injury and chronic pain
- Modulation of microRNA activity by a conserved RNA binding protein

Pilot Projects

- Passive heat therapy as a novel clinical intervention for metabolic disease
- Targeted therapies against HPV+ head and neck cancers

Resources

- Table top refrigerated centrifuge
- Illumina HiSeq 2500 high throughput sequencing system
- Bioinformatics Core
- Communications Core

Index Terms

cell biology, developmental biology, bioinformatics, genomics, proteomics, cancer, minority education, reproductive biology

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Research Intensive Partner

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Regional Partner Institutions

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Morehead State University, Morehead

Northern Kentucky University, Highland Heights

Western Kentucky University, Bowling Green

Murray State University, Murray

Outreach Institutions

Bellarmino University, Louisville
Berea College, Berea
Bluegrass Community and Technical College, Lexington
Hazard Community and Technical College, Hazard
Kentucky State University, Frankfort
Lindsey Wilson College, Columbia
Somerset Community College, Somerset
Transylvania University, Lexington
University of Pikeville and School of Osteopathic Medicine, Pikeville
West Kentucky Community and Technical College, Paducah

Program Goals

- Support the development of infrastructure and resources for biomedical and health related research.
- Develop sustainable critical mass of competitive research programs at all state-supported institutions.
- Enhance the pipeline for undergraduate students from KY universities and colleges to graduate and professional degree programs in biomedical research and health-related professions.

Research Projects

- Detecting and characterizing circular RNAs using high-throughput sequencing data
- Fungal plant pathogen of wild host species as a model for emerging infectious disease through host shifts
- Identification of novel tRNA modification genes in human animal cells
- Contribution of NMDA NR2B subunit to risky choice and amphetamine reward
- Examining the role of FGF signaling during *Xenopus* pharyngeal development
- Effects of p75NTR on oxidative stress-induced degeneration of CNS neurons
- Laser assisted green synthesis of graphene quantum dot as a photodynamic antibacterial agent in plasma and its time resolved pump probe studies
- Physical activity during pregnancy: novel pathways and intervention strategies for improving maternal and neonatal outcomes
- Functional analysis of a Cathepsin L in *Drosophila melanogaster*
- Dimensions of emotion regulation in nonsuicidal self-injury and suicide in adolescents
- Evaluation of glis3 spatio-temporal distribution during the development and maintenance of the zebrafish (*Danio rerio*) pancreas
- Cell-type specific expression and function of Cabin 1 in cerebellar development
- Community usage of controlled neuropsychotropic and illicit drugs and their potential for the induction of fish gene expression profiles associated with human neurological disorders

Pilot Next Generation Sequencing Projects

- **Cycle 1**
 - Transcriptomics of the avian immune response using RNA-seq.
 - Quantifying gene expression changes in *Xenopus laevis* spinal cord following crush injury.
 - Whole genome CRISPR/Cas9 screen to identify genes required for survival of lung cancer cells on 3 dimensional ECM treated with cisplatin.

- Metabolic inflexibility with obesity: Investigating molecular mechanisms that influence the metabolic health of women.
- Comparative gene expression associated with inflammation and endoplasmic reticulum stress in diabetic kidney.
- Role of *tudor* gene in small piRNA biogenesis in *Drosophila* brain.
- Quantify differentially abundant RNA transcripts in mouse kidney tissue with chronic alcohol consumption.
- Determine transcriptome response to endoplasmic reticulum stress in rat oligodendrocyte precursor cells
- Impact of G-quadruplex forming oligonucleotides from c-MYC promoter (Pu27)
- Identification of molecular of targets of natural compound which inhibits breast cancer stem cells
- Novel Interferon-stimulated gene pathway
- Manipulation of PMN gene expression during *Yersinia pestis* infection
- **Cycle 2**
 - LncRNA-dependent mechanism of DNA/RNA-binding proteins
 - Isolation and gene expression profiling of successfully regenerating hindbrain
 - PCBs and changes in the microbiome during pregnancy and lactation
 - Role of iron-sulfur cluster proteins in diabetes: shifting metabolism one sugar at a time
 - Investigating β -caryophyllene-induced alterations in transcriptome profiles related to Identifying novel targets of Iroquois transcription factors in the vertebrate pharynx
 - Characterization of chemo-resistant breast cancer cells using RNA-seq
 - Molecular mechanism by which circadian clock regulates gene expression
 - Identification of point mutations in the Pu27 family G-quadruplex sequences
 - Microbial ecology of antibiotic resistance in Louisville environments
 - Genome-wide CRISPR-Cas9 Screen to identify pathways that determine response to AS1411

Resources

- Genomics Core Facility
- Bioinformatics Research and Service Core
- Applied Statistics Laboratory

Index Terms

neuroscience, genomics, molecular biology, microarrays, next generation sequencing, bioinformatics, genetics, bacteria, antipsychotic drugs, brain damage, Alzheimer's disease, schizophrenia, memory loss, cardiovascular disease, diabetes, asthma, evolution, vision, eyes, retina, metabolic regulation, cancer, anti-cancer drugs, drug addiction, estrogens, osteoporosis, aging, taste, neurological development, women's health

Louisiana

P2oGM103424

Louisiana Biomedical Research Network
Louisiana State University, Baton Rouge

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Louisiana Tech University
Southeastern Louisiana University
Southern University and A&M College
The University of Louisiana at Monroe
Xavier University of New Orleans

Mentor Institutions

Louisiana State University Health Sciences Center, New Orleans
Louisiana State University Health Sciences Center, Shreveport
Pennington Biomedical Research Center
Tulane Medical Center
Tulane National Primate Research Center

Summer Research Institutions

Baton Rouge Community College
Centenary College of Louisiana
Dillard's University
Loyola University of New Orleans
Louisiana College
Louisiana State University, Alexandria
Louisiana State University-Eunice
McNeese State University
Nicholls State University
Northwestern State University
Our Lady of Holy Cross College
Our Lady of the Lake College
Southern University at New Orleans
Southern University at Shreveport
University of Louisiana at Lafayette
University of New Orleans

Program Goals

- Maintain and expand the previously established state-wide infrastructure and intellectual research network supporting interdisciplinary biomedical research.
- Expand and improve the critical mass of biomedical investigators at PUI campuses through the support of mentored research and enhanced communication.
- Increase undergraduate student interest in biomedical research careers throughout Louisiana by providing summer and academic year research opportunities to all PUI institutions within the state
- Evaluate, assess, and continuously monitor the progress within LBRN through detailed tracking of research accomplishments, the development of human resources, and productive collaborations among participating institutions.

