Institutional Development Award (IDeA) Program
IDeA NETWORKS OF BIOMEDICAL RESEARCH EXCELLENCE (INBRE)
Directory of Active Awards by State
July, 2008

Alaska

Contaminants and Infectious Agents: Molecular Approaches
University of Alaska, Fairbanks - P20 RR016466

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Partner Institution
University of Alaska, Anchorage

Outreach Institutions
College of Rural Alaska, Fairbanks
University of Alaska Southeast, Juneau

Program Goals
- Enlarge and sustain an inter-campus network for environmental health research
- Focus on molecular toxicology of subsistence species, infectious agents, and zoonotic diseases
- Support research projects of junior faculty, postdoctoral research associates, and graduate students
- Provide research opportunities for undergraduate students throughout Alaska
- Provide outreach activities to students and teachers in high schools, at smaller colleges in Alaska, health corporations, hospitals, and other organizations at rural sites
- Enhance science knowledge of the Alaskan workforce and expand the undergraduate student pipeline into health careers, with particular attention to Alaska Native students
- Form a core research team consisting of ten recently recruited faculty members
- Feature bioinformatics as an integral part of the program

Research Projects

- Contaminants Molecular Approaches
  - Structural and functional features of the 5-HT3R binding sites
  - Essential and non-essential elements bioavailability from subsistence foods in arctic fox model
  - Development of a fish model for molecular toxicology research
  - Theoretical and experimental population genetics of mating systems
  - Chromatin remodeling by acetylation and phosphorylation
- Infectious Agents Molecular Approaches
  - Bacterial replication within cells of vectors
  - Biology, ecology, and genetics of avian influenza in wild birds
  - A portable and extensible system for genome data management and analysis
  - Evolution of the major histocompatibility complex an a natural model

Resources

- DNA core laboratory
- Flow cytometer
- Biomedical computer science facility
- Central animal facility
- Scanning and transmission electron microscope facility
- Public health laboratory
- Applied science and engineering technology laboratory
- Ecosystem and biomedical health facility

Index Terms

molecular toxicology, infectious agents, zoonotic diseases, minority outreach, public health, rural health care, environmental biology, bioinformatics, dioxin, hepatitis B, cancer, liver disease, epidemiology, minority education

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Arkansas

Partnerships for Biomedical Research in Arkansas
University of Arkansas for Medical Sciences - P20 RR016460

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

Partner Institutions
Arkansas State University
Hendrix College
John Brown University
Lyon College
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
Philander Smith College
University of Arkansas at Monticello

Program Goals
- Expand and strengthen the biomedical research infrastructure of the lead and partner institutions by developing a multidisciplinary research network united by the scientific theme of *Cellular Signaling, Growth, and Differentiation*
- Increase the biomedical research base in Arkansas by providing research support to select faculty at the Arkansas INBRE partner undergraduate institutions (UGIs) so they can obtain independent extramural funding for their biomedical research projects
- Provide research opportunities for undergraduate students from the seven partner UGIs, thereby serving as a “pipeline” for students to choose health research careers

- Sponsor specialized outreach activities for faculty and students from UGIs other than the seven partner UGIs, thereby preparing other investigators for future INBRE support
- Enhance the science and technology base of Arkansas' future workforce by developing a cadre of trained scientists – especially those with expertise in biomedical research and bioinformatics – and provide resources to stimulate growth of biotechnology industries in Arkansas

Research Projects

- Neuroscience
  - Effects of nicotine on processes mediated by the reticular activating system
  - Effects of adverse perinatal experiences on cortical organization
  - Cholinergic mechanisms in neuronal regeneration
- Cancer and signaling mechanisms
  - Signaling by non-classical ligands of estrogen receptor: novel approaches to detection and mechanism
  - p107 function in 3T3-L1 differentiation
  - Effects of prenatal steroid treatment on guinea pig ventilatory muscles
  - Role of ascorbate in coordinating growth and senescence in *Arabidopsis thaliana*
  - Anticancer thiosemicarbazone complexes of ruthenium and copper - synthesis, biochemistry, and cellular mechanisms targeting nucleic acids
  - Interaction of aging and estradiol metabolites on coronary arterial function
  - Metal chelates in prevention of cisplatin-induced kidney cell death
- Overlap
  - Transcriptional regulation of the myelin proteolipid protein gene: Effect of intron 1-binding factors on chromatin remodeling during oligodendrocyte differentiation
  - Molecular mechanisms contributing to gender disparity in multiple sclerosis
  - The role of bone morphogenetic proteins in nociceptive neuron development
  - Assessment of drug uptake and permeability properties of novel anticancer agents in the brain

Resources

- Genomics facility
- UAMS proteomics facility
- UAF proteomics facility
- Microscopy 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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Delaware

IDeA Network for Biomedical Research Excellence
Delaware Biotechnology Institute, University of Delaware, Newark - P20 RR016472

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Partner Institutions
Christiana Care Health System, Newark
Delaware State University, Dover
Nemours / A.I. duPont Hospital for Children, Wilmington
University of Delaware, Newark
Wesley College, Dover

Outreach Institutions
Delaware Technical & Community College, Stanton
University of Delaware School of Nursing, Newark

Program Goals
- Develop biomedical research capability in Delaware
- Strengthen the existing biomedical research infrastructure
- Develop junior and early-career faculty in Delaware through mentored biomedical research
- Enlarge the pool of individuals and teams of researchers who can compete successfully for NIH grants
- Strengthen the existing biomedical research infrastructure
- Engage all levels of research potential, including undergraduate students, graduate students, post-doctoral associates, faculty, nurses, medical interns, and medical research personnel through improved biomedical workforce development
- Strengthen the network of academic and medical institutions of higher learning across the state and foster an emerging medical research initiative in the Delaware health care system
- Develop research themes in cancer, biomedical imaging, animal modeling, infectious diseases and biochemistry
- Establish an outreach program with internships, personnel exchanges, education and training programs, seminars, and other activities at outreach partner institutions

Research Projects
- Cancer
  - Electrospun collagen scaffolds for development of 3-D cellular models for testing anti-neoplastic agents
  - Autocrine stimulation of primary and metastatic brain cancer cells

- Proteomic analysis of apoptotic mechanisms in cancer
- Dominance of mTOR inhibitors in breast cancer: broad antineoplastic effects *in vitro* and *in vivo*
- Nanotechnology for cancer detection and therapeutics
- Role of IGFBP-2 fragments in development of androgen insensitive prostate cancer

- Biomedical Imaging
  - 3-D image analysis algorithms for automatic computation of ground glass opacity of lung tumors
  - Analysis of 3-D breast surface deformation during mammographic compression
- Animal Modeling
  - Hepatic lipid metabolism and gene expression in hen
  - Characterization of surfactant protein expression in avian lung as a model for upper respiratory disease in humans
  - Investigating the neurobiology of sensory processing and learning in an invertebrate model system
- Infectious Disease
  - RNA cap hypermethylases in Microsporidia
- Biochemistry
  - Extent of nucleophilic participation in acyl, sulfonyl and sulfamoyl halides
- Nursing Research
  - An exploration of the genetic basis for premenstrual syndrome
  - Parents of children with sickle cell disease: their perceptions of family management

Resources

- Bioimaging core
- Bioinformatics core
- Biomolecular core lab (Nemours)
- Center for Translational Cancer Research core facility
- DNA sequencing & genotyping core facility
- Growth chambers
- Mass spectroscopy facility
- NMR core facility
- Protein production core facility

