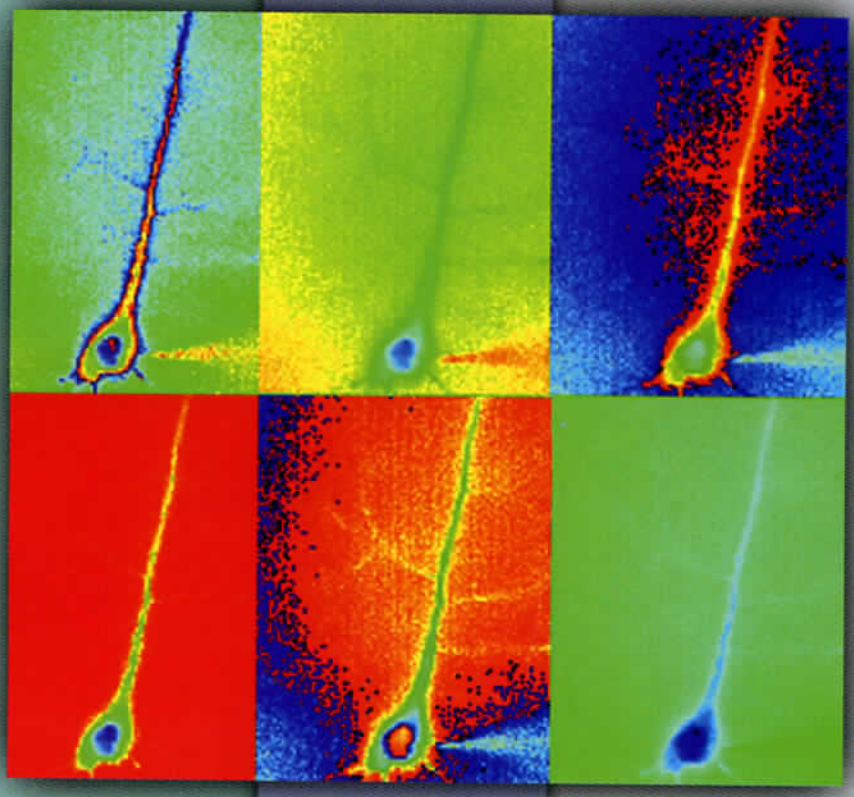
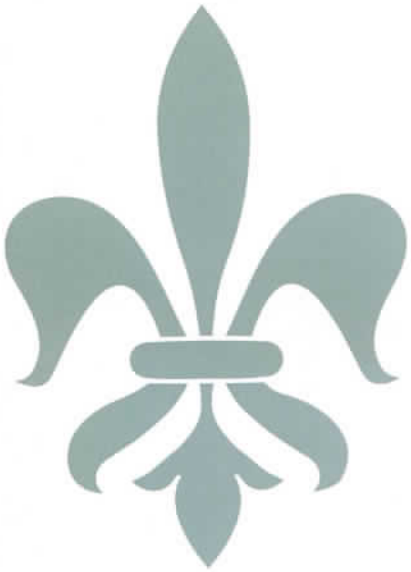
Louisiana State University Health Sciences Center

The Interdisciplinary Neuroscience Graduate Program

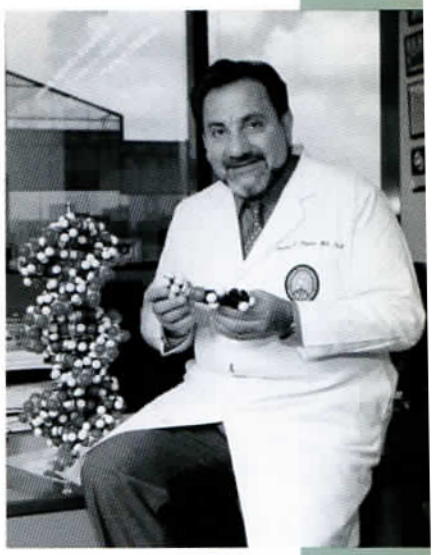


New Orleans

The Neuroscience Center of Excellence



The Neuroscience Center of Excellence



Nicolas G. Bazan, M.D., Ph.D.
Director
LSU Neuroscience Center of Excellence

In introducing the Interdisciplinary PhD Program in the Neurosciences, I would like to provide prospective applicants with an overview of the nature of the Louisiana State University Health Sciences Center, Neuroscience Center of Excellence. The Neuroscience Center is the hub of the PhD training program and, during the past decade, it has become a driving force behind the development of the neurosciences at the LSU Health Sciences Center. Since 1998, the Center's headquarters occupy 38,000 ft^2 of well equipped, new research space. Several new faculty members recruited by the center and jointly appointed with various departments have offices and laboratories in the new space. In addition, some clinical neuroscientists' offices and/or laboratories are housed here, as well. However, most members of the Neuroscience Center occupy space in other, nearby buildings. Yet even as the "headquarters" expands in the future, the mission will continue to be to promote interactions between all neuroscientists, to facilitate and stimulate interdisciplinary research between neurobiologists and clinical neuroscientists, to foster research collaborations that enhance research productivity and provide a solid foundation for program projects and the like. Overall, the mission of the Center is to contribute to the creation of an environment of high standards, where investigations on the nervous system and the diseases which affect it are conducted. To this end, the identification and recruitment of outstanding faculty to build a critical mass of expertise is already a tangible asset.

To effectively bridge neurobiology with the clinical neurosciences, the Neuroscience Center promotes collaborative research and actively fosters communication between the diverse disciplines. One means of achieving this goal is a faculty development program initiated in 1991 to assist faculty through incentive grants, as well as bridge funding. Furthermore, the Neuroscience Center since 1991 provides expert and very valuable assistance in grantsmanship to neuroscience investigators. The Brain Tissue Bank established in 1992 enables basic scientists and clinicians to directly study the human brain.

Community outreach programs are a major activity of the center. The Center conducts yearly Brain Awareness Week programs (since 1994) for school children and adults to educate the public about brain diseases.