Research Projects

- **Computational and structural biology**
 - Large-scale atomistic simulation for novel self-assembled drug delivery vehicles
 - Design and synthesis of novel polyphenol cancer therapeutics
- **Molecular mechanisms of disease**
 - Characterizing inhibitors of the mutagenic retrotransposon LINE1 endonuclease
 - Spore outer structures: contribution to germination heterogeneity
 - The role of mediator in maintaining and differentiating human mesenchymal stem cells
 - Role of heme oxygenase in the renal control of hypertension
 - An investigation of the role of SOCS36E in energy homeostasis and obesity in *Drosophila*
 - Mechanisms underlying nonalcoholic fatty liver disease
 - Molecular mechanisms of antioxidant on gene regulation in prostate cancer cells
 - Mechanism of translation initiation in the protozoan parasite *Giardia lamblia*
- **Therapeutics and preventive medicine**
 - DPP4 inhibitors in combating the effects of homocysteine and cholesterol
 - Development of casein kinase 1 inhibitors as therapeutics of Alzheimer's disease
 - A predictive modeling framework for studying disparity in colorectal screening
 - Neurolymphatic biomarker analysis in multiple sclerosis
 - Cytotoxicity of tocotrienol nanoemulsions loaded with paclitaxel/gemcitabine PUFA conjugates against pancreatic cancer cells

Resources

Imaging Facility
Genomics Facility
Proteomics Facility
Bioinformatics Core Facility
Molecular Biology Core Facility
Access Grid Facilities
Computational Facilities

Index Terms

cancer, infectious diseases, bacteria, genomics, proteomics, cell biology, molecular biology, imaging, virus, bioinformatics, computational biology

Maine

P2oGM103423

Comparative Functional Genomics INBRE in Maine Mount Desert Island Biological Laboratory, Salisbury Cove

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Partner Institutions

Bates College, Lewiston
Bowdoin College, Brunswick
Colby College, Waterville
College of the Atlantic, Bar Harbor
The Jackson Laboratory, Bar Harbor
The University of Maine, Orono
University of Maine Honors College, Orono
University of Maine, Farmington
University of Maine, Machias
Southern Maine Community College

Outreach Institutions

University of Maine, Fort Kent
University of Maine, Presque Isle

Program Goals

- Strengthening the lead and partner institutions' biomedical research infrastructure through a multi-disciplinary research network with a thematic scientific focus in comparative functional genomics.
- Providing research support to investigators, postdoctoral fellows and graduate students.
- Creating year-round research opportunities for undergraduate and community college students at network institutions.
- Providing outreach activities to high school and undergraduate students, serving as a pipeline for students and faculty to continue in health research careers, and enhancing the scientific and technical knowledge of Maine's workforce by significantly expanding state, regional and national collaborations with other IDeA, NIGMS, and NIH-supported programs.

Research Projects

- Effect of expression of human mutant CHMP2B, an ESCRT-III component involved in frontotemporal dementia, on circadian rhythms in *Drosophila*
- Deciphering *Helicobacter pylori*'s glycode: uncovering & harnessing drug targets
- Investigating the nanoscale organization of chromatin by super-resolution STED microscopy
- Exploration of two different compensatory strategies for recovery from injury in the cricket CNS
- Functional genomic dissection of viral and cellular factors that regulate JC polyomavirus infection
- Using halophilic *Archaea* as model systems to explore responses to environmental stressors
- Role of nuclear factor, erythroid 2 (Nfe2) in the oxidative stress response during development
- Defining macrophage-nerve dependent signals in the regulation of limb regeneration
- A role for the Tnfaip8 gene family in tumorigenesis
- Epigenetic mechanisms of memory formation and maintenance

Pilot Projects

- DNA barcoding to identify medical cannabis chemotype
- RNA-binding proteins and hyphal mRNA transport in the pathogenic fungus *Candida albicans*
- Synthesis of O-mannosylated oligosaccharides
- Identification of brain and gonadal gene expression patterns involved in sex change in a protogynous teleost fish, the black sea bass (*Centropristis striata*)

Resources

- Animal resources
- Bioinformatics
- Cell culture
- Electrophysiology
- Biological imaging
- DNA sequencing and microarray

Index Terms

genomics, proteomics, cell signaling, cell biology, disease resistance, developmental biology, respiratory physiology, regeneration, comparative nomics, functional genomics, immunology, fungal-host dynamics, translational regulation, DNA repair, organogenesis, gene regulation

Mississippi

P2oGM103476

Mississippi INBRE

The University of Southern Mississippi, Hattiesburg

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Partner Institutions

Research/Mentor Institutions

The University of Southern Mississippi, Hattiesburg (Lead)

Jackson State University, Jackson

Mississippi State University, Starkville

University of Mississippi, Oxford

University of Mississippi Medical Center, Jackson

My Brother's Keeper, Inc., Jackson

Primarily Undergraduate Institutions

Alcorn State University, Lorman
Coahoma Community College, Clarksdale
Copiah-Lincoln Community College, Natchez
Delta State University, Cleveland
Hinds Community College, Raymond
Itawamba Community College, Fulton
Millsaps College, Jackson
Mississippi College, Clinton
Mississippi Gulf Coast Community College, Perkinston
Mississippi University for Women, Columbus
Rust College, Holly Springs
Tougaloo College, Jackson

Outreach Institutions

Belhaven University, Jackson
Blue Mountain College, Blue Mountain
Copiah-Lincoln Community College, Wesson
Delta State University, Stoneville
East Central Community College, Decatur
East Mississippi Community College, Scooba
Hinds Community College, Jackson
Holmes Community College, Goodman
Jones County Junior College, Ellisville
Mississippi Valley State University, Itta Bena
Northeast Mississippi Community College, Booneville
Northwest Mississippi Community College, Senatobia
Pearl River Community College, Poplarville
Southwest Mississippi Community College, Summit
William Carey University, Hattiesburg

Program Goals

- Develop biomedical research foci throughout the state with emphasis on undergraduate institutions.
- Enhance core research facilities in high-throughput genomics, proteomics, imaging instrumentation and bioinformatics and make them available for use state-wide.
- Strengthen biomedical research and training in Mississippi via a multifaceted approach directed toward both faculty and students.
- Provide training and mentoring activities through workshops on subjects such as bioinformatics, grant writing and management, publication and presentation, and research techniques.
- Prepare a workforce of researchers trained in collection and analysis of massive datasets.
- Establish experienced scientists as mentors to facilitate development of independent research projects at partner undergraduate institutions.
- Enhance undergraduate science training at outreach colleges through summer research awards and workshops.

Research Projects

- From sialome shifts to sialome switches and sialome phases: a new paradigm in tick biology

- Sulfhydryl metabolism and yeast-mold dimorphism in the pathogenic fungus *Histoplasma capsulatum*
- Role of miR-1017 in modulating neurodegeneration
- Mirtron structure/function
- Identification of new miRNA-like genes in mammals
- Repression of arthropod RNAi by zika virus
- Functionalized polymers for RNAi based pesticides
- Aptamer-polymer based sensing technologies
- Annotation of miRNAs in twelve fly species
- Structural transitions in proteins and protein assemblies

Pilot Projects

- Photoinduced biomolecule damage by bifunctional N-substituted heteroaromatic salts
- Role of DCLK1 in the oncogenesis and chemoresistance of colorectal cancer
- Identification of novel regulators of selective autophagy in *Tetrahymena thermophile*
- Novel therapeutics for hormone resistant breast and prostate cancers
- Preventative measures against cellular disorders
- Selective recognition of breast cancer cell using Hyper Rayleigh Scattering spectroscopy (HRS)
- Antibacterial natural polymer-based electrospun fibers for use in wound healing
- Post-translational modifications and protein interactions controlling CFTR stability
- Characterization of *Xenorhabdus nematophilia* biofilm formation and impact on host association in a naturally-occurring symbiosis
- Cathepsin B regulation in early zebrafish embryonic development

Resources

- Imaging Facility, USM
- Molecular and Genomics Core Facility, UMMC
- Proteomics Core Facility, MSU
- Bioinformatics Core
- Community Engagement and Training Core, My Brother's Keeper, Inc.