Index Terms

biomedical translation, bioinformatics, biotechnology, computational biology, cancer, colorectal cancer, breast cancer, imaging, 3-D reconstruction, public health, minority education, uterine fibroids, prostate cancer, bone cancer, bioengineering, biosensors, neuromuscular disease, lung cancer, fungal diseases, drug delivery system, drug synthesis, vaccine synthesis, transgenic plants, cell signaling, retrovirus, immune response, virtual surgery, Lyme disease, bioconversion, infectious diseases, women's health, anti-neoplastic agents, glioblastoma, neuroblastoma, tumor detection, prostate tumors, mammography, cardiovascular disease, microsporidia, biomedical imaging, biochemistry

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Hawaii

Cellular Basis of Immunological and Neurological Disease
John A. Burns School of Medicine, University of Hawaii, Manoa - P20 RR016467

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Partner Institutions
Chaminade University, Honolulu
Hawaii Pacific University, Kaneohe
Queen's Medical Center, Honolulu
University of Hawaii, Hilo

Outreach Institutions
Kapiolani Community College, Honolulu
Leeward Community College, Pearl City
Maui Community College, Kahului
Windward Community College, Kaneohe

Program Goals
- Expand and develop competitive research capacity in Hawaii by building on the institutional network foundation begun under BRIN
- Develop multi-disciplinary research projects that explore the cellular basis of immunological and neurological diseases
- Develop core competencies in immunology, cell biology, and developmental biology
- Establish teams consisting of a senior mentor investigator, junior investigators at the lead and affiliated institutions, and graduate and undergraduate students
- Provide outreach activities to undergraduate institutions and community colleges
- Foster the development of individual careers and of institutional research capacity
- Sponsor training and mentoring workshops and seminars
- Provide academic work force development through bioinformatics core training activities
- Enhance the science and technology knowledge of Hawaii's workforce

Research Projects
- Fundamental mechanisms involved in disease pathogenesis
  - Role of caveolae in airway remodeling in asthma
  - Endocrine disruptor accumulation in rural Hawaii food
  - Identification and study of natural product inhibitors of ras/raf-1 kinase inhibitors as possible

anti-cancer agents
  - Synthesis and evaluation of analogs of three botanically-derived anti-malarial compounds
  - genetic factors influencing virulence of avian pox virus and malaria; co-evolution of disease agents and hosts
  - Modulators of TRPM cation channels from marine organisms
  - Ozone as an environmental toxicant for humans and animals
  - Regulation of TERT expression in murine primordial germ cells
  - Novel methods for transgenic mice production
- Reproductive biology
  - Analysis of the regulation of TERT expression in primordial germ cells
- Development of materials and methods for biomedical and translational research
  - Inhibitors of mast cells degranulation and TRPM cation
  - Transposon targeted integration

Resources
- Bioinformatics core facility
- Biological electron microscopy facility
- Molecular biology core facility
- Vivarium
- Tissue culture facilities
- Laboratory of molecular medicine and infectious diseases
- Retrovirology research laboratory
- Genomic research core facility

Index Terms
immunology, cell biology, developmental biology, neurobiology, cell signaling, imaging, molecular biology, genomics, proteomics, HIV, cancer, aging, infertility, neuropathy, dementia, forensics, toxicology, physical anthropology, addiction, nicotine, inflammatory diseases, asthma, arthritis, air pollutants, ozone

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Idaho

Idaho INBRE Program
University of Idaho, Moscow - P20 RR16454

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Partner Institutions
Boise State University, Boise
Boise Veterans Administration Medical Center, Boise
The College of Idaho, Caldwell
Idaho State University, Pocatello
Mountain States Tumor and Medical Research Institute, Boise
Northwest Nazarene University, Nampa

Outreach Institutions
Brigham Young University - Idaho, Rexberg
College of Southern Idaho, Twin Falls
Eastern Idaho Technical College, Idaho Falls
Lewis-Clark State College, Lewiston
North Idaho College, Coeur d'Alene

Program Goals
- Continue to build an interdisciplinary multi-institutional research network within the theme of cell signaling
- Support a network of research partners consisting of colleges with developing research missions to enhance the research base
- Maintain an educational pipeline through college and graduate school that offers progressively greater research experiences at each level
- Enhance educational outreach activities at undergraduate colleges
- Create an educated workforce that will sustain a developing biomedical industry in Idaho
- Develop bioinformatics resources as research and teaching tools

Research Projects
- Structure/function analysis of anthracycline reduction by human carbonyl reductase
- Oncostatin M induces VEGF in human breast carcinoma cells: stimulation of angiogenesis *in vitro* and *in vivo*
- Involvement of astrocyte caspase activation and CD40/CD40L interactions in Alzheimer's disease (with three subprojects)

- Molecular interactions of the pericellular matrix
- Cadmium chelation therapy: development of new agents to prevent/treat heavy metal poisoning
- Investigating differential cell sensitivity to cadmium and cadmium-sequestering molecules
- Distribution of flux control between ADH and ALDH in liver ethanol metabolism (with three subprojects)

Resources

- Microarray core facility
- Molecular biology core facility
- Proteomics core laboratory
- DNA sequencing laboratory
- Bioinformatics facility
- Molecular ecology and genomics core laboratory
- Imaging center (microscopy and IVIS)
- Cell culture and processing laboratory

Index Terms

cell signaling, bioinformatics, Internet2, cancer, breast cancer, Alzheimer's disease, metal poisoning, alcohol metabolism, alcoholism, prostate cancer, anti-cancer drug toxicity, neurodegeneration, inflammation, bone, cartilage, drug design

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Kansas

Kansas IDeA Network of Biomedical Research Excellence
University of Kansas Medical Center, Kansas City - P20 RR016475

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Partner Institutions
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University of Kansas, Lawrence
Wichita State University, Wichita

Outreach Institutions
Emporia State University, Emporia
Fort Hays State University, Hays
Haskell Indian Nations University, Lawrence
Langston University, Langston, Oklahoma
Pittsburg State University, Pittsburg
Washburn University, Topeka

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 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

Research Projects
- Bile acids in the replication of Hepatitis C virus
- Transcriptional profiles of *Anopheles gambiae* hemocytes
- The role of RNA-binding initiation factors in protein synthesis
- Identification of transcriptional targets of Ind
- Pitx2-regulated genes in left-right development and cardiac morphogenesis
- Cellular pathogen gene identification via graph data mining

- High resolution structure of the type III secretion system
- CNS sites where estrogen modulates hyperalgesia
- AEBP-1 and ovarian physiology
- Generation and analysis of a mouse model of Klippel-Trenaunay syndrome
- Role of myelinated cutaneous axons in diabetes-induced proprioceptive and balance deficits
- Regulation of apoptosis in the *Drosophila* retina
- Role of caspase-2 in skin cancer prevention
- Partition of DSRNAs to daughter cells following mitosis/meiosis
- Mechanisms of dorsoventral patterning during neural development
- Viral and host responses to herpes simplex virus infection
- Voltage gated calcium channels as scaffolding proteins for synapse formation
- The impact of dopamine signaling on Fragile X Syndrome behaviors
- Tail morphogenesis in zebrafish
- Cellular & functional characterization of dopamine receptor interacting proteins
- The role of gap junctions in oxidative neurodegeneration in cerebellum
- Directed differentiation of human embryonic stem cells towards renal lineage
- Understanding the role of small RNAs in *Arabidopsis* pollen development