The summer undergraduate neuroscience (SUN) program offers Louisiana's undergraduate students hands-on-experiences in laboratory research and education in the neurosciences since 1994, with the goal of instilling an interest in medicine and research as a career. To foster a highly interactive atmosphere, the Center organizes an Annual Retreat, a Faculty Advance, seminars and lectures, focused group discussions, Advisory Committee Meetings, etc. Graduate Students are active participants of most of these activities.

In my own laboratory, we recently began exploring signaling of gene expression in Alzheimer's Disease to uncover potential therapeutic strategies to slow down neurodegeneration. In spite of our own contributions in this area and that of others, it will be several years until these research findings are applicable to Alzheimer's patients. To make a difference now, we envisioned a daycare center for underserved Alzehimer's Disease patients. Included in this program would be an active caregiver support program through which family members caring for these patients would be prepared to cope with and understand the nature of this disease. This comprehensive program would help the patient, while assisting caregivers in managing the anxiety and other consequences of caring for a loved one afflicted with this devastating disease. We are fortunate that the Daughters of Charity Foundation (St. Louis, MO) has funded our proposal for this program. The Neuroscience Center has devoted a major effort in launching this community outreach service and will soon announce the opening of the program.

The Center is also contributing to the stimulation of economic development. The focus has been on discovering faulty cellular and molecular events in brain, spinal cord, retina and peripheral nerve diseases, which may be targets for novel therapeutic relevant drugs. To this end, in 1993, the Center established a collaborative agreement with an outstanding team of organic chemists at the Universidad de Alcala, Spain, to apply combinatorial chemistry and other advanced approaches to design new chemical that may become drugs. Thus far, several families of new drugs have been discovered based on this collaboration, two patents were obtained and several others are in progress. This wealth of new knowledge has allowed the Center to establish a strong drug discovery program with a powerful ally at the Universidad de Alcala.

In November, 1999, the Neuroscience Center will celebrate its 10th Anniversary. Since its inception, the Center has become a nucleus of academic excellence, attracting out-of-state businesses to New Orleans, as well as distinguished experts and private and federal funding to support its research. The goal of our interdisciplinary PhD program in the Neurosciences is to produce scientists who have areas of focus, yet are familiar with the full scope and potential of the neurosciences. In doing so, we aim to develop an appreciation for high-quality research, including translational research, to benefit those suffering from nervous system diseases.

I would like to take this opportunity to express my appreciation of the initiative of Drs. Iris Lindberg, Haydee Bazan and Mark Alliegro, in generating this wonderful brochure.

New Orleans area including
Louisiana State University Health Sciences Center Campus

Program of Study

The Interdisciplinary Neuroscience Training Program at Louisiana State University Medical Center is a multidisciplinary, interdepartmental program offering research training leading to the M.S. and Ph.D. degrees in brain science. Now in its seventh year, the program has approximately 15 students enrolled. About 35 faculty from both basic and clinical departments participate in the program. Research strengths range from behavioral and systems neuroscience to molecular neurobiology and genetics. As examples, faculty research programs focus upon such diverse topics as sensory processing, mechanisms of synaptic transmission and membrane excitability, protein trafficking, signal transduction and second messengers, and the molecular genetics of neurological disorders, to name a few.

The curriculum is designed to expose the student to a broad range of topics in the field. Required courses are investigative neuroscience, medical neuroscience, molecular neurobiology, and behavioral neuroscience. Students also take biochemistry, molecular biology, and biostatistics, and are encouraged to take cell biology and developmental neuroscience. An integral component of the program is the laboratory research rotation in which the student learns research techniques and problems in the laboratory of individual faculty during their first year of study. Neuroscience students also participate in the neuroscience seminar series and the Neuroscience Center retreat and the Greater New Orleans Chapter of the Society for Neuroscience.

Students enrolled in the program have come from all geographic regions of the U.S. as well as from other countries. Recent graduates have been offered postdoctoral positions at Harvard University and the Massachusetts Institute of Technology, attesting to the quality of training of the program. We anticipate further growth of the program in the future.

R. Ranney Mize, Ph.D. Co-Director
Interdisciplinary Neuroscience Training Progra

Financial Aid

Highly competitive stipends are available from the Neuroscience Center, individual departments, and the LSU Medical Center Graduate School. Fellowships from NIH, NSF, and the Howard Hughes Foundation are also available on a competitive basis. Tuition is paid for all students accepted into the program.

Core Facilities

The faculty are all located in modern buildings with state-of-the-art laboratories; most are located within adjacent 3 buildings at the Medical Center, but others are located at other institutions such as Ochsner Hospital and the University of New Orleans. The Medical Center Core Laboratories, which is a service facility, provides oligonucleotide and peptide synthesis and sequencing, amino acid analysis, mass spectrometry, flow cytometry, and phosphoimaging. Specialized biochemistry equipment, including HPLCs and FPLCs for protein and peptide analysis, PCR cyclers, ultracentrifuges, and many types of spectrophotometers, are available in faculty laboratories. Other multidisciplinary facilities include ultrastructure laboratories with electron microscopes and a Computer Imaging Center for three-dimensional modeling and reconstruction, confocal microscopy, and digital image analysis. The Neuroscience Center Cell Culture Facility grows ten different neuronal cell lines as well as a number of different neuroendocrine cell lines. Equipment for high-speed sequencing of DNA has recently been purchased by the Neuroscience Center. Extensive library facilities are available at the Medical Library of the Medical Center and the University Library at the University of New Orleans. A comprehensive Computer Services Center is available on the Medical Center campus.

Living and Housing Costs

The cost of living in the New Orleans area is generally below the national average. A recently remodeled dormitory with an exercise area and health facility is available on the Medical Campus. Living accommodations are also available in the historic Garden District, Uptown, and the Warehouse District, all of which offer distinctive Greek Revival and Victorian architecture. Student apartments can also be found in the French Quarter at reasonable cost. Health care is available on campus through the student Health Center of the LSU Medical School.

Student Group

Approximately 110 students are enrolled in the LSU Medical Center School of graduate studies. About 12-15 of these students are enrolled in the Neuroscience Program and train in graduate programs of the various basic science departments of the Medical Center. The Interdisciplinary Neuroscience Program accepts 4 students per year.