Index Terms

cancer, infectious diseases, bacterial pathogenesis, biofilms, pulmonary infections, vector-borne diseases, genomics, proteomics, cell biology, molecular biology, bioinformatics, cell imaging, cystic fibrosis, Alzheimer's disease, cancer therapy, lung cancer, breast cancer, prostate cancer, melanoma, cardiovascular disease, minority education, diabetes, obesity, HBCU, undergraduate summer research program, health disparities, community-based public health education

Montana Network of Biomedical Research Excellence Montana State University, Bozeman

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Partner Institutions

Aaniiih Nakoda College, Harlem
Blackfeet Community College, Browning
Carroll College, Helena
Chief Dull Knife College, Lame Deer
Flathead Valley Community College, Kalispell
Fort Peck Community College, Poplar
Little Big Horn College, Crow Agency
Montana State University, Billings
Montana Tech of the University of Montana, Butte
Rocky Mountain College, Billings
Salish Kootenai College, Pablo
Stone Child College, Rocky Boy Agency
The University of Montana, Missoula
The University of Montana-Western, Dillon

Program Goals

- Strengthen Montana's biomedical and bioinformatics infrastructure through continued development of shared facilities, research collaborations, focused working groups, and training opportunities.
- Develop a continuous pipeline for Montana Native and non-Native students to careers in health research and increase the scientific and technological knowledge of the state's workforce.
- Mentor and develop health disparities investigators in the social and behavioral sciences and partner them with infectious disease and environmental health investigators to sustain and grow an interdisciplinary biomedical research network.
- Develop and support sustainable research initiatives by MT INBRE III network investigators that will mitigate health disparities in Montana's rural and Native American communities.

Research Projects

- West Nile virus surveillance for protection of public health (risk model)
- Collecting narratives of hope through group-based indigenous arts experiences
- Effects of bariatric surgery on microbiota populations and the transport of nutrients
- Building research teams through the West Nile virus project
- Correlation of stress level and disease susceptibility in the Blackfeet community
- Randomized controlled trial of a culturally-adapted version of Thrive, a computerized Cognitive Behavior Therapy (cCBT) program to treat depressive symptoms, syndromes, and disorders among rural Montanans
- Enhancing dietary quality and health outcomes on the Flathead reservation
- Self-respect and Pride: improving resilience in the Tribe—an intervention to promote health and prevent substance abuse among Crow youth
- Supporting the health and development of rural Montanan infants and toddlers via family-centered early intervention
- Colorado Tick fever virus infection
- DNA sensory technology (Switch-based Diagnostic Assays for Limited Resource Settings)
- Environmental remediation technologies: dechlorination of carbon tetrachloride
- Antibiotic potential of bryophytes, lichens, and pteridophytes in Northwest Montana

Pilot Planning Projects

- Development of a regenerative medicine study for osteoarthritis in Montana Agricultural Workers
- Development of a breath analysis study to determine incidence of SIBO and LI in native populations

Education and Outreach Projects

- Undergraduate research projects and public health internships at Montana Tech
- Undergraduate public health/biomedical research internships at Montana State University-Billings
- Undergraduate biomedical research internships at MSU-Bozeman
- Undergraduate Montana INBRE public health internships at MSU-Bozeman
- Montana INBRE Native American graduate fellowship at MSU-Bozeman and University of Montana (UM)
- American Indian research opportunities research program at MSU-Bozeman
- Project feasibility and preparation interventions for adolescent stress: a planning project

Resources

- Statistical Consulting and Research Services
- Bioinformatics Core Facility
- Metabolomics and Proteomics Mass Spec Core Facility (MSU-Bozeman)
- NMR Core Facility (MSU-Bozeman)
- Microscopy Core Facility (MSU-Bozeman)
- Imaging & Chemical Analysis Laboratory (ICAL) IMSU-Bozeman)
- HELPS (Human Ecology Learning and Problem Solving) Lab
- Research Laboratory (Blackfeet Community College)

Index Terms

epidemiology, pathogenesis, infectious diseases, environmental health, West Nile virus, biodefense, antibiotics, minority education, suicide prevention, water quality, bioinformatics, biostatistics, health disparities, CBPR, indigenous research, food sovereignty, pipeline development, mental health, tick-borne diseases

Nebraska Research Network in Functional Genomics University of Nebraska Medical Center

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Partner Institutions:

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Creighton University Medical Center, Omaha
Doane University, Crete
Nebraska Wesleyan University, Lincoln
University of Nebraska, Kearney
University of Nebraska, Lincoln
University of Nebraska, Omaha

Outreach Institutions:

Chadron State College, Chadron
Wayne State College, Wayne
College of Saint Mary, Omaha

Program Goals

- Establish a multidisciplinary research network with scientific themes of cell signaling, infectious disease, and structural biology and biophysics.
- Build and increase Nebraska's research base and capacity.
- Provide research opportunities for undergraduate students and serve as a pipeline for students to enter health research careers.
- Promote research collaborations.
- Provide outreach to underrepresented minority students to bring them into the research enterprise and support disease-specific initiatives.
- Enhance the science and technology knowledge of Nebraska's workforce.
- Support an emerging biotechnology industry in Nebraska.

Pilot Projects

- Metabolic imaging of disease progression in skin cancer by FLIM
- Antimicrobial properties of click-derived triazole compounds, triazolium salts and triazolyl metal complexes
- Dynamics of Buggy Creek virus infection: Investigations with *in vitro* and *in vivo* models
- Examination of spermine riboswitch structure and function for the development of antibiological agents
- Development of lab-on-a-chip devices for biological and environmental applications
- Mechanisms of prion protein-plasma membrane interactions: A multi-scale molecular modeling approach
- CURB: Center for Undergraduate Research on Biofilms
- Examination of plasticity in energetics, enzyme activities, mitochondrial gene expression with changes in locomotor performance
- Investigation of anti-oxidation effect of H₂S in PC12 neuronal cells by using cell permeable fluorescence sensors
- Origin and evolution of novel rRNA introns in fungi
- Development of microfluidic devices to extract and concentrate extremely long DNA molecules for genome analysis
- Septin-mediated pathways in filamentation and cell wall integrity in *C. albicans*
- Evaluation of novel anti-toxoplasma therapeutics
- Human skeletal muscle responses to temperature; Implications in health and disease
- Virulence determinants in the Coxsackievirus B3 genome Mechanisms of replication-coupled nucleosome assembly
- Identification and characterization of extracellular localizing *Coxiella burnetii* type IV secretion system components in relation to host interaction
- Persister formation during antibiotic and antimicrobial peptide challenge
- Phytochemical and biodegradable polymer complexes: preparation, stability and their anti-oxidant potential

Resources

- Bioinformatics Core Research Facilities
- Mass Spectrometry Proteomics Core Facility
- Genetic Sequence Analysis Facility
- Peptide Chemistry Core Facility
- cDNA Microarray Core Facility
- Mammalian Cell Culture Facility
- Histology Facility
- Mouse Genome Engineering Core Laboratory
- Molecular Biology Core Facilities
- Laser-Scanning Confocal Microscopy Imaging Facility
- Flow Cytometry Core Facility
- Structural Bioinformatics/Proteomics
- CD and VCD Spectroscopy
- Molecular Dynamics Simulations