Resources

- Bioinformatics satellite core - University of Kansas Medical Center
  http://www2.kumc.edu/siddrc/bioinformatics/
- Bioinformatics satellite core - Kansas State University
  http://bioinformatics.ksu.edu/web/index.shtml
- Bioinformatics core - University of Kansas - Lawrence
  http://www.bcf.ku.edu/index.htm
- Bioinformatics satellite core - Wichita State University
  http://bioinformatics.hh.wichita.edu/

Index Terms

cell biology, developmental biology, genomics, proteomics, lipidomics, cancer, eyes, skin cancer, nervous system, minority education, reproductive biology

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Kentucky

KY-IDeA Networks of Biomedical Research Excellence
University of Louisville, Louisville - P20 RR016481

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Partner Institutions
Eastern Kentucky University, Richmond
Morehead State University, Morehead
Northern Kentucky University, Highland Heights
University of Kentucky, Lexington
Western Kentucky University, Bowling Green

Outreach Institutions
Bellarmine University, Louisville
Berea College, Berea
Kentucky State University, Frankfort
Kentucky Wesleyan College, Owensboro
Murray State University, Murray
Pikeville College, Pikeville
Transylvania University, Lexington

Program Goals
- Continue to develop infrastructure and a network of biomedical researchers to increase the capacity for research in Kentucky
- Build a research core to provide eleven researchers with the motivation and support needed to become competitive for independent federal funding
- Nurture research within the themes of genomics and neuroscience
- Develop core research facilities in genomics and bioinformatics
- Provide summer research opportunities for undergraduate students in all affiliated institutions to develop the pipeline of students entering educational tracks toward careers in biomedical research

Research Projects
- Genetic and metabolic adaptation by *Salmonella* to the natural environment
- Antipsychotic drug action after hippocampal damage
- Characterization of putative magnesium transporting P-type ATPases
- Structural and functional recovery of auditory hair cells in zebrafish

- RNA-based mechanisms of transcription elongation control
- A butterfly transposon mutagenesis screen for the study of wingless signal transduction
- Mechanisms of transcriptional coordination among phosphorylase kinase genes
- Amphetamine-induced acute withdrawal/reversible depression in rats
- Molecular mechanisms of estrogen-regulated bone resorption
- QSAR of adrenergic receptor antagonist
- Functional and molecular analysis of long-term sleep disruption by ethanol

Resources
- Genomics core
- Light microscope facility
- Bioinformatics core

Index Terms
neuroscience, genomics, molecular biology, bioinformatics, genetics, bacteria, *Salmonella*, 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

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Louisiana

Louisiana Biomedical Research Network
Louisiana State University, Baton Rouge - P20 RR016456

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Partner Institutions
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Louisiana State University, Shreveport
Louisiana Tech University
Southern University and A&M College
Tulane University
The University of Louisiana at Monroe

Outreach Institutions
Centenary College of Louisiana
Grambling State University
Louisiana College
Nicholls State University
Northwestern State University
Southeastern Louisiana University
Southern University at New Orleans
University of New Orleans
Xavier University of New Orleans

Program Goals
- Establish a research network supporting interdisciplinary biomedical research
- Support specific research projects led by investigators from participating institutions and mentored by experienced biomedical scientists
- Generate a critical mass of biomedical investigators at each participating PUI campus through support of mentored research projects, and enhanced communication and collaboration with established research laboratories and facilities
- Support biomedical research and education throughout Louisiana by providing outreach opportunities for students and faculty from all colleges and universities within the state that are not INBRE partner institutions

Research Projects

- Molecular and cell biology
  - Role of gM in KSHV entry, egress and virus-induced cell fusion
  - Development of marine macrolides latrunculins as angiogenesis modulators
  - Regulation of prostate gene expression by 1,3 butadiene
  - The role of chromatin in HSV-1 gene regulation
  - Cardiomyocyte signaling by cholesterol ozonation products
  - NR4A regulation of organogenesis
  - Glucosylceramide synthase in a novel target for cancer treatment
- Bioinformatics and biocomputing
  - Visual and analytical tools for cluster analysis
  - Gene expression data mining for physiological discovery
  - Large-scale finite element models of the optic nerve head
  - Lacrimal gland bioinformatics: a neural connection of dry eye and aging
  - Neural network-enhanced stereoscopic visualization for interactive analysis of multidimensional biomedical and other data sets
  - Targeting HER-2 protein for breast cancer using computational approach
  - The study of apoptosis using a new discrete computational method
  - Prediction of conserved and divergent secondary structure features of herpes simplex virus Type-1 (HSV-1) UL20p and gK proteins using combination of multiple computational methods
  - The study of neuronal synchrony using coupled oscillator model for brain function restoration
  - The study of protein damage in aging and age-related diseases in brain using BioMEMS and bioinformatics tools
  - Microarray gene expression biclustering using associative pattern mining

Resources

- Imagining 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, lung cancer, virus, minority education

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Maine

Comparative Functional Genomics INBRE in Maine
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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

Outreach Institutions
Primary Outreach Institutions
University of Maine, Farmington
University of Maine, Machias
University of Maine, Orono
Secondary Outreach Institutions
Maine Maritime Academy
University of Maine, Fort Kent
University of Maine, Presque Island
University of New England
University of Southern Maine, Portland

Program Goals
- Augment and strengthen Maine's biomedical research capacity by further developing the collaborative research and training network initiated through BRIN; composed of two research institutions, two undergraduate and graduate degree granting institutions, and three undergraduate degree granting institutions
- Strengthen the lead and partner institutions' biomedical research infrastructure
- Develop a multidisciplinary research program with a scientific focus on comparative functional genomics
- Create expanded opportunities for developing competitiveness for biomedical research funding
- Provide research support and core facilities to junior faculty, postdoctoral fellows, and graduate students at participating institutions
- Create year-round and seasonal research and training opportunities for undergraduate students at participating institutions

- Provide outreach activities to students and faculty at other undergraduate institutions and community colleges in Maine to create a pipeline for students to pursue careers in health research
- Enhance the scientific and technical knowledge of Maine's workforce

Research Projects

- Toxicology
  - Identification of novel regulatory sequences in ABCB and ABCC subfamily genes by comparative genomic analysis
  - Dioxin exposure impairs embryonic heart development: comparative expression and promoter analysis of the beta 1-adrenergic receptor
- Gene regulation
  - Machine learning methods for phylogenetics and genomics
  - Bioinformatics of 3'-UTR-based post-transcriptional regulator elements
  - Discovery and characterization of conserved motifs that regulate gene expression during spermatogenesis
- Developmental Biology
  - Visualization of compensatory auditory interneuron regeneration
  - Functional characteristics of regulatory sequences predicted from genomic sequences
  - Wnt signaling in the developing gastrointestinal tract
  - Mechanisms underlying hyperoxia induced developmental plasticity of respiratory control
- Cell Signaling
  - Influence of melatonin on neurite growth and regeneration in crustaceans
  - Sequencing and characterization of excitatory glutamate receptors in the freshwater snails *Helisoma trivolvis* and *Biomphalaria glabrata*
  - The dynamics of primary B cell responses in teleost fish
  - Testing the role of gene deserts in genome organization of the nucleus