Applying

Applicants must hold a bachelor's degree or the equivalent thereof. Students should have taken courses in biology, chemistry, and mathematics; courses in physics and computer science are recommended. GRE scores of 1200 (combined quantitative and verbal scores) are required. The General Test of the Graduate Record Examinations is required and the Subject Test in any area of science is preferred. Admission is determined by test scores, grades, recommendations, a written statement of interest and goals, and a personal interview when possible.

Correspondence and Information

Please email the Recruitment Committee Chair, Dr. Iris Lindberg, at **ilindb@LSUMC** if you would like rapid additional information on the program.

Alternatively, visit our website at:

http://neuroscience.lsumc.edu/NCprogrm.html

or

write either:

Drs. Bazan and Mize in front of a picture of Dr. Robert Daniels, former Dean of the Medical School

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or
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New Orleans

As the mighty Mississippi River reaches the gulf on its journey to the sea, there lies a city so rich in culture and heritage that it has been dubbed "America's most exotic and international city." Centuries ago, French, Acadian, Spanish and American settlers came together to create what is now called New Orleans. This magical name conjures up images of history, architecture, food, drink, and fun in the minds of people throughout the world. At the heart of our city is the French Quarter, what we call the "Vieux Carre" or "old city." This 10 block square is a mosaic of colors, sounds, tastes, smells and feelings like no other place in the world. Nestled in the Mississippi River's crescent, the Quarter is a blend of old and new traditions, cultures and customs.

Steamboat approaching the Mississippi River Bridge

Each year New Orleans hosts numerous exciting events that bring international attention and participants. Some of the most well known events include Mardi Gras and The New Orleans Jazz and Heritage Festival; the French Quarter Festival and many more local festivals take place throughout the year. The City also hosts such cultural opportunities as the Louisiana Philharmonic Orchestra, the New Orleans Museum of Art, the Contemporary Arts Center, the Louisiana State Museum, and many historical homes and plantations. The New Orleans metropolitan area has a population of approximately 1.5 million people and is home to five major universities.

Jackson Square in the French Quarter

Despite its sprawling size, to its residents New Orleans is intimate and small-town, made up of dozens of neighborhoods where families have lived within the same blocks for generations. Red beans and rice are served throughout the city on Mondays, people visit the tombs of their departed on All Saints' Day, and from the smartest office to the most down-home local bar, folks are ready to celebrate anything at the drop of a hat. As they say in New Orleans, laissez les bons temps rouler—let the good times roll!

New Orleanians love their city—most of them wouldn't live anywhere else. They treasure custom and tradition, take in stride the heat of a semitropical climate, and look at life with a laid-back attitude that makes New Orleans a close cousin to her Caribbean neighbors.

The Mississippi River

Audubon Park, New Orleans

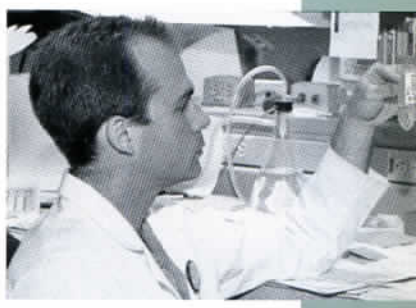
Graduate Faculty of the Interdisciplinary Neuroscience Center Graduate Program

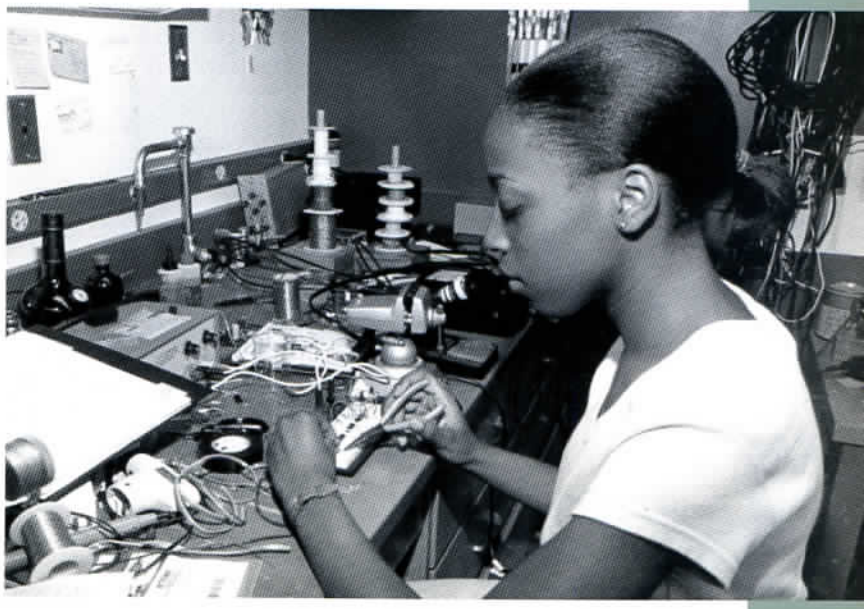
Mark Alliegro, Ph.D.
Endogenous lectins of retinal pigment epithelium
Associate Professor, Cell Biology, Anatomy and Neuroscience

Research in Dr. Alliegro's laboratory is concerned with the basic mechanisms of cell differentiation in development and disease. One model system studied is the sea urchin embryo. At the time of gastrulation, the embryo is converted from a simple, hollow ball of epithelial cells into a complex structure containing the three primary germ layers (endoderm, mesoderm, and ectoderm), and rudiments of the larval gut and skeleton. Dr. Alliegro's group focuses on the molecules and events that may be involved in specific aspects of this transition. Similar questions are addressed in mammalian systems using cultured vascular endothelial cells. A protein has been identified which may be involved in the process of capillary morphogenesis via control of endothelial cell proliferation and differentiation. A related molecule is being studied in retinal pigment epithelium for its possible involvement in proliferative eye disorders.