Index Terms

cell signaling, infectious diseases, structural biology and biophysics, genomics, proteomics, cancer, bone, bacteria, ecosystems, heart disease, exercise training, myocardial infarction, virus, HIV, immune response, respiratory infections, antibiotics, drug discovery, diabetes, minority education, neural crest, zinc finger proteins, toll like receptor signaling, large DNA viruses, riboswitches, biomineralization, sequence analysis, enterovirus, toxoplasma, *Candida*

IDeA Network of Biomedical Research Excellence University of Nevada School of Medicine

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Partner Institutions

University of Nevada, Las Vegas
University of Nevada, Reno

Outreach Institutions

College of Southern Nevada, Las Vegas
Great Basin College, Eiko
Nevada State College, Henderson
Sierra Nevada College, Incline Village
Truckee Meadows Community College
Western Nevada College, Carson City

Program Goals

- Develop the research base and capacity at the host and partner institutions with targeted hires of new researchers and by providing research and mentoring support to faculty, postdoctoral fellows and graduate students.
- Support and develop research service cores in bioinformatics, genomics, proteomics, cytometry, confocal microscopy, histology and live animal imaging that will serve researchers and students at the host, partner and outreach institutions
- Enhance the INBRE student development pipeline by increasing mentoring and research programs for undergraduate students, supporting small grants for faculty development at the outreach institutions and initiating a program to equip and support science teachers in K-12.
- Collaborate with other Western IDeA states (Montana, Wyoming, New Mexico, Alaska, Idaho, Hawaii) by funding Undergraduate Student Interstate Research Opportunities, regional scientific and programmatic meetings, and a regional resource exchange.

Research Projects

- New adaptive designs for clinical studies by using computationally intensive techniques
- Colorectal cancer survival disparities in Nevada
- Post-translational modification discovery in kidney transplant recipients
- Development of chemically modified, stable insulin analogs
- Metabolomics lipid profiling for early detection of hepatocellular carcinoma

Resources

- Bioinformatics core
- Proteomics core

Index Terms

cell growth and differentiation, cancer, immunology, developmental biology, neurodevelopment, cell signaling, genomics, proteomics, bioinformatics, economically disadvantaged, minority education

New Hampshire

P20GM103506

New Hampshire IDeA Network of Biomedical Research Excellence Geisel School of Medicine at Dartmouth

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Lead Institutions

Geisel School of Medicine at Dartmouth
University of New Hampshire, Durham

Partner Institutions

Colby Sawyer College, New London
Community College System of New Hampshire
Franklin Pierce University, Rindge
Keene State College, Keene
New England College, Henniker
Plymouth State University, Plymouth
St. Anselm College, Manchester

Program Goals

- Enhance scientific, scholarly, and administrative interactions within the NH-INBRE network.
- Enhance the biomedical research infrastructure at NH-INBRE institutions.
- Enhance the research opportunities for students and faculty at NH-INBRE institutions.
- Enhance the science and research culture at NH-INBRE institutions.
- Enhance the bioinformatics and genomics infrastructure, training, and research activities at NH-INBRE institutions.
- Facilitate student transition to New Hampshire's workforce.

Research Projects

- **Microbial Pathogenesis**
 - The effects of clinically relevant SNPs on Virulence capabilities of *V. cholerae*
 - Neurobiology and Behavior
 - Neural mechanisms of circadian rhythms and interactions between clocks

Pilot Projects

- **Microbial Pathogenesis**
 - C-di-GMP mediated biofilm formation in *Pseudomonas fluorescens*
 - Regulation of the Cek1 MAP kinase cascade and morphogenesis in *Candida albicans*
- **Molecular and Cellular Biology**
 - Cell survival through a dicentric chromosome phase
 - Targeted treatment of cancer and neurological disorders
 - Advancement of a novel fatty acid synthase inhibitor
- **Neurobiology and Behavior**
 - Molecular and cellular mechanisms of circadian and circatidal rhythms
- **Human Health**
 - Behavioral and cortical effects of computerized language training for autism
 - An efficacy and feasibility study of a hope-centered intervention for adolescents
 - Enhancing follow-up mechanisms for women at risk for postpartum depression

Resources

- **Dartmouth**
 - Molecular biology core facility
 - Genomics and microarray laboratory
 - Biostatistics shared resource
 - Bioinformatics shared resource
 - Herbert C. Englert Cell Analysis Laboratory Imaging Resource
 - Immune monitoring shared resource
 - Transgenic and genetic construct shared resource
 - Irradiation services
 - Pharmacology shared resource
 - Pathology translational research shared resource
 - Advanced clinical imaging shared resource
 - Office of Clinical Research
 - Trace element analysis core facility
 - Monoclonal antibody production shared resource
 - Dartmouth SYNERGY
- **University of New Hampshire**
 - Glycomics center biotechnology shared resource
 - Hubbard Center for Genomic Studies
 - UNH Center for Xenon Imaging (MRI)
 - Center for Comparative Molecular Endocrinology
 - Advanced Polymer Science Training and Education Center
 - University instrumentation center shared resource

Index Terms

research training, genetics, molecular biology, cellular biology, environmental biology, microbiology, behavioral science, bioinformatics, clinical research and training, research opportunities, undergraduate research, minority education, technology core facilities

New Mexico

P2oGM103451

New Mexico IDeA Networks of Biomedical Research Excellence New Mexico State University, Las Cruces

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Lead Institution

New Mexico State University, Las Cruces

Partner Institutions (New Mexico)

Eastern New Mexico University, Portales
National Center for Genome Resources
New Mexico Institute of Mining & Technology, Socorro
New Mexico Highlands University, Las Vegas
National Center for Genome Resources, Santa Fe
Pueblo of Zuni, Zuni
San Juan College, Farmington
University of New Mexico, Albuquerque
Western New Mexico University, Silver City

Program Goals

- To provide student-focused experiences in biomedical and biobehavioral research. Student research experiences are available through Developmental Research Projects.
- To provide a collaborative sequencing and bioinformatics core (SBC) that supports hypothesis and discovery-driven research in the thematic areas of NM-INBRE.
- To build and enhance the biomedical research base through faculty development and a strong portfolio of scientific research projects in thematic focus areas.
- To support multi-disciplinary collaborative and community-based research and cooperate synergistically with NIGMS IDeA and other related programs at the STATE, regional and national level.