Resources

- Zebrafish facility
- Center for Comparative Toxicology
- Center for Marine Functional Genomic Studies
- Animal services core facility
- Bioinformatics core facility
- Cell isolation, culture, and organ perfusion core facility
- Gene expression unit
- Marine DNA sequencing center
- Imaging core facility
- Instrumentation core facility
- Oocyte expression and electrophysiology unit

Index Terms

genomics, proteomics, cell signaling, cell biology, neuroscience, cell development, nerve regeneration, hearing, immune response, reproduction, pollution, cardiovascular disease, gastrointestinal tract, environmental health

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Mississippi

Mississippi Functional Genomics Network
University of Southern Mississippi, Hattiesburg - P20 RR016476

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Partner Institutions
Alcorn State University, Lorman
Millsaps College, Jackson
Mississippi University for Women, Columbus
Tougaloo College, Jackson

Outreach Institutions
Delta State University, Stoneville
Mississippi College, Clinton
Mississippi Gulf Coast Community College, Perkinston
Mississippi Valley State University, Itta Bena
Rust College, Holly Springs

Program Goals
- Develop functional genomics of cancer and of microbial pathogenesis as primary research foci
- Enhance core research facilities in high-throughput genomics, proteomics, cellomics, 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
- Make the bioinformatics core training tools and software more available through an expanded Web site
- Provide an online clearinghouse for funding opportunities and e-library access to all students and faculty in the state
- Support and mentor eight promising faculty researchers at the partner undergraduate institutions
- 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

- Functional genomics of cancer
  - The molecular biology of lung cancer
  - Proteomics of cytokine induction in tumor cells
  - Cell cycle regulation in *Aspergillus*
- Functional genomics of microbial pathogenesis
  - Molecular biology of multi-drug adaptation in *Mucor*
  - Functional genomics of IcsA, a pathogenic determinant in *Shigella*
  - Molecular analysis of ranaviruses
  - Functional genomics of viral oncogenesis in Marek's disease

Resources

- Imaging facility
- Genomics facility
- Proteomics facility
- Cellomics facility
- Pharmacogenomics facility
- Bioinformatics core facility
- Animal facility
- Molecular biology core laboratory

Index Terms

cancer, infectious diseases, bacteria, genomics, proteomics, cell biology, molecular biology, imaging, lung cancer, Marek's disease, virus, minority education

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Montana

Montana Network of Biomedical Research Excellence
Montana State University, Bozeman - P20 RR016455

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Partner Institutions
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McLaughlin Research Institute, Great Falls
Montana State University, Billings
Montana State University - Northern, Havre
Montana Tech of The University of Montana, Butte
NIH Rocky Mountain Laboratories, Hamilton
Rocky Mountain College, Billings
University of Montana
University of Montana - Western, Dillon

Outreach Institutions
Blackfeet Community College, Browning
Chief Dull Knife College, Lame Deer
Fort Belknap College, Harlem
Fort Peck Community College, Poplar
Little Big Horn College, Crow Agency
Salish-Kootenai College, Pablo
Stone Child College, Rocky Boy Agency

Program Goals
- Establish Montana as a leader in research on the epidemiology and pathogenesis of infectious diseases and environmentally-related health issues
- Develop a Montana workforce to meet the biomedical research and economic development challenges of the future
- Increase the number of researchers at undergraduate institutions in the research themes to achieve a sustainable, productive, and competitive research network
- Elevate the research programs at the lead institution to cutting-edge science
- Develop an educational pipeline to careers in health research with expanded research opportunities for students
- Enhance scientific education and offer opportunities to participate in environmental health research for students at the state's Tribal colleges

Research Projects

- Infectious diseases
  - Genetic analysis of biofilm formation in *Candida*
  - Characterizing the secretory pathway of *Candida albicans*
  - Understanding environmental factors in human risk to SNV
  - Factors affecting hantavirus transmission
  - Novel anti-infectious agents from mine waste microbes
  - Prion protein conversion in chronic wasting disease
  - Mycobacteriophage characterization
  - Isolation of molecules that inhibit pathways regulating cell polarity in yeast
- Environmental Health
  - Health risks from environmental contamination
  - Fate of personal care products discharged in sewage

Resources

- Proteomics and biological mass spectrometer facility
- Laser capture microdissection and functional genomics facility
- Environmental chemistry laboratory
- Bioinformatics teaching and research facility
- Electron microscopy facility
- Advanced confocal imaging facility
- Center for Computational Biology data analysis facility
- High performance computing
- Molecular computational core facility (UM-Missoula)
- NMR facility
- Macromolecular crystallography facility
- Veterinary molecular biology bioinformatics facility
- Veterinary molecular biology DNA sequencing facility
- Veterinary molecular biology flow cytometry facility
- Veterinary molecular biology histopathology laboratory

Index Terms

epidemiology, pathogenesis, infectious diseases, environmental health, *Candida*, hantavirus, biodefense, antibiotics, prion diseases, neuroscience, biofilms, minority education, water quality, mycology, bioinformatics

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Nebraska

Nebraska Research Network in Functional Genomics
University of Nebraska Medical Center - P20 RR016469

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Partner Institutions
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Creighton University Medical Center, Omaha
Doane College, Crete
Nebraska Wesleyan University, Lincoln
University of Nebraska, Kearney
University of Nebraska, Lincoln
University of Nebraska, Omaha
Wayne State College

Outreach Institutions
Chadron State College, Chadron
Little Priest Community College, Winnebago
Western Nebraska Community College, Scottsbluff

Program Goals
- Establish a multidisciplinary research network with scientific themes of cell signaling, infectious disease, and neuroscience
- 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

Research Projects
- Cell signaling
  - Transcriptional regulation of the N-cadherin gene

- Cell signaling associated with the latent membrane protein (LMP-1) that is involved in EBV infection
- A combinatorial approach to colorimetric drug sensors
- The role of riboswitches in the regulation of gene expression
- Structural characterization of the cpr gene cluster
- *Paramecium bursaria* chlorella virus (PBCV-1)
- Dietary modulation of protein kinase C expression in the intestinal epithelium and its relationship to the development of colon cancer
- Cell signaling and mechanical properties of individual cells in osteogenesis
- Microbial inhabitants of Nebraska wetlands
- The structural role of non-collagenous proteins in bone
- CCR4-NOT coactivators post-transcription functions
- Type III chaperones in the type III protein secretion system of *Pseudomonas syringae*
- TLR3 signaling in pulmonary mucosal epithelial cells

- Infectious diseases
  - Interaction between viruses and host cells
  - Characterization of a novel transcriptional suppressor, OTK18
  - Disease resistance response in *Arabidopsis* to infection by turnip crinkle virus
  - Structure and function of internal ribosome entry sites in viral genomes
  - Basis for virulence in high and low virulent strains of *Listeria*
  - Innate immunity of damselflies to parasitism
- Neuroscience
  - Gene expression during development of the neural crest

Resources

- Molecular modeling core facility
- Bioinformatics core research facilities
- Mass spectrometry proteomics core facility
- Genetic sequence analysis facility
- Peptide chemistry core facility
- cDNA microarray core facility
- Mouse genome engineering facility
- Mammalian cell culture facility
- Histology facility
- Center for human molecular genetics core laboratories
- Molecular biology core facilities
- Laser-scanning microscope imaging facility
- Flow cytometry core facility