Rene Anand, Ph.D.
Molecular and cellular neurobiology of nicotinic acetylcholine receptors
Assistant Professor, Neurology and Neuroscience

Neurotransmitter-gated ion channels play a critical role in synaptic signaling in the central and peripheral nervous system. The research program in this laboratory is broadly focused on understanding the molecular architectures and functional roles of nicotinic acetylcholine-gated ion channels (AChRs). The long-term goals are to identify intracellular proteins associated with neuronal AChRs and to elucidate their structural and functional roles at cholinergic synapses in the central nervous system. The laboratory is using protein-protein interaction cloning strategies to identify proteins that interact with neuronal AChRs in vivo. The current goals are to fully characterize the interaction of these proteins with neuronal AChRs and elucidate the significance of these interactions in vivo. These studies will better our understanding of how ion channels are targeted to presynaptic or post synaptic endings of a neuron, what proteins mediate their clustering at synaptic subsites, and how this sublocalization might allow Ca2+ ions entering through these channels to activate specific intracellular signaling pathways. Long term research projects will involve gene knock out strategies to assess the vivo physiological roles of these proteins. This information will provide a molecular understanding of the roles of neuronal AChRs in addiction to nicotine, inherited human epileptic disorders and also as therapeutic targets for the symtomatic treatment of Alzheimer's disease, Parkinson's disease, Tourette's syndrome, schizophrenia, inflammatory bowel disease (ulcerative colitis) and chronic pain. A fundamental understanding of the functional roles of proteins associated with neuronal AChRs could provide novel targets for development of drugs useful for the treatment of many neurological diseases.





Mark A. Batzer, Ph.D.

Positional cloning of genes related to neuronal disorders

Associate Professor, Pathology, Biochemistry and Molecular Biology and Neuroscience

This laboratory is interested in the study of human genetic variation and the identification of the genes responsible for several genetic disorders. Studies of human genetic variation involve the analysis of different types of genetic markers such as mitochondrial DNA and other nuclear markers. There are also several collaborative projects involving the identification of genes involved in hearing loss and cancer within the laboratory. These projects focus on the construction of physical maps comprised of overlapping cloned segments of DNA within candidate gene regions using large-insert bacterial artificial chromosome (BAC) and P1 derived artificial chromosome (PAC) clones. These cloning systems faithfully propagate insert DNA with an average size of 150,000 bp, eliminating most of the undesirable properties of yeast artificial chromosomes (YACs) and the small size restrictions of other bacterial cloning systems, Once physical maps have been constructed, candidate genes within the region are identified using a variety of approaches including exon trapping, large scale DNA sequence analysis and direct selection of cDNAs. The analysis of the candidate genes will provide insight into the biochemical basis of these disorders and facilitate accurate genetic analysis of affected individuals.

Haydee E. P. Bazan, Ph.D.

Lipids involved in signal transduction mechanisms in the eye

Professor, Ophthalmology, Biochemistry and Molecular Biology and Neuroscience

Dr. Bazan's laboratory studies second messengers in the retina, particularly, platelet-activating factor (PAF), a lipid mediator of inflammatory and immunological responses. These studies have demonstrated that PAF, which is formed from a biologically inactive precursor (alkyl-acyl phosphatidylcholine) through the activation of a phospholipase A2, appears in the retina after injury caused by laser photocoagulation. Isolation of the precursor from neural retina showed that it contains a high proportion of arachidonic acid, and may contribute to the formation of other mediators of inflammation (e.g. prostaglandins and lipoxygenase metabolites). The group is also investigating the rapid and transient increase in the expression of immediate-early genes (IEG) c-fos and c-jun induced by PAF and other possible trophic factors in the retinoblastoma line, Y79, which is derived from photoreceptor cells. In addition, they are studying how injury to corneal nerves trigger gene responses in the trigeminal ganglion, in terms of cell-signaling pathways such as the expression of growth-associated protein (GAP-43), a substrate of protein kinase C, which is involved in the induction of cellular responses.

Nicolas G. Bazan, M.D., Ph.D.

Synaptic signaling and gene expression: neurobiology of disease

Boyd and Villere Professor of Ophthalmology, Biochemistry and Molecular Biology and Neurology, Director, LSU Neuroscience Center of Excellence

During development and throughout life, the nervous system, including the retina, continually modifies itself. These modifications reflect plasticity in terms of synaptic reorganization and other cellular events. Plasticity may also result from insult to the brain: stroke leads to reorganization of synaptic circuitry and epilepsy may lead to the establishment of aberrant circuits.

A major goal of the N. Bazan laboratory is to understand signaling pathways through which neurotransmitters and neuromodulators promote long-lasting modifications in synaptic strength (plasticity) and neuronal survival. Both neuronal and glial signaling are studied and, in particular, messengers that modulate gene expression.

A convergence of approaches including cell, neurochemical and molecular are used. These are complemented by primary cell cultures (e.g. hippocampal neurons) and animal models of neurological (epilepsy, stroke, head injury) and retinal diseases (age-related macular degeneration, retinitis pigmentosa, diabetic retinopathy). The central hypothesis being explored is that lipid messengers mediate the pathological upregulation of genes that lead to neuronal damage and death in ischemia, trauma and neurodegeneration.

Phospholipases A2-generated messengers modulate both synaptic receptors, as well as downstream signaling. The current focus is on protein kinases that control transcription factors that, in turn, modulate inducible genes. Sites of pharmacological action, as well as novel drugs, acting on these informational pathways are being identified.

These studies are designed to examine how lipid second messengers mediate cross-talk between synapses and genes to modulate long-term responses in neural plasticity, and how to manipulate these intracellular signaling pathways pharmacologically to prevent or repair neural deficits. We are exploring a gene, the inducible prostaglandin synthase, the product of which accumulates in hippocampus in models of epilepsy, as well as in retina in light-induced photoreceptor degeneration. The lab is also studying membrane biogenesis, in terms of the supply and trafficking of a key building block, docosahexaenoic acid in synapses and photoreceptors. In our studies of excitable membrane biogenesis, we have discovered that the essential fatty acid, docosahexaenoic acid, which is a major component of photoreceptors, is conserved by means of metabolic loops involving the liver and the interstitial space surrounding photoreceptors. These loops are altered in certain retinal degenerations and, possibly, also in some neurological diseases.

Our goal is to determine the crosstalk between synapses and genes that modulate long-term responses, which could perhaps be manipulated to prevent or repair synaptic plasticity deficits in several diseases by pharmacological means.

Roger Beuerman, Ph.D.