Research Projects

- **Structure and Function of Biomolecules**
 - Optimization of binding affinity and specificity of SH3-domain binding peptides
 - Anti-oxidant properties of modified arginine residues
 - Natural product exploration in tarantula hawk wasp venom using LC-MS/MS
 - Design for ultrasound theranostic agents carrying podophyllotoxin-like compounds
 - Lipids regulate oxygen bioavailability: simulations of membranes and fat droplets
 - Genetic analysis of cajal bodies and their role in RNP biogenesis in *Arabidopsis*
 - Examining CPEB expression and function in the *Manduca sexta* nervous system
 - Regulation of CLL progression and B cell development by membrane scaffolds
 - Integrated approach to discover and engineer type II polyketide natural products
 - Identification of antibiotics in honey and nectar from Russian knapweed
 - DNA ligase IV modulates the response to select chemotherapeutics
 - Natural product-inspired beta-lactone proteasome inhibitors as anticancer agents
 - Developing novel small molecule-based microRNA regulators
- **Cell and Organism**
 - Mechanisms of GPR30-dependent IGFBP1 expression in breast cancer cells
 - V-ATPase-dependent regulation of estrogen receptor in breast cells
 - Ethnic and age effects of vascular responses in women with metabolic syndrome
 - Can hormesis reduce free radical damage and improve healthspan and lifespan?
 - Identifying factors influencing invasive progression of in situ breast disease
 - Neural mechanisms of spatial memory decline in Alzheimer's disease
- **Pathogens**
 - Post-transcriptional regulation of virulence genes in *Escherichia coli* O157:H7
 - Deciphering immunogenomic responses to a fungal pathogen in toad populations
 - Molecular and microbiome analysis of gallbladder cancer in New Mexico populations
 - Novel diagnostic tools for malaria and Chagas disease
 - Elucidation of *Coxiella burnetii* carbohydrate and lipid metabolic pathways
- **Population/Community/Health**
 - Zuni Health Initiative: chronic disease care to reduce health disparity
 - Toxicological impacts of “mineral aging” on human health in the presence of PPCPS
- **Bioinformatics/Sequencing/Genomics, Clinical Translational**
 - Statistical analysis of gene sets

Resources

- National Center for Genome Resources (NCGR) applies bioinformatics, software engineering and next-generation sequencing to solve the omic challenges of the 21st century through collaborative research and services. The SBC uses the following technologies to accelerate IDeA research in *Sequencing: Illumina, PacBio; and Nanopore MinION*. NCGR also provides new simple bioinformatics tool for biologists which are focused on the most popular Next Gen Sequencing experiments in RNA-Seq, DNA-Seq, and ChIP seq. They provide custom support for assemblies, gene fusion, copy number variation, and metagenomics.

Index Terms

antibiotics, antimicrobial, bacteria, *Batrachochytrium dendrobatidis*, behavioral health, biobehavioral, bioinformatics, biomarkers, biostatistics, biotechnology, brain health, breast cancer, Cajal body, cardiovascular disease, Chagas disease, chemotherapy, community health, crassulacean acid metabolism, cytochromes, cytoplasmic polyadenylation binding protein, diabetes, DNA repair, drug discovery, drug resistance, G-protein-coupled estrogen receptor, gene sets, genetic dependencies, genomics, health disparity, hormesis, hypertension, imaging, immunity, immunology, infectious disease, inflammation, ischemia, kidney disease, leukemia, lipid membrane, malaria, memory, metabolic syndrome, mineral aging, microRNA regulators, mountain west research consortium, Navajo Nation, neurogenetics, next-generation sequencing, obesity, oxidative damage, pathogens, peptide, photosensitizing agents, PPCP, proteasome inhibitors, RNA interference, signaling pathways, specific analysis sequencing platform instrument, *Staphylococcus aureus*, student research training, ultrasound, V-ATPase pumps, Vacuolar-ATPase, vasodilation, Zuni Pueblo

North Dakota

P20GM103442

North Dakota INBRE: Health and the Environment
University of North Dakota School of Medicine and Health Sciences,
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Partner Institutions

Cankdeska Cikana Community College
Dickinson State University
Fort Berthold Community College
Mayville State University
Minot State University
North Dakota State University
Sitting Bull College
Turtle Mountain Community College
United Tribes Technical College
Valley City State University

Program Goals

- Build biomedical research capacity in North Dakota by serving research universities, baccalaureate institutions and Tribal Colleges in the state.
- Initiate competitive, sustainable research programs at four predominantly undergraduate institutions (PUIs) and five Tribal Colleges (TCUs).
- Increase the number of students from PUIs and TCUs who choose to pursue advanced training in the biomedical sciences.
- Empower all stakeholders in North Dakota to participate fully in the Nation's research and training portfolio.
- Enhance bioinformatics core facilities to provide computational resources and increase state wide access to electronic resources for biomedical research.
- Enhance existing and newly formed core facilities at the research universities to make them sustainable and effective training and service centers for the scientific network.

Research Projects

- Molecular insights into the mechanisms of atmospheric nucleation
- Environmental health: coal fly ash phytoremediation and plants biofortification
- Determining the potential impact of road traffic and dust on environmental health
- The role of c-Met in acidic extracellular pH-induced cell motility and invasion
- The etiology of exuberant tissue in equine
- Trophic level bioaccumulation of cadmium in the Red River Valley of North Dakota.
- Epigenomic and transcription control in bean
- Examination of the secondary effects of magnesium on ALDH2 substrates, inhibitors
- Ghrelin interaction with genetic risk factors of methamphetamine addiction
- The role of allosteric disulfide bonds in cellular infection and metal insertion
- Metagenomics of North American tick species
- Caffeine: a model drug for studying environmental factors in addiction
- The effect of epigenetic manipulation on differentiation therapy in AML
- Novel formamide ligands, their antifungal activity and methods of their synthesis
- Non-auxin hormonal control of leaf expansion in *Arabidopsis*
- Environmental and geographical constraints on plant evolution
- Mechanisms of gene expression in an *in vitro* model of metal-induced cellular change
- Genetic polymorphisms, gene expression and pre-eclampsia
- Mercury in fish from the Sakakawea Reservoir
- InFuse: Integrating fundamentals using student experiences

Resources

- Informatic resources core facility
- Behavioral core facility
- Flow Cytometry core facility
- Environmental analysis core facility
- Mentoring core

Index Terms

heavy metals, environment, biomarkers, cadmium, arsenic, zinc, remediation, eclampsia, kidney, proximal tubule, plants, ticks, fly ash, enzymes, beans, nutrition, cancer, renal disease, undergraduate research

Oklahoma IDeA Network of Biomedical Research Excellence University of Oklahoma Health Sciences Center, Oklahoma City

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Partner Institutions

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Northeastern State University, Tahlequah and Broken Arrow Campuses
Oklahoma Medical Research Foundation, Oklahoma City
Oklahoma State University, Stillwater
University of Central Oklahoma, Edmond
University of Oklahoma, Norman

Outreach Institutions

Comanche Nation College, Lawton
Langston University, Langston
Oklahoma City Community College, Oklahoma City
Redlands Community College, El Reno
Southeastern Oklahoma State University, Durant
Southwestern Oklahoma State University, Weatherford
Tulsa Community College, Tulsa
University of Tulsa, Tulsa

Program Goals

- Build capacity for biomedical research in Oklahoma by supporting promising new faculty, recruiting students into biomedical research careers and sustaining vital core facilities.
- Create a network of institutions that perform biomedical research, teach and provide patient care; this network includes a Historically Black College, a Tribal College and several other institutions with large enrollments of students from underrepresented minority groups.
- Develop research strengths in the thematic areas of microbiology and immunology, cancer and developmental biology.
- Lead institutions and partner undergraduate institutions to develop independent research programs.
- Encourage and mentor participating research investigators to develop new grant applications to leverage INBRE funding.
- Provide summer internships for students to participate in faculty research projects and enroll in new educational programs in bioinformatics and genomics.
- Support core facilities in functional genomics and bioinformatics.