Index Terms

cell signaling, infectious diseases, neuroscience, genomics, proteomics, cancer, colon cancer, bone, bacteria, ecosystems, heart disease, exercise training, myocardial infarction, virus, HIV, immune response, respiratory infections, antibiotics, drug discovery, diabetes, minority education

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Nevada

IDEA Network of Biomedical Research Excellence
University of Nevada School of Medicine - P20 RR016464

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Partner Institutions
Nevada Cancer Institute
University of Nevada, Las Vegas
University of Nevada, Reno

Outreach Institutions
College of Southern Nevada
Great Basin College
Truckee Meadows Community College
Western Nevada Community College

Program Goals
- Increase the success of Nevada researchers in competing for biomedical grant awards and expand total extramural funding in the state
- Increase the number of multi-investigator, interdisciplinary, and inter-institutional grant awards in Nevada
- Promote the careers of selected target faculty working at the partner institutions through the funding of two- to three-year seed projects, which will allow them to establish their research programs and collect data for subsequent submission of grant proposals
- Promote the development of the Nevada Cancer Institute by establishing programmatic, training, and shared instrumentation facility linkages with UNSOM, UNR, and UNLV through the INBRE
- Promote bioinformatics research and training at all three research institutions in the network through the further development of the Nevada Bioinformatics Center
- Maintain and enhance technology core facilities in genomics, proteomics, cytometry, and imaging that support researchers throughout the state
- Position the Nevada bioinformatics, genomics, and proteomics cores as regional resources for the western IDeA states
- Increase the number of Nevada undergraduates involved in biomedical research and increase the number and quality of Nevada undergraduates entering graduate school and professional schools in health science related fields

- Increase the number of Nevada undergraduates interested in biomedical research careers by improving the effectiveness of our community colleges as feeder institutions for biomedical-related academic majors programs at the universities

Research Projects

- The role of arginine methylation in modulating biomolecular interactions
- Function of CP190 in chromatin insulators
- Transcription associated mutagenesis in cells under conditions of arrested growth
- Roles and regulation of a *Shigella* protease, IcsP
- Fetal to adult B-cell developmental switch and a new method for B-CLL diagnosis
- Roles of p24 proteins in glycosylation and extracellular signaling pathways
- Role of mitochondrial carrier homologues (MtCH) in apoptosis regulation and carcinogenesis
- The role of Notch In adult neuroplasticity
- Senescence signaling through p53
- Novel extracellular proteins in axon guidance
- Functional analysis of SALL4 in hematopoietic differentiation and leukemogenesis
- ischemia in hibernators
- Graft versus host disease and anti-tumor activity

Resources

- Bioinformatics core
- Proteomics core
- Flow cytometry core
- Imaging core
- Histology core
- Central services core

Index Terms

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

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New Mexico

New Mexico IDeA Networks of Biomedical Research Excellence
New Mexico State University, Las Cruces - P20 RR016480

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Partner Institutions
Eastern New Mexico University, Portales
National Center for Genome Resources, Santa Fe
New Mexico Highlands University, Las Vegas
New Mexico Institute of Mining & Technology, Socorro
University of New Mexico, Albuquerque

Outreach Institutions
Diné College, Shiprock
San Juan Community College, Farmington
University of New Mexico - Gallup
Western New Mexico University, Silver City

Program Goals
- Increase the scope of the science and research cores at the two lead research and educational institutions in New Mexico
- Develop research capacity in the thematic areas of structure and function of biomolecules, complex physiological processes in cells and organisms, and pathogens and infectious disease processes
- Build and enhance the biomedical research base through faculty development
- Establish an outreach program for students at four-year baccalaureate, Tribal and community colleges to foster interest in biomedical research education
- Initiate a partnership with the National Center for Genome Resources for bioinformatics training and research
- Provide interactive communications, technical expertise, and data management and analysis tools to all program participants

Research Projects
- Structure and function of biomolecules
  - Structural studies on the role of zinc in bacterial proliferation
  - Protein structure-function in gastric microbial pathogenesis
  - Functions of apolipoproteins in cancer apoptosis

    - Elucidation of the pancratistatin cytotoxic pharmacophore
    - Glycosphingolipid-enriched microdomains in cancer cell invasion
    - ICAM-1 mimics as LFA-1 Inhibitor
    - Structural and dynamic analysis of proteins in neuron cell motility
    - Development of nanoparticles w/ photon upconverting property for cancer detection
- Cell and organism
    - Molecular biology of steroid receptor in *xenopus* oocytes
    - Characterization of Mob1 dynamics in living cells
    - To investigate the pharmacology of the mushroom bodies
    - Gene expression patterns during spermatogenesis
    - Markers of prostate cancer progression: a telomere-based proteomic approach
- Pathogens
    - Regulation of multi-drug resistance in *S. aureus*
    - Evolutionary consequences of dengue virus emergence
    - Bacterial antibiotic resistance in agriculture
    - Role of stress granule formation in mediating viral infection

Resources

- Cell and organism core facility, New Mexico State University
- Mass spectrometry core facility, University of New Mexico
- Bioinformatics core

Index Terms

biomolecules, hypertension, memory, cell division, reproduction, pathogens, immunology, inflammation, biodefense, cell biology, organismal biology, antibiotics, cancer, drug resistance, bacteria, dengue fever, *Staphylococcus* infection, minority education, cardiovascular disease, infectious diseases, zinc, gene expression, prostate cancer markers, spermatogenesis, ICAM-1, neuron cell motility

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North Dakota

North Dakota INBRE: Health and the Environment
University of North Dakota School of Medicine and Health Sciences, Grand Forks - P20 RR016471

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Partner Institutions
Dickinson State University, Dickinson
Mayville State University, Mayville
Minot State University, Minot
North Dakota State University, Fargo
Valley City State University, Valley City

Outreach Institutions
North Dakota Association of Tribal Colleges, Bismarck
Turtle Mountain Community College, Belcourt

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 six predominantly undergraduate institutions (PUIs)
- Increase the number of students from PUIs who choose to pursue advanced training in the biomedical sciences
- Empower Tribal colleges to strengthen their introductory science curricula to increase the number and level of preparation of Tribal college students transferring to four-year science programs
- Enhance bioinformatics core facilities to provide computational resources and increase state-wide access to electronic resources for biomedical research
- Enhance existing proteomics and biology core facilities at the research universities to make them sustainable and effective training and service centers for the scientific network
- Develop research programs at the PUIs, with a thematic research focus in health and the environment; with three sub-themes: pesticides and non-mammalian biomarkers; nutrition, growth, and development; and genetic factors

Research Projects

- Pesticides and non-mammalian biomarkers
  - Functional genomics of endocrine disruption
  - Determining aquatic bioindicators for atrazine
  - Effect of MCPA, 2,4 D and bromoxynil on lung development
  - Discovery and development of new anti-fungal drugs
- Nutrition, growth and development
  - Copper deficiency and ocular health
  - Anticancer mechanisms of lycopene action
  - Novel fluorescence methods for biomedical applications (overlaps with genetic factors research theme)
- Genetic factors
  - Analysis of MLL translocations and fusion genes
  - Genetic polymorphisms and pre-eclampsia

Resources

- Bioinformatics core facilities
- Proteomics core facility
- Cell biology center
- Nucleic acid analysis facility
- Biology core facility