Neurobiology of pain systems; transduction mechanisms; molecular mechanisms of nerve regeneration

Professor of Ophthalmology, Anatomy, Psychiatry and Neuroscience

This laboratory has several related and active areas: the first is in pain systems. Pain has been shown to be a complex physiological and psychological experience with profound effects on the organism. In this laboratory the study of peripheral pain pathways has used neurophysiological and psychophysical methods to analyze the neural message for pain. The primary receptor events involving calcium and specific membrane systems for ionic activation are approached using pharmacological probes. The control of pain following tissue injury and the action of new classes of drugs is being investigated. Physiology of brain-stem mechanisms in the relay of pain messages is also studied. The second area focuses on functional changes in the peripheral nervous system in aging and disease process are studied at a cellular and molecular level. Third, the uptake and transport of human herpes virus in corneal nerves is studied along with the molecular events involved in triggering reactivation of virus formation. Fourth, studies of peripheral nerve repair and of the molecular interactions of cells in neuroma formation include growth factors, their receptors as well as cytokines. Rescue of spinal cord neurons from death after injury and the action of new neurotrophic factors is being tested.

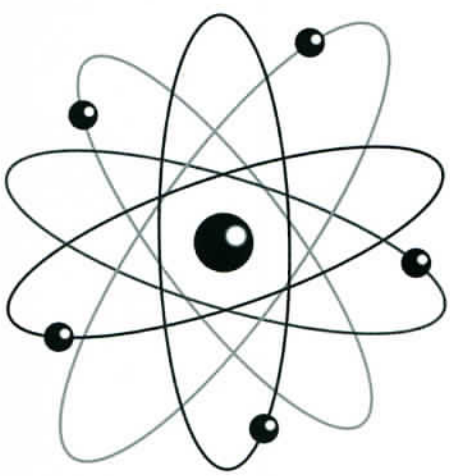
Nursing and Allied Health Professions Building

Richard Bobbin, Ph.D.
Pharmacology of sensory systems, especially the cochlea
Professor, Otorhinolaryngology and Biocommunication, Pharmacology and Experimental Therapeutics and Neuroscience

Dr. Bobbin's research activities are concerned with neurotransmitter pharmacology, physiology and biochemistry using the peripheral auditory organ as a model system. In addition, minor activities concern the mechanism of action of ototoxic drugs and noise induced deafness. Current investigations are being carried out to discover: 1) the identity and mechanism of action of the chemical transmitters at the hair cell to afferent nerve junction and at the efferent nerve to hair cell junction; 2) the mechanisms of action of ototoxic drugs such as aspirin; and 3) the mechanisms by which intense sound produces damage to cells in the cochlea. In vivo experimental approaches include single and whole nerve recordings while applying drugs into the cochlea and sampling of cochlear fluids for subsequent biochemical analysis utilizing high pressure liquid chromatography and mass spectrometry. In vitro techniques include whole cell voltage clamp recordings of isolated cells from the cochlea and monitoring of the contraction of the outer hair cells.

Kevin Brown, Ph.D.
Molecular basis of Ataxia-Telangiectasia (a genetic disorder that leads to progressive neuronal degeneration); understanding molecular pathways activated after genome damage
Assistant Professor, Biochemistry and Molecular Biology and Neuroscience

Dr. Brown's laboratory is interested in the gene product mutated in the human genetic disorder ataxia-Telangiectasia (A-T). A-T patients primarily suffer from cerebellar ataxia, due to progressive loss of Purkinje cells as well as immune dysfunction, and an extremely high rates of cancer. Recently, the A-T gene (designated ATM) was identified, and these efforts showed that ATM possesses to the catalytic domain of the lipid kinase phosphatidylinositol 3-kinase thus placing ATM in a family of protein kinases known to be involved in mitogenic signal transduction, meiotic recombination, and cell cycle control.. These observations have lead to the widely accepted view that ATM plays a central role in choreographing appropriate cellular responses to genome damage, such as insuring the fidelity of DNA repair and halting cell cycle advance. However, the function of ATM in post-mitotic cells, such as neurons, is far less obvious. This point is of key importance since A-T patients invariably suffer from neuronal dysfunction and eventual neurodegeneration.



Claude F. Burgoyne, M.D.
Digitized image analysis of the optic disc
Assistant Professor of Ophthalmology and Neuroscience

Dr. Burgoyne's laboratory studies the optic disc as an elastic, deformable structure which is subject and responsive to a predictable distribution of force. The laboratory has developed the ability to detect small, short- and long term changes in the surface of the optic disc using digitized image analysis. Mechanical testing of the optic disc is carried out in normal primate eyes. The primate model of glaucoma is employed to study changes in normal mechanical behavior of the disc which follow the onset of chronic exposure to elevated intraocular pressure. Histologic techniques are used to verify damage to the axons term goal of the lab is to describe the pattern of mechanical failure of the structural tissues of the disc that underlies the onset and progression of glaucomatous damage to the optic disc. Mechanical testing and longitudinal imaging of human glaucoma patients and normals will begin soon.

Carmen C. Canavier, Ph.D.
Computational models of single neurons and small networks
Assistant Professor, Psychology, University of New Orleans and jointly appointed at the Neuroscience Center

Our first project deals with computational modeling of the regulation and modulation of the firing pattern in midbrain dopamine neurons. Using the simulation package NEURON, I have constructed a detailed model of the regulation of the firing pattern of dopamine neurons in vitro by sodium and calcium dynamics within the cell and their modulation by various pharmaceutical agents. There are numerous extensions that need to be made to the model, including the incorporation of the effects of somatodendritic release of dopamine. In collaboration with experimentalists, my lab is also analyzing the sources of irregular firing in these neurons, including chaos and correlated noise.

The second project deals with a neuromechanical model for bipedal and quadrupedal locomotion that includes a spinal central pattern generator, sensory feedback, and plasticity in the feedback circuit. My hypothesis is that a simple symmetric network generates the various gaits observed in quadrupeds and bipeds. The project will use techniques from nonlinear dynamics and neural networks, including mapping of attractor basins, phase response curve analysis of coupled oscillators, genetic algorithms, and various learning rules.