Research Projects

- Effect of nanoscale surface treatment on the biomechanical performances of titanium
- Identification of an anti-apoptotic mutation causing T cell cancer predisposition
- Identification of virulence factors in *E. coli* strains causing neonatal sepsis
- The role of lateral septal neural circuitry in anxiety and depression-related behavior
- Memory T cell-mediated protection against malaria
- Ard1 control of cell survival and cancer progression in *Drosophila*
- Low cost clot-dissolving protein from transgenic plants for stroke treatment
- Personalized pressure ulcer prevention for spinal cord-injured wheelchair users

Pilot Projects

- Investigating the role of UPR activator IRE1 in IL-4 expression
- Quantifying the structural dependence of flagellar biomechanics and motility
- Understanding the function of Mcm10 and polymerase epsilon interaction in yeast
- Antibiofilm effect of cinnamon oil nanoemulsions on *S. aureus*, MRSA and VRSA

Resources

- Molecular Biology Resource Center
- Flow and Image Cytometry Laboratories
- Genomics Support Core Facility
- Medical Glycobiology Center
- Laboratory for Macromolecular Crystallography
- Laser Mass Spectroscopy Facility
- Animal Care Facilities
- Imaging Facility
- BIACORE Core Facility
- DNA Sequencing Facility
- Microinjection Core Facility
- Protein Expression Core Facility
- Microarray Core Facility

Index Terms

microbiology, immunology, cancer, developmental biology, genomics, bacteria, nutrition, brain, minority education

Puerto Rico

P2oGM103475

Advancing Competitive Biomedical Research in Puerto Rico
University of Puerto Rico, San Juan

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Partner Institutions

Research Institutions

University of Puerto Rico, Medical Sciences Campus (Lead)
University of Puerto Rico, Rio Piedras Campus

Primarily Undergraduate Institutions

University of Puerto Rico, Mayaguez Campus
University of Puerto Rico, Humacao Campus
University of Puerto Rico, Cayey Campus
Inter American University, San Juan Campus
Inter American University, Bayamon Campus
Universidad del Este, Bayamon Campus
Universidad del Turabo, Caguas Campus
Universidad Metropolitana, San Juan Campus

Outreach Institutions

Universidad Central del Caribe, Bayamón, PR
Ponce Health Sciences University, Ponce, PR
Pontifical Catholic University of Puerto Rico, Ponce, PR
University of Puerto Rico, Ponce Campus
University of Puerto Rico, Aguadilla Campus
Inter American University, San German Campus
Carlos Albizu University, San Juan, PR

Program Goals

- Strengthen the PR-INBRE network lead and partner institutions' biomedical expertise and research infrastructure.
- Contribute to the development of research faculty, postdoctoral Fellows, graduate and undergraduate students of underrepresented groups in research.
- Enhance the science and technology competency of the biomedical workforce.

Research Projects

- **Molecular medicine/cancer**
 - Metagenomic and metabolomic approaches to study microbiome dynamics for cervical cancer prevention
- **Drug discovery and development**
 - Development of nanoparticles containing docetaxel and nitrochalcone for controlled combination chemotherapy
 - New Halophilic hydrolases for the synthesis of chiral pharmaceutical intermediates
 - Biocompatible carbon-based nanoparticles for combined neuroimaging and drug therapy

Pilot Projects

- Drug discovery of novel targeted therapeutics for metastatic breast cancer
- Development of a bioinformatics platform for patient selection to facilitate future clinical trials in Puerto Rico
- Ultrasound-induced neuroplasticity
- Role of RAGE, FABP4 and IL-1 β in breast cancer subtypes using *in vitro* co-culture models
- Bioinformatics characterization of aggressive prostate cancer biomarkers to build a nano-biosensor for prostate cancer detection
- Characterization and development of a novel Wee-1 kinase inhibitor as a new anti-breast cancer therapeutic agent
- The impact of a high fat diet on the gut microbiome and depression
- Designing an improved tissue-type plasminogen activator
- Drug discovery of novel anticancer compounds from Puerto Rican medicinal plants
- Novel drug development against drug resistance, which occurs during chemotherapy
- Linking metal-mediated alterations of the ecdysone-dependent signaling pathway to social impairment in *Drosophila melanogaster*
- Analysis of the function of the MUSA1 ubiquitin E3 Ligase during muscle development in *Xenopus laevis*
- *In vitro* testing of gold nanodisc assemblies for photothermal ablation tumor therapy

Resources

- High Performance Computing Facility
- Internet2 capability
- Bioinformatics Research Core (BiRC)
- Centralized Research Instrumentation Cores
 - Genomic Translational Research Unit (Ion Semiconductor Next Generation Sequencers)
 - Sequencing and Genotyping Core (Illumina MiSeq Next Generation and Sanger Sequencers)
 - Proteomics Discovery Core (LC-MS/MS)
 - Metabolomics Core (GC-MS)
 - Molecular Dynamics Core (Raman, CD)
- Chemical Toxicology Testing facility at UMET (ChemTOX)
 - Flow Cytometer (six color detection capability)
 - Automated Cell Counter
 - Bio-Imaging Microscope (Olympus FSX100)
 - Freeze dry system
 - Autoclave
 - UVP Gel documentation device
- UPR Molecular Sciences Center
 - NMR (700 MHz)
 - Mass Spectrometry (MALDI TOF/TOF & ESI MS/MS)
 - Raman IR Spectroscopy
 - Circular Dichroism (Jasco 1500)
 - GC-MS
 - Confocal microscopy
- Caribbean Primate Research Center
- UPR Comprehensive Cancer Center

Index Terms

Bioinformatics, neuroscience, neurobiology of behavior, drug discovery, drug testing, drug delivery, molecular medicine, genomics, metagenomics, functional genomics, proteomics, biotechnology, cancer, anticancer drugs, drug resistance, carcinogens, environmental pollutants, environmental health, health disparities research, biomedical workforce training, professional development training, student training

Rhode Island

P2oGM103430

Rhode Island Network for Excellence in Biomedical Research University of Rhode Island, Kingston

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Partner Institutions

Brown University, Providence

Bryant University, Smithfield

Providence College, Providence

Rhode Island College, Providence

Roger Williams University, Bristol

Salve Regina University, Newport

Outreach Institutions

Community College of Rhode Island, Warwick

Program Goals

- Develop research capacity at the doctoral degree granting and baccalaureate institutions in Rhode Island.
- Enhance the capacity of junior investigators to compete for extramural research funds for individual or collaborative projects.
- Build a productive, collaborative research program in cancer, molecular toxicology, and neuroscience.
- Train a cadre of undergraduate and graduate students in research instrumentation and methodology for careers in the biomedical sciences.
- Maintain and provide inclusive access to state-of-the-art analytical instrumentation through a centralized research facility core.
- Establish an effective outreach program for recruiting, training and mentoring underrepresented scientists and students.
- Assist investigators with data mining, data processing, and molecular modeling needs through development of bioinformatics core resources.
- Organize seminars and workshops on topics of interest to Network participants.