Index Terms

cancer, drug discovery, environmental health, molecular biology, toxicology, genomics, anti-fungal drugs, eclampsia, pregnancy, eyes, pesticides, lungs, lycopene, tomatoes, nutrition, anti-carcinogens, copper deficiency, hormones, minority education, women's health

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Oklahoma

Oklahoma IDeA Network of Biomedical Research Excellence
University of Oklahoma Health Sciences Center, Oklahoma City - P20 RR016478

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Partner Institutions
Cameron University, Lawton
Langston University, Langston
Northeastern State University, Tahlequah and Broken Arrow Campuses
Oklahoma Medical Research Foundation, Oklahoma City
Oklahoma State University, Stillwater
Southeastern Oklahoma State University, Durant
Southwestern Oklahoma State University, Weatherford
University of Central Oklahoma, Edmond
University of Oklahoma - Norman

Outreach Institutions
Comanche Nation College, Lawton
Oklahoma City Community College, Oklahoma City
Redlands Community College, El Reno
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 neuroscience
- Enhance opportunities for investigators at the lead institutions and partner undergraduate institutions to develop independent research programs
- Encourage and mentor participating investigators to develop new NIH grant applications within eighteen months
- 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

- Develop a new core facility for functional magnetic resonance imaging in animal research to support statewide research initiatives in cancer and neuroscience

Research Projects
- Regulation of chinergic function in *caenorhabditis elegans*
- Characterization of NAG expression and functions
- Novel siderophores produced by marine bacteria and fungi
- Development and screening of transition metal complexes as CXCR4 antagonists
- Mechanisms of synchronication: vestigial paths to urea cycle deficiencies
- MRI-guided photoimmunotherapy
- Diplochromosomes: origins and segregation behavior
- *In vivo* localization of anthrax toxins by magnetic resonance imaging
- Regulation of mismatch repair in *Streptoccocus pyogenes*
- The role of MMS19 in DNA repair and transcription

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, neuroscience, genomics, bacteria, nutrition, *Streptococcus*, brain, minority education

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Puerto Rico

Advancing Competitive Biomedical Research in Puerto Rico
University of Puerto Rico, San Juan - P20 RR016470

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Partner Institutions
Inter American University of Puerto Rico - Bayamon
Ponce School of Medicine
Universidad Central del Caribe, Bayamon
Universidad Metropolitana, San Juan
University of Puerto Rico - Humacao Campus
University of Puerto Rico - Mayaguez Campus
University of Puerto Rico - Rio Piedras Campus
University of Puerto Rico School of Medicine, San Juan
University of Turabo, Gurabo

Outreach Institutions
Carlos Albizu University, San Juan
Inter American University of Puerto Rico - Metropolitan Campus, Rio Piedras
Pontifical Catholic University of Puerto Rico, Ponce
Universidad del Este, Carolina
University of Puerto Rico - Bayamon
University of Puerto Rico - Cayey Campus

Program Goals
- Strengthen the scientific infrastructure and research competitiveness of Puerto Rico by creating the Alliance for the Advancement of Biomedical Research Excellence
- Develop research strengths in the areas of neuroscience, drug design and delivery, and molecular medicine
- Elevate the productivity, competitiveness, and number of human resources needed to attract established investigators in these key research areas
- Promote the development of research skills of talented junior investigators and gifted students
- Establish an administrative core, bioinformatics core, research core, and outreach core to promote the activities in the research areas
- Provide access to technical expertise and data analysis tools for researchers through their high performance computing facility
- Support key resources through a DNA sequencing and multilocus genotyping facility, a proteomics facility, and an access to biomedical electronic scientific informatics project

- Create programs for junior researchers, graduate and undergraduate students to support research and professional development

Research Projects

- Neuroscience
  - Localization of substance P and acetylcholine in the pathway mediating mucociliary activity
  - New methodologies for the synthesis of amino derivatives as nicotinic receptor agonists (also within drug design and delivery research theme)
- Drug design and delivery
  - DNA interaction and mutational activity of novel benzazolo[3,2-a] quinolinium salts anticancer drugs
  - Potentially bioactive metabolites from tropical fungi
  - Synthesis, characterization, anticancer activity and reactivity toward biological targets of new platinum (II) complexes
  - Photosensitized reduction and DNA alkylation of alkylating quinones and nitroarenes
  - Study of the underlying factors that shape enzyme properties in organic solvents
  - Molecular studies of proteins encapsulated in soft materials
- Molecular medicine
  - Identification and expression analysis of ABC genes in *Plasmodium yoelii*
  - Cell cycle changes in the galactosemic lens
  - Photochemistry and bioactivity of polycyclic aromatic hydrocarbons adsorbed on model surfaces

Resources

- High performance computing facility
- DNA sequencing and multilocus genotyping facility
- Proteomics facility
- Zoological museum
- Herbarium and greenhouse
- Animal care facility
- Microarray facility
- Molecular biology and gene characterization facilities
- Tissue and cell culture facilities
- NMR facility
- Biotesting facility
- Laser and spectroscopy facility
- X-ray crystallography facility
- Mass spectrometry facility
- Surface microscopy and spectroscopy facility
- Time resolved-resonance raman spectroscopy facility
- Automated synthesis and sequencing facility
- Molecular neurobiology laboratory
- Caribbean Primate Research Center
- Visualization laboratory
- Flow cytometry facility

Index Terms

neuroscience, drug design, drug delivery, molecular medicine, genomics, proteomics, eyes, cancer, anticancer drugs, biotechnology, malaria, drug resistance, cataract, hyperglycemia, tuberculosis, carcinogens, pollutants, asthma, sinusitis, cystic fibrosis, bronchitis, artificial blood, minority education, environmental health

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Rhode Island

Rhode Island Network for Molecular Toxicology
University of Rhode Island, Kingston - P20 RR016457

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Partner Institutions
Brown University, Providence
Providence College, Providence
Rhode Island College, Providence
Roger Williams University, Bristol
Salve Regina University, Newport

Outreach Institutions
City Campus, Providence
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 molecular toxicology, cell biology, and environmental health
- 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 mutual interest to Network participants

Research Projects
- Molecular toxicology
  - Maintaining DNA replication fork stability: role of the fanconi anemia pathway

    - Modulation of D2-like dopamine receptor-mediated striatal signaling pathways byRGS-2
    - Role partitioning by aryl hydrocarbon receptors (AHR) in cell regulation and toxicity
    - Reservatrol induction of gene expression via activation of CAR and NRF2
    - Constitutive androstane receptor (CAR) activation and intracellular transport
    - Characterization of pyrethroids on sperm voltage-sensitive calcium channels
    - Cell signaling leading to UV-induced cell injury
    - Genome stability through bloom syndrome helicase and Rad51 complex formation
    - Nanomaterial-based bioelectronic detection of disease markers
- Cell biology
    - *E. Hystolica* EhADH2 enzyme as anti-amoebic target
    - Molecular and biochemical characterization of a secreted lipase in leishmania
    - Genetic and molecular analysis of aging and apoptosis in the yeast, *saccharomyces*
    - The role of alternative splicing of UFD2a in differentiation
- Environmental health
    - Mercury contaminants in commercial and recreational finfish of Narragansett Bay, Rhode Island