Julia L. Cook, Ph.D.
Alton Ochsner Medical Foundation, Division of Research, Department of Molecular Genetics; Research Adjunct Assistant Professor, LSU Medical Center, Ophthalmology, Biochemistry and Molecular Biology and Neuroscience

Dr. Cook's research interests are in the area of molecular mechanisms of growth and growth regulation with an emphasis on therapeutic and interventional aspects. This laboratory is interested in applications of antisense and triplex technologies to cellular growth control and to the study of glial and neural-specific gene expression. They are investigating in vivo gene transfer into several different animal models of injury using retroviral and adenoviral based methods. In addition, they are studying the role of p53,DNA interactions in transcriptional regulation.

Jeffrey Erickson, Ph.D.
Cellular biology of the neuron
Assistant Professor, Pharmacology and Experimental Therapeutics and Neuroscience

Neurotransmission depends on the regulated release of chemical transmitter molecules. This requires the packaging of these substances into the specialized secretory vesicles of neurons and neuroendocrine cells, a process mediated by specific vesicular transporters. We have recently cloned and functionally identified the family of genes encoding the vesicular transporters for biogenic amines and acetylcholine. The goal of this laboratory is to determine at the molecular and cellular levels whether these vesicular transporters are potential sites for the regulation of presynaptic function. We aim to define the transmembrane regions of these intregral membrane glycoproteins which determine transporter specificity and evaluate what effect site-specific mutations have on vesicular packaging of transmitter and neurosecretion. Here, we are guided by numerous unc-17 point mutants in the nematode *C. elegans* which have known presynaptic deficits in cholinergic function. Since these transporters are targeted to different secretory organelles that release transmitter differently we aim to identify the signals which are required for synaptic vesicle targeting. In addition, using the yeast-two hybrid system we are identifying proteins which are important in the trafficking of these transporters to various intracellular storage sites. Finally, using a transgenic approach, we are investigating whether genetic variability in the expression of these proteins can determine vulnerability to neurotoxins such as MPTP. This information is providing new insights into the pharmacology and physiology of biogenic amine and acetylcholine vesicular storage in cardiovascular, endocrine, and central nervous system function and has important implications for neurodegenerative disease.

Reha Erzurumlu, Ph.D.
Development and plasticity of somatosensory and visual pathways
Professor, Cell Biology and Anatomy and Neuroscience

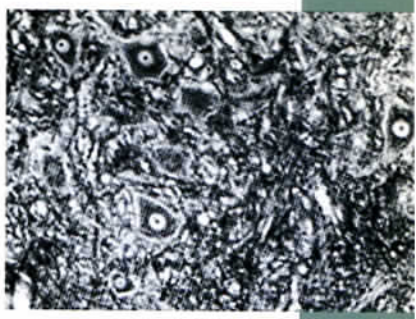
Our laboratory is interested in cellular and molecular mechanisms underlying axon-target interactions and patterning of synaptic connections in mammalian sensory pathways. We focus on the rodent trigeminal system along which the array of whiskers on the snout is replicated by the patterned organization of afferent terminals and postsynaptic neurons in the brainstem trigeminal nuclei, the dorsal thalamus and the primary somatosensory cortex. We employ in vivo and in vitro anatomical, molecular and electrophysiological techniques to study establishment of orderly connections between the sensory periphery and the CNS and activity-dependent refinement of synaptic connections. Currently we are using dissociated trigeminal ganglion cell cultures and explant cocultures of the trigeminal pathway to examine the role of neurotrophins and axon guidance molecules during target recognition and sensory axon patterning within targets. We have also begun examination of the electrophysiological properties and synaptic responses of trigeminal system neurons in explant coculture and in vitro slice preparations. Both lines of studies involve normal rats, mice and transgenic and knockout mice. Similar studies on the developing mammalian visual system are also ongoing.

Charles P. France, Ph.D.
Opioids, GABA modulators, analgesia, drug abuse, and dependence
Professor, Pharmacology and Experimental Therapeutics and Neuroscience

Studies in this laboratory are focused on the behavioral consequences of acute and chronic exposure to various drugs of abuse. A wide variety of behavioral procedures, including self-administration and drug discrimination assays, are used in non-human primates, rodents and avian species to identify important behavioral and pharmacologic variables that contribute to the abuse liability and dependence potential of opioids, benzodiazepines and stimulants. Other studies evaluate some of the physiologic consequences of the same drugs including studies on antinociceptive, respiratory, immunologic and neuroendocrine effects. One goal of these studies is to identify novel pharmacotherapeutics that might be useful in the treatment of opioid or benzodiazepine dependence.

William Guido, Ph.D.
Structural and functional organization of the mammalian visual system
Associate Professor, Anatomy and Neuroscience

Dr. Guido's work considers the neural mechanisms underlying visual-information processing. He is particularly interested in how early visual experience guides the normal development of the visual system. An integral component of this system, and the present focus of Dr. Guido's studies, is the dorsal lateral geniculate nucleus, the thalamic relay between the retina and visual cortex. His work indicates that the lateral geniculate operates as more than just a passive relay of retinal signals en route to visual cortex. Rather, it serves as a variable gateway or filter, determining what, when, and how much retinal information gets passed on to higher visual centers. His studies explore how the complex innervation patterns and intrinsic membrane properties of LGN relay neurons control the gain and efficacy of signal transmission. To address these issues he uses a variety of anatomical and single-cell recording techniques, in both *in vivo* whole-animal and in vitro brain-slice preparations. The other aspect of his research considers the cellular mechanisms underlying development and plasticity of the retinogeniculate system. He uses an *in vitro* brain slice preparation to study the integrative membrane properties of visually-naive geniculate neurons as well as those exposed to abnormal visual experience during a critical period of their development. By using dye-filled, intracellular recording electrodes he seeks to establish structure-function relationships between cell morphology and cellular membrane properties.



John W. Haycock, Ph.D.
Signal transduction systems and neurotransmitter function
Professor, Biochemistry and Molecular Biology and Neuroscience

The research focus of the laboratory is upon catecholamine function in the nervous system. Fundamental neuroscience studies include investigations of the intracellular signaling pathways that regulate catecholamine function and the molecular biochemistry of tyrosine hydroxylase (TH).