Research Projects

- **Cancer**
 - Enhancing the permeability of carbon nanomaterials into tumor spheroid models
 - DNA polymerase theta and its potential role in cancer
 - Regulation of gene expression by mutant Swi/Snf complexes and their interactors
 - Mechanisms of anticancer effects of plant metabolites on human gastric cancer
 - Influence of IDH1/2 mutations on genome stability
 - Phosphonium tethered terpyridine metal complexes as G4-DNA binders
 - Triaryl anti-cancer agents; synthesis, toxicity and anti-cancer activity
 - Nano-biomarker arrays for cutaneous T-cell carcinoma
 - A novel nano-biosensing technique for early detection of lung cancer biomarkers
 - Sustained intravitreal delivery strategies for the treatment of uveal melanoma
- **Molecular Toxicology**
 - Exploring the relationship between structure and function in KmtR
 - Effect of N-terminal acetylation on chaperone function and protein aggregation
 - Development of narrow spectrum antibiotics that target bacterial GlcNAcases
 - Uncovering novel antiamebic compounds in plants, maple syrup, and marine microbes
 - Molecular mechanisms underlying the interaction of *S. enterica* with fresh foods
 - Investigating beta-keto esters as bacterial quorum sensing modulators
 - Effect of genetic diversity on virulence and transmission using ants as a model
 - Oxygen generating biomaterials to attenuate UV-induced skin cell damage
 - Sequence variation and molecular evolution of lytic enzymes in predatory bacteria
 - Deciphering *Kingella kingae* RTX-toxin regulation

- **Neuroscience**

- Characterizing enhancers in a Drosophila model of Amyotrophic Lateral Sclerosis
- Neurobiological co-regulation of the rat posterior parietal cortex
- Early comprehension of action-related words
- Functional differentiation of the rat posterior parietal cortex
- Characterization of brain activity in patients with Amyotrophic Lateral Sclerosis
- Measuring sensitivity to probability vs. emotional reactivity in risk perception
- Small molecule mimics of superoxide regulating enzymes
- Effects of social status and facial attractiveness on recognition memory for faces
- Modeling dopaminergic neuron response to neurostimulation for Parkinson's disease
- Pharmacotherapeutic intervention in an animal model of body dysmorphism

Pilot Projects

- Disparities in appropriateness of care among metastatic breast cancer patients

Resources

- Centralized Research Facility Core – proteomics; genomics; imaging; spectrometry; elemental analysis; flow cytometry; microscopy
- Bioinformatics Core Facility- genomics; molecular modeling; 3-D printing; programming

Index Terms

toxicology, cancer biology, neuroscience, behavioral science, proteomics, genomics, mutagenesis, cell signaling, skin cancer, lung cancer, cancer of the eye, chemotherapy, Alzheimer's disease, Parkinson's disease, ALS, undergraduate research

South Carolina

P20GM103499

South Carolina IDeA Networks of Biomedical Research Excellence University of South Carolina

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Partner Institutions

Comprehensive Research Universities

Clemson University

Medical University of South Carolina

University of South Carolina

Network Predominantly Undergraduate Institutions (PUIs)

Clafin University
Coastal Carolina University
College of Charleston
Francis Marion University
Furman University
Converse College Presbyterian College
Presbyterian College
South Carolina State University
University of South Carolina – Aiken
Winthrop University

Outreach PUIs

Anderson University
Benedict College
Lander University
University of South Carolina Beaufort

Program Goals

- To engage the participating institutions into a research network that includes both CRU and PUI faculty members, to build a system that will further strengthen undergraduate research and research training in two major areas of scientific emphasis: translational regenerative medicine and biochemistry/molecular biology.
- To build a “pipeline to research careers” that actively encourages and supports minority students and students from underserved areas in the state to pursue a college education and engage in biomedical research.

Research Projects

- BMP-Notch interaction in AV endocardial cushion remodeling
- Mechanism of chromatin decondensation in lymphocytes
- Structural and functional relationship of KLF4 in pressure ulcers
- Genetic mechanisms underlying craniofacial skeletal development in zebrafish
- Desmoplakin harnesses Rho GTPase and p38 MAPK signaling to coordinate cell migration
- Piece-wise NMR study of human neuropeptides and their receptors
- Pregnancy, TIMP4 and cardiac remodeling
- Neural correlates of symmetry in visuo-spatial working memory
- The effect of exercise training on proteins and microRNAs bound to high-density lipoproteins
- Skeletal muscle tissue engineering and regenerative medicine
- BMP-Notch interaction in AV endocardial cushion remodeling
- Synthesis and biological evaluation of phidianidine analogues
- Making mutant hiPSC-derived cardiomyocytes as models of human heart disease
- High-speed volumetric imaging: method for recording neural activity in 3D

Resources

- USC DNA microarray facility
- USC School of Medicine instrumentation resource facility (IRF)
- MUSC proteogenomics facility
- Claflin 700 MHz NMR Facility
- Histotechnology facilities – Clemson
- Surface analysis facilities – Clemson
- Mechanical testing facility – Clemson
- Waters LC-ESI-MS with fluorescence and UV-Vis detection – Furman
- BD biosciences FacSORT flow cytometer – Furman
- Life Science Biology and Biomedical Research Center – Winthrop
- Sims Chemistry and Biochemistry Research Center – Winthrop

Index Terms

regenerative medicine, bioengineering, biomaterials, cardiovascular disease, tissue engineering, stem cell biology, angiogenesis, extracellular matrix, metalloproteins, biochemistry, molecular biology, cell biology, neuroscience, cancer, virus-host interactions, proteomics and genomics, bioinformatics

South Dakota

P2oGM103443

South Dakota Biomedical Research Infrastructure Network University of South Dakota, Vermillion

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Partner Institutions

Augustana College, Sioux Falls
Black Hills State University, Spearfish
Dakota Wesleyan University
Mount Marty College
University of Sioux Falls
University of South Dakota Sanford School of Medicine, Vermillion

Outreach Institutions

Sisseton-Wahpeton College, Agency Village
Oglala Lakota College, Kyle

Program Goals

- Continue to develop a strong collaborative network within South Dakota to enhance basic biomedical research capabilities.
- Foster interdisciplinary research in the control of cell growth, with special emphasis on proteomics and genomics.
- Enhance research capacity and critical mass of investigators through mentorship of junior investigators at the lead institution.
- Maintain professionally staffed core facilities in proteomics and genomics for use by investigators throughout the state.
- Provide increased opportunities for graduate training in the core disciplines.
- Provide research support and mentoring for junior investigators and faculty from partner institutions.
- Provide training and research opportunities for students at predominantly undergraduate institutions.
- Introduce undergraduate students to graduate programs and career opportunities in biomedical sciences and bioinformatics.
- Foster interest in further education and careers in science and research for students at Tribal Colleges through enhancement of their science education programs and provision of research opportunities.

Research Projects

- Development of copper-catalyzed reactions to synthesize chiral molecules using visible light
- Physiological and developmental consequences of genome duplication in ivy
- Induction of oxidative stress in murine microglial cells by airborne particulate matter
- Investigating the anticancer properties of non-natural isothiocyanates
- Assessing the toxicity of nanomaterials for renewable energy and biolabeling applications

Resources

- DNA sequencing and genotyping core facility
- Genomics core facility
- Proteomics core facility
- Bioinformatics core facility
- Scientific library databases

Index Terms

proteomics, bioinformatics, genomics, DNA sequencing, genotyping, drug discovery, medicinal chemistry, natural products chemistry; physiological (including cellular) and developmental responses to stimuli, environmental health

Vermont

P20GM103449

Vermont Genetics Network
University of Vermont, Burlington

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Partner Institutions

Castleton State College, Castleton
Green Mountain College, Poultney
Johnson State College, Johnson
Lyndon State College, Lyndonville
Middlebury College, Middlebury
Norwich University, Northfield
Saint Michael's College, Colchester

Outreach Institutions

Community College of Vermont, Statewide
Landmark College

Program Goals

- Implement a new program to increase funding competitiveness of network faculty.
- Expand the undergraduate internship program to add a variety of training settings and diversity of participating students particularly veterans, disabled and under-represented minorities.
- Enhance proteomics and microarray services and implement sustainability business plans.