Resources

- Centralized research facility core
    - proteomics
    - genomics
    - cell biology
    - histology & imaging
    - spectrometry
    - radioactivity detection
    - elemental analysis
- DNA sequencing facility
- Animal care facility
- NMR facility
- Electron microscopy facilities
- Zebrafish breeding colony
- Bioinformatic core facility
- Transgenic mouse facility

Index Terms

toxicology, environmental health, cell biology, proteomics, genomics, cancer, mutagenesis, male reproductive health, Amoebiosis, Leishmaniosis, heavy metals, pesticides, Ah receptor, cell signaling, skin cancer, ultraviolet radiation, nanotechnology, biomarkers, minority education, undergraduate research

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South Carolina

South Carolina IDeA Networks of Biomedical Research Excellence
University of South Carolina - P20 RR16461

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Partner Institutions

Comprehensive Research Universities
- Clemson University
- Medical University of South Carolina
- University of South Carolina

Primarily Undergraduate Institutions
- Claflin University
- College of Charleston
- Furman University
- Winthrop University

Outreach Institutions

- Allen University
- Anderson University
- Benedict College
- Bob Jones University
- Charleston Southern University
- The Citadel
- Coastal Carolina University
- Coker College
- Columbia College
- Converse College
- Erskine College
- Francis Marion University
- Lander University
- Limestone College
- Morris College
- Newberry College
- Presbyterian College
- South Carolina State University
- Southern Wesleyan University
- University of South Carolina - Aiken
- University of South Carolina - Beaufort
- University of South Carolina - Upstate
- Voorhees College
- Wofford College

Program Goals

- Develop South Carolina's biomedical research capacity through support of multi-disciplinary, multi-institutional and complementary research programs in the thematic areas of Regenerative Medicine, including biomaterials, tissue engineering, and stem cell technology
- Develop research and educational programs for undergraduate students in the related disciplines of biochemistry, bioengineering, biotechnology, and cell, molecular, and developmental biology
- Strengthen the network of inter-institutional research collaborations established under the BRIN Program
- Recruit faculty, postdoctoral fellows, and technical personnel to build capacity and strengthen infrastructure for biomedical research
- Acquire state-of-the-art instrumentation and develop core facilities for support of biomedical research

- Provide effective mentoring for target faculty to promote their success in biomedical research
- Engage undergraduate students in research throughout their academic careers as a mechanism to enhance their interest and competence in biomedical research
- Reach out to minority faculty and students at academic institutions throughout the state in order to expand participation in biomedical research experiences
- Develop statewide bioinformatics capacity, with emphasis on training programs and access to hardware

Research Projects

- Role of zinc in pathogenesis of prostate cancer
- Development of SNP human identification technology
- Cloning and expression of Flap endonuclease from hyperthermophilic *Archaeoglobus fulgidus*
- Production of edible vaccines using transgenic plant technology
- Role of Mir-1 in control of mouse embryonic stem cell differentiation into vascular smooth muscle cells
- PLGEOF nanoparticles conjugated with αvβ3 integrin-binding ligand for targeted tumor delivery
- Detection of active forms of the amyloid-β protein for early diagnosis of Alzheimer's disease
- 3-dimensional model for *in vitro* cartilage development
- Measurement of platelet response to adsorbed fibrinogen and albumin
- Fragment size-specific effects of HA on endothelial cell (EC) phenotype and responses
- Preparation of vascular grafts from purified aortic elastin
- Periostin regulation of proliferation, migration and apoptosis of post-EMT cushion cells
- Effect of adsorption on protein secondary structure using circular dichroism (CD)
- Epithelial-dependent antibody interactions at the intestinal surface
- Bone marrow derived progenitor cell recruitment to the large intestine
- Distribution of phospholipase Cβ4 in the circadian clock of the mouse brain
- Study of myocyte- and stem cell-augmented repair mechanisms *in vitro*
- Periostin as a signaling protein that promotes fibrogenesis in the adult and neonatal mouse heart
- Structural studies of recombinant human adiponectin membrane receptor 1 and 2
- Pharmacologic properties of aryl hydrocarbon receptor (AHR) ligands in murine and human cell models
- Impact of adult attachment style on cardiovascular and HPA axis reactivity to stress

Resources

Plant biotechnology lab and South Carolina Center for Biotechnology (DNA sequencing) - USC
Cell culture facilities - Clemson
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
USC School of Medicine Instrumentation Resource Facility (IRF) - USC
Life Science Biology and Biomedical Research Center - Winthrop
Sims Chemistry and Biochemistry Research Center - Winthrop
Stem cell core laboratories - MUSC

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

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South Dakota

South Dakota Biomedical Research Infrastructure Network
University of South Dakota, Vermilion - P20 RR016479

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http://www.usd.edu/brin/home.htm

Partner Institutions
Augustana College, Sioux Falls
Black Hills State University, Spearfish
Dakota Wesleyan University, Mitchell
Mount Marty College, Yankton
University of Sioux Falls, Sioux Falls
University of South Dakota School of Medicine, Vermillion

Outreach Institutions
Sinte Gleske University, Mission
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

- Environmental and chemical
  - Aeroallergenic fungi in the Black Hills
  - Defense related genes in solanaceous plant
  - Infection of eggs of rainbow trout with *Flavobacterium columnare*
  - Characterization of virus-induced cell death genes in *Nicotiana*
  - Modeling aromatic hydrate and ammonium ion in AChE
  - Plant genome research
  - Mechanisms of mouse hepatitis virus host range expansion
  - Chemical sensor based on dopamine molecular imprinted polymers
  - DNA barcoding of Black Hills arachnids
  - Characterization of prion gene in *Bison bison*
  - Functional genomics in relatives of *Arabidopsis thaliana*
  - Comparative phylogeography of pine-oak birds
  - Rational drug design for giardiasis
  - Identification of chromosome arms in gene expression of wheat HMW glutenins
  - Thiamine influence in walleye productions and Chinook salmon embryos
- Developmental and psychological
  - The origin of chordate segmentation
  - Transcriptional regulation of chromatin
  - Gustatory centers in the Zebrafish brain
  - Testing cognitive models on a decision-making task
- Causes and treatments of diseases/conditions
  - Obesity, decreased fertility, and leptin resistance in lethal yellow mouse
  - Synthesis of novel precursors to proposed antibacterial agents
  - Characterization and localization of the breast cancer gene BASE
  - Genetic mechanism of interspecies communication between dental plaque bacteria
  - Effect of PKD1 and Beta-catenin on proliferation of prostate cancer cells
  - Elucidating signaling mechanisms in platelets and megakaryocytes
  - Neurohumoral control of cardiovascular functions
  - Virulence gene regulation in *Staphylococcus*
  - Assessing potential medicinal plants for treatment of type II diabetes mellitus
  - Examination of changes in aerobic and anaerobic denitrification performed by *Pseudomonas aeruginosa*
  - Anti-ovarian cancer properties of RU-486
  - Staphylococcal biofilm formation in response to environmental stress factors
  - Bacterial pathogenesis of *Streptococcus pyogenes*
  - Physiological genomics and signal transduction of the ovary
  - Biological variability in omega-3 index
  - Omega-3 fatty acids, aspirin, and platelet function
  - Naphthalimide-modified chitosan materials to create biodegradable films
  - Pathogenesis of obesity-linked kidney disease
  - Kidney NMDA receptor function in normal and disease models
  - Characterization of repair genes in *Chlamydomonas reinhardtii*
  - Corticotropin releasing factor in central nucleus of amygdala in stress
  - Can a subunit of the 20s proteosome complex be conditionally individually overexpressed