Multiple receptor-activated cascades mediate the multiple-site phosphorylation of TH, the first and ratelimiting enzyme in catecholamine biosynthesis. The laboratory has recently identified the three sites (Ser19, Ser31, Ser40) whose phosphorylation is regulated in vivo, as well as the three different protein kinase systems that are directly responsible (CAM-PKII, ERK, PKA). The coordinate effects of multiple-site phosphorylation on tyrosine hydroxylase activity are being studied. In addition, phosphorylation state-specific antibodies to the three sites are being produced. Clinical neuroscience studies include postmortem investigations of monoaminergic enzymes. In humans, alternative splicing creates multiple TH isoforms that differ in the ERK-sensitive site. Immunocytochemical and Western mapping studies, using isoform-specific antibodies, of brains from normal and mentally ill subjects are underway.

James M. Hill, Ph.D.
Visual science, virology
Professor of Ophthalmology, Pharmacology and Experimental Therapeutics, Microbiology and Immunology, and Neuroscience

Dr. Hill's primary research interests over the last 15 years have involved animal models for the study of viral and bacterial keratitis. He has developed unique ocular drug delivery systems. He developed the first reliable and efficient means to induce ocular herpes reactivation and recurrent corneal disease. His primary research goal is to develop chemotherapy to prevent the irreversible scarring that occurs as a consequence of bacterial and viral infections.

Pamela J. Hornby, Ph.D.
Neuropharmacology of central nervous system autonomic pathways
Professor, Pharmacology and Experimental Therapeutics and Neuroscience

Dr. Hornby's research interest is how the central nervous system controls gastrointestinal functions, with an emphasis on motor activity. The hindbrain is emerging as an important site for control of upper gastrointestinal function and represents a target for developing new therapeutic agents for the treatment of diseases such as gastroesophageal reflux (heartburn) and dyspepsia/gastroparesis (bloating and nausea related to decreased emptying of stomach contents). The research in this laboratory has revealed several neurotransmitter systems in hindbrain nuclei which can alter lower esophageal sphincter and gastric motor function. The mechanisms by which these effects are mediated are under investigation. This will lead to an understanding of how normal gastrointestinal function is impaired in these diseases that account for about 40% of cases requiring referral to gastroenterologists.

S. Michal Jazwinski, Ph.D.
Regulation of gene expression during organismal aging; longevity-assurance genes
Professor, Biochemistry and Molecular Biology and Neuroscience

Dr. Jazwinski's laboratory focuses on cell cycle control, particularly initiation of DNA replication, in eukaryotic cells and on the molecular mechanisms of cellular aging. The organism utilized in these studies is the yeast *Saccharomyces cerevisiae*. Yeast cells have a limited life span defined by the number of cell divisions. Individual yeast cells have a finite life span defined by the number of cells divisions. A procedure for obtaining age-synchronized yeast in bulk quantities has been developed. The cells in these preparations were of the nominal age specified, and, more importantly, they were of the correct functional or physiological age. In order to determine whether age-specific patterns of gene expression occur in yeast, mRNA that was isolated from young and old yeast cells was used to synthesize cDNA probes for screening a yeast genomic DNA library. In this way, five genes preferentially expressed in young cells and one gene preferentially expressed in old cells have been cloned.

Resource Center Building

Daniel R. Kapusta, Ph.D.
Central nervous system control of renal function
Associate Professor, Pharmacology, Experimental Therapeutics and Neuroscience

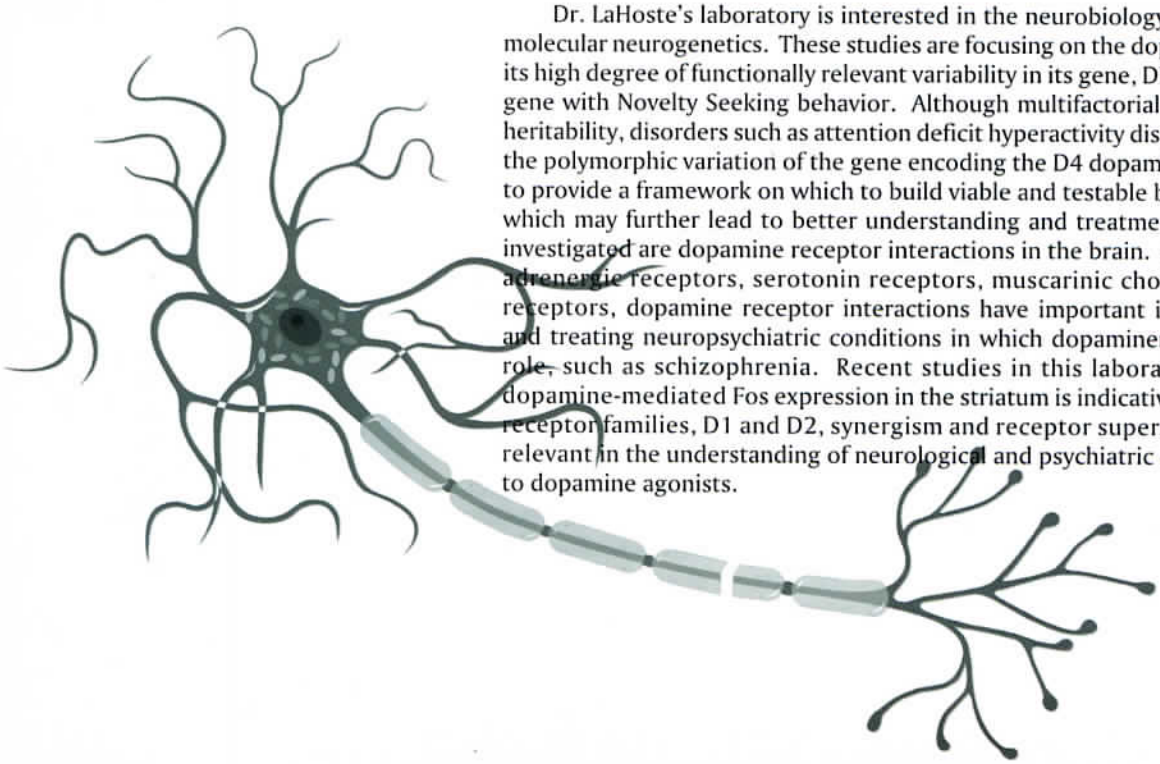
Dr. Kapusta studies the interaction of central and peripheral neural and hormonal mechanisms involved in control of renal function. This laboratory focuses on understanding how central opioid systems interact with other hormones, neurotransmitters and the renal nerves in the regulation of renal tubular sodium and water handling under normal and pathological (i.e., hypertension, stress) conditions. These investigations employ techniques for microinjection of opioid agonists/antagonists into discrete brain nuclei, measurement of renal hemodynamic and excretory function and direct recording of renal sympathetic nerve activity in conscious experimental animals.

Bronya J.B. Keats, Ph.D.
Positional cloning of genes for nervous system disorders
Professor, Biometry and Genetics; Otorhinolaryngology and Biocommunication and Neuroscience

Genes of hereditary disorders in which the basic biological defect is unknown can be identified using a combination of molecular and statistical genetic methods known as positional cloning. Families in which a disease gene is segregating are studied in order to localize, clone, and characterize the responsible gene and identify its product. Dr. Keats' major research interest is the application of these molecular and statistical genetic techniques to hereditary disorders that affect the nervous system. Of particular interest are Friedreich ataxia, Spinocerebellar ataxia, Charcot-Marie-Tooth disease, Usher's Syndrome, and non-syndromic forms of hearing loss. DNA microsatellite markers are typed on individuals affected with these diseases and their relatives in order to detect markers that tightly flank the disease gene. Physical mapping methods are then applied to identify transcripts within the candidate region. The results of these studies will provide important information for genetic counseling and presymptomatic diagnosis and the eventual development of effective treatments. Dr. Keats is also performing similar genetic studies to find genes that cause deafness in the mouse. These studies take advantage of interspecific crosses, and because of the high degree of homology between the mouse and human genomes; they will provide valuable information concerning genes that cause hearing loss in humans.

Gerald J. LaHoste, Ph.D.
Molecular mechanisms of synaptic plasticity, behavior, and neurodegeneration.
Associate Professor and Associate Chair, Department of Psychology, University of New Orleans and LSU Neuroscience Center

Dr. LaHoste's laboratory is interested in the neurobiology of behavior, as well as human molecular neurogenetics. These studies are focusing on the dopamine D4 receptor, because of its high degree of functionally relevant variability in its gene, DRD4, and the association of this gene with Novelty Seeking behavior. Although multifactorial in etiology and polygenetic in heritability, disorders such as attention deficit hyperactivity disorder (ADHD) may be a result of the polymorphic variation of the gene encoding the D4 dopamine receptor. Dr. LaHoste aims to provide a framework on which to build viable and testable biological hypotheses of ADHD, which may further lead to better understanding and treatment of the disorder. Also being investigated are dopamine receptor interactions in the brain. As part a superfamily including adrenergic receptors, serotonin receptors, muscarinic cholinergic receptors and opiate receptors, dopamine receptor interactions have important implications for understanding and treating neuropsychiatric conditions in which dopaminergic neurotransmission plays a role, such as schizophrenia. Recent studies in this laboratory have demonstrated that dopamine-mediated Fos expression in the striatum is indicative of the state of two dopamine receptor families, D1 and D2, synergism and receptor supersensitivity. These findings are relevant in the understanding of neurological and psychiatric conditions involving sensitivity to dopamine agonists.



Thomas Lallier, Ph.D.

Molecular mechanisms controlling early embryonic morphogenic tissue movements cell migration, and axonal outgrowth

Assistant Professor, Cell Biology and Anatomy and Neuroscience

My laboratory is interested in elucidating the molecular mechanisms of cell migration. These involve the ability of cells to dynamically regulate their mechanical contacts with other cells and with the extracellular matrix (ECM). We are focusing upon the cell movements involved with the morphogenesis of early *Xenopus* embryos. Our current research is focusing on two aspects on cellular migration 1) molecules responsible for cell attachment to the ECM, and 2) molecules which regulate cell attachment and guidance. We have focused our attention upon cell interactions with laminin (an ECM component involved in epithelia formation and axon guidance) and its cell surface receptors (specifically the a6 subunit of integrin). We are presently studying the interaction between these molecules in neurulation, neural crest cell migration, axon guidance, and pronephric duct formation. We are also investigating the role of semaphorins (collapsins) in setting up the initial tissue pattern within the *Xenopus* embryo. Semaphorins are a family of cell surface associated molecules, which are involved in axon guidance, by altering adhesive events locally. We will be investigating semaphorin induced guidance in directing axon guidance as well as cell migrations of the neural crest cell and the pronephros. These experiments will be performed *in vivo*, by over-expressing and under-expressing various members of the semaphorin family within the living embryo. This will provide information fundamental to our understanding of cellular migrations, the establishment of complex neural networks, and the regulation of morphogenesis in general. It is through a knowledge of the basic cellular events of embryogenesis that we can come to understand the underlying causes of many recurrent birth defects.

Iris Lindberg, Ph.D.

Biochemistry of neuropeptides

Professor of Biochemistry and Molecular Biology and Neuroscience

Work in this laboratory centers around the cell biology of the processes required to generate bioactive neuropeptides, such as endorphins and enkephalins. Biologically active peptides are first synthesized as much larger precursor molecules from which smaller, bioactive peptides are excised through the action of specialized processing enzymes. These processing enzymes form a distinct subfamily of subtilisin-like proteinases and we are actively involved in the study of their structure, specificity, synthesis, and regulation. We employ site-directed mutagenesis and transfection of neuroendocrine cell lines to provide information on functionally important regions within both precursor substrates as well as within the enzymes themselves. We have recently identified an endogenous inhibitor of one of the enzymes which appears to control its activation as well as its activity within the secretory pathway. By judicious mutation of selected regions within enzymes and inhibitors - as well as the use of combinatorial chemistry techniques - we hope to gain information on the cellular regulation of neuropeptide synthesizing enzymes. We are also working with an animal null for a gene critical for neuropeptide synthesis.

Cindy L. Linn, Ph.D.

Neuromodulation of vertebrate retinal neurons

Assistant Professor, Cell Biology and Anatomy and Neuroscience