Research Projects

- Effect of elevation and forest area on ixodes density and *Borrelia*-infection
- Dual regulation model for control of a modified catabolite repression system
- Ecosystem, tick microbiome and blood meal source as drivers of Lyme disease risk

Pilot Projects

- Mapping the neuronal circuitry and molecular mechanism underlying nociception in *D. melanogaster*
- Metabolic consequences of synaptic plasticity
- Co-transmission and activity induced changes in central and peripheral neurons
- Induction of cryptic genes in rate Antarctic marinobacter for the production of novel secondary metabolites
- The causes and consequences of perceived postpartum weight-bias
- A mathematical model for calcium regulation in an Alzheimer's neuron
- Vermont trematodes: diversity, interactions and the risk of cercarial dermatitis
- Diet specialization and gut microbiota in neotropical katydids

Resources

- Microarray facility
- Proteomics facility
- Bioinformatics core
- Next gen sequencer
- FACS facility
- Imaging facility (COBRE)
- Molecular biology facility (COBRE)
- Vermont Cancer Center
- Structural biology – x-ray crystallography
- High performance computing center
- Center for Clinical and Translational Science (CCTS)
- Animal facility, College of Medicine, UVM
- UVM Internet2
- Vermont Center on Behavior & Health (COBRE)

Index Terms

genetics, microarray, proteomics, outreach, diversity, biological sequence analysis, bioinformatics

West Virginia

P20GM103434

West Virginia IDeA Networks of Biomedical Research Excellence Marshall University School of Medicine, Huntington

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Partner Institutions

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Bethany College, Bethany
Bluefield State College, Bluefield
Concord University, Athens
Davis and Elkins College, Elkins
Fairmont State University, Fairmont
Glennville State College, Glennville
Shepherd College, Shepherdstown
University of Charleston, Charleston
West Liberty University, West Liberty
West Virginia School of Osteopathic Medicine, Lewisburg
West Virginia State University, Institute
West Virginia University, Morgantown
West Virginia Wesleyan College, Buckhannon
Wheeling Jesuit University, Wheeling

Program Goals

- Develop and enhance the multidisciplinary statewide research network biomedical research base and capacity that was created during Phase I of the WV INBRE program by providing research support to faculty, postdoctoral fellows, and graduate students at the participating institutions.
- Provide research opportunities for undergraduate students and serve as a pipeline for undergraduate students into health research careers.
- Work with partner institutions to enhance research activities for undergraduate students.
- Enhance science and technology knowledge of the state's workforce.
- Strengthen and develop stronger relationships between WV INBRE and other NIGMS biomedical research programs (e.g. COBRE) to enhance biomedical research opportunities for West Virginia's students and participating undergraduate faculty.

Research Projects

- The mechanism of action of resaruzin, a novel antibiotic
- The role of tea saponins in regulating cellular apoptosis
- Molecular mechanisms of erythrocyte invasion by *Francisella tularensis*
- Effects of therapies involving an anti-nodal antibody in metastatic melanoma by modeling and simulation
- Role of serine/threonine kinase interacting protein during retrovirus replication
- Mechanisms of DNA methyltransferase inhibitors-induced cellular differentiation
- Characterization and transcription profiling of resazomycin-susceptible bacteria
- Distributed file system B-trees for large scale genomics research
- Estrogen related receptors regulation by ING4: potential role in breast cancer patients

Pilot Projects

- Effects of digitoxigenin on wound healing in diabetic rats
- Alteration of the cortactin/coronin 1B axis in driving head and neck cancer invasion
- The effect of theaflavin (TF2a) on ovarian cancer cells
- The mechanism of immunostimulation of a novel tetrionic acid
- Synthesis of bioactive natural products and development of their analogs
- Glyceollin I as a novel chemosensitizer acting through HIF-1-alpha
- Cisplatin renal cytotoxicity reduced by resveratrol and its analogs
- The Gut Microbiome in Mouse Models of Stroke and Alzheimer's Disease
- Impact of DNA hypomethylating agents on H3K9/H3K56 acetylation in leukemia cells
- Identifying transcriptional changes by nicotine and opioids in dopaminergic neurons

Resources

- Genomics core facility with microarray capabilities
- Imaging core facility
- Computational chemistry and modeling laboratory
- Proteomics core facility
- Flow cytometry core facility
- Recombinant DNA core facility
- Image analysis facility
- Animal care facility

Index Terms

cell biology, molecular biology, cardiovascular disease, cancer, diabetes, obesity, proteomics, genomics, imaging, fat metabolism, genetics, infectious disease, cell signaling, natural products

Wyoming IDeA Network of Biomedical Research Excellence

University of Wyoming at Casper

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Partner Institutions

Casper College, Casper

Central Wyoming College, Riverton

Eastern Wyoming Community College, Torrington

Gillette College, Gillette

Laramie County Community College, Cheyenne

Northwest Community College, Powell

Sheridan College, Sheridan

Western Wyoming Community College, Rock Springs

Outreach Institutions

University of Wyoming at Casper

Program Goals

- Establish a statewide network for biomedical research excellence.
- Provide opportunities for undergraduates at the University of Wyoming, and at six of the state's seven community colleges, to participate in hands-on biomedical research.
- Enhance Wyoming INBRE Network by forming partnerships between faculty at UW and community colleges.
- Build on existing research strengths in two thematic areas: cardiometabolic syndrome and technology for chronic disease research and therapeutics.
- Expand the Wyoming research network across the western IDeA region.
- Provide research support to faculty, postdoctoral fellows and graduate students.
- Provide research and learning opportunities for undergraduates at the University of Wyoming and the network community colleges to create a pipeline for students to continue in health research careers.
- Enhance science and technology knowledge of the state's workforce.

Research Projects

- Polycystic ovarian syndrome in American Indian women: an exploratory study
- The effect of obesity induced hyperinsulinemia on lactation
- Molecular mechanisms of luteinizing hormone dysregulation in PCOS
- Role of RBM20 in the regulation of cardiac gene splicing in heart failure
- CARD9 signaling and childhood obesity-associated cardiac dysfunction
- Optogenetic control of GCS via microRNAs as treatment for liver steatosis
- Circulating tumor cell capture and release from degradable hydrogel surfaces
- Growing resilience phase II: Albany County redesign and Wind River expansions
- TRPV1 activation prevents high fat diet-induced non-alcoholic fatty liver disease (NAFLD) in obesity via SIRT-1

Pilot Projects

- Localized immunosuppression for peripheral nerve allografts
- Transition metal chelators as novel therapeutics against *Toxoplasma gondii*
- Microfluidic production of multimodal therapeutic PEG hydrogel nanoparticles

Resources

- Bioinformatics Core Facility
- Imaging/Microscopy Core Facility

Index Terms

cardiometabolic syndrome, chronic disease, obesity, type 2 diabetes, optogenetics, polycystic ovarian syndrome, public health, nutrition, genomics, cell signaling, rural health, glaucoma, therapeutics, allograft