Resources

- Proteomics core facility
- Genomics core facility
- DNA sequencing and genotyping core facility

Index Terms

cell growth, proteomics, genomics, cell signaling, bacteria, environmental biology, obesity, prion diseases, *Staphylococcus*, antibiotic resistance, infectious diseases, nutrition, oncology, cancer, gynecology, *Streptococcus*, toxic shock syndrome, rheumatic heart disease, autoimmune disorders, blood pressure regulation, pregnancy, women's health, reproductive hormones, minority education, cardiovascular disease, biofilms, omega-3 fatty acids, leptin resistance, diabetes mellitus, dental plaque

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Vermont

Vermont Genetics Network
University of Vermont, Burlington - P20 RR016462

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Partner Institutions
Castleton State College, Castleton
Johnson State College, Johnson
Middlebury College, Middlebury
Norwich University, Northfield
Saint Michael's College, Colchester

Outreach Institutions
Bennington College, Bennington
Burlington College, Burlington
Castleton State College, Castleton
Champlain College, Burlington
Community College of Vermont, Statewide
Green Mountain College, Poultney
Johnson State College, Johnson
Landmark College, Putney
Lyndon State College, Lyndonville
Marlboro College, Marlboro
Middlebury College, Middlebury
Norwich University, Northfield
Saint Michael's College, Colchester
Southern Vermont College, Bennington
Sterling College, Craftsbury Common
University of Vermont, Burlington
Vermont Technical College, Randolph Center

Program Goals
- Build a culture of research at the baccalaureate partner institutions that will be sustained
- Establish an outreach core
- Strengthen the research capacity and critical mass of genetics biomedical researchers at the lead institution, the University of Vermont, as a resource for the entire state
- Assess the progress of the VGN through longitudinal studies

Research Projects

- Chemistry
  - Synthesis of chiral 1.2 diamines via asymmetric addition of RLi to 1.2-diimines
  - The mechanism of ethylene regulation of photoperiodic flowering in plants
  - The glycation of heme proteins by ribose 5-phosphate
  - New chemical tools for the quantitative assessment of biological metabolomes
- Human physiology
  - Exercise intensity effects on appetite in middle-aged women
  - Baseline airway mechanical function and airway function during exercise in asthma
  - Psychomotor stimulant induced sensitization of impulsive behavior
- Molecular biology
  - Hormonal and leukocyte responses after different resistance exercise protocols
  - effects of testosterone on adult neurogenesis in the dentate gyrus
- Psychology
  - Perception of threat in military veterans, cadets, and civilians

Resources

- Microarray facility
- Proteomics facility
- Bioinformatics core
- Imaging facility (COBRE)
- molecular biology facility (COBRE)
- Vermont Cancer Center
- Structural biology - x-ray crystallography
- Life science computing center
- Clinical research facility
- Animal facility, College of Medicine, UVM
- Mass spectroscopy facility
- UVM Internet2

Index Terms

genetics, microarray, proteomics, outreach, diversity, cancer, biological sequence analysis, middleware, groupware

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West Virginia

West Virginia IDeA Networks of Biomedical Research Excellence
Marshall University School of Medicine, Huntington - P20 RR016477

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http://www.wv-inbre.net/

Partner Institutions
Alderson-Broaddus College, Philippi
Charleston Area Medical Center, Charleston
Fairmont State University, Fairmont
Valley Health Systems (ACoRN)
West Liberty State College, West Liberty
West Virginia State University, Institute
West Virginia University, Morgantown
Wheeling Jesuit University, Wheeling

Outreach Institutions
Bethany College, Bethany
Bluefield State College, Bluefield
Concord University, Athens
Davis and Elkins College, Elkins
Glenville State College, Glenville
Mountain State University, Beckley
Salem International University, Salem
Shepherd College, Shepherdstown
University of Charleston, Charleston
West Virginia Wesleyan College, Buckhannon

Program Goals
- Build on the foundation of the successful network of biomedical research and teaching institutions established in West Virginia through the BRIN Program
- Create a multidisciplinary research theme for this network in cellular and molecular biology, with an emphasis on cardiovascular disease
- Establish a programmatic structure to facilitate the research progress, mentorship and training, and career development, of scientists and students at the network institutions

- Expand the scope of the Appalachian Cardiovascular Research Network (ACoRN) developed during the West Virginia BRIN Program
- Provide research opportunities for undergraduate students that will serve as a pipeline into health-related research careers
- Develop activities to advance the outreach institutions to the level of participation of the partner institutions
- Enhance the science and technology knowledge base of the West Virginia workforce through providing workshops, seminars, research training and mentoring, and access to state-of-the-art core facilities

Research Projects

- Effect of statins on inflammatory response in human aortic endothelial cells (HAEC)
- Genetic basis for familial hyperlipidemia (FCHL)
- Integrin regulation of cell death in cancer cells
- Dapsone activation of CYP2C9: a molecular modeling study
- Response of vascular smooth muscle cells to stretch
- AFAP-110 as a regulator of angiogenesis
- Signaling pathways in apigenin-inhibiting tumor growth
- Homocysteine metabolism genes and homocysteine-induced apoptosis in human umbilical vein endothelial cells

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, proteomics, genomics, imaging, computational chemistry, fat metabolism, genetics

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Wyoming

UW Northern Rockies Regional INBRE
University of Wyoming, Laramie - P20 RR016474

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http://www.uwyo.edu/inbre/

Partner Institutions
Casper College, Casper
Central Wyoming College, Riverton
Northwest Community College, Powell
Sheridan College, Sheridan
Western Wyoming Community College, Rock Springs

Outreach Institutions
Eastern Wyoming College, Torrington
Laramie County Community College, Cheyenne

Program Goals
- Continue to build on accomplishments achieved as a result of the BRIN Program
- Increase the competitiveness of Wyoming investigators in obtaining funding from NIH within five years
- Develop research in the themes of integrative physiology, fertility and women's health, and health outcomes in rural populations
- Establish a multidisciplinary research network that will build and strengthen biomedical research expertise and infrastructure at the University of Wyoming and its partner institutions
- Provide role models and build links to other institutions by creating a visiting senior scientist program in which well-established, internationally-recognized scientists will spend three to twelve months at the University of Wyoming
- Provide research support to faculty, postdoctoral fellows and graduate students
- Provide additional 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
- Fertility and women's health
  - Vitamin E, ovarian cancer, and fertility

    - Targeted fast-release nanoparticles for ovarian cancer
- Integrative physiology
    - Maternal undernutrition programs and fetal heart gene expression
    - Placentomal vascular adaptations to early maternal nutrient restriction in the ewe
    - Aging and ventricular dysfunction
    - Lineage-specific processes of evolution
    - *C.elegans* as a model to study viral anti-apoptotic genes
    - Neurological basis for postpartum depression
    - Motor control across speech sub-systems: respiration, phonation and lips
- Community–based participatory research
    - Community-focused health and bio-physiological research

Resources
- Bioinformatics core facility
- Imaging/ microscopy core facility
- Center for Rural Health Research and Education (CRHRE)

Index Terms
integrative physiology, fertility, women's health, public health, ovarian cancer, cancer, nutrition, genomics, cell signaling, rural health, placental development

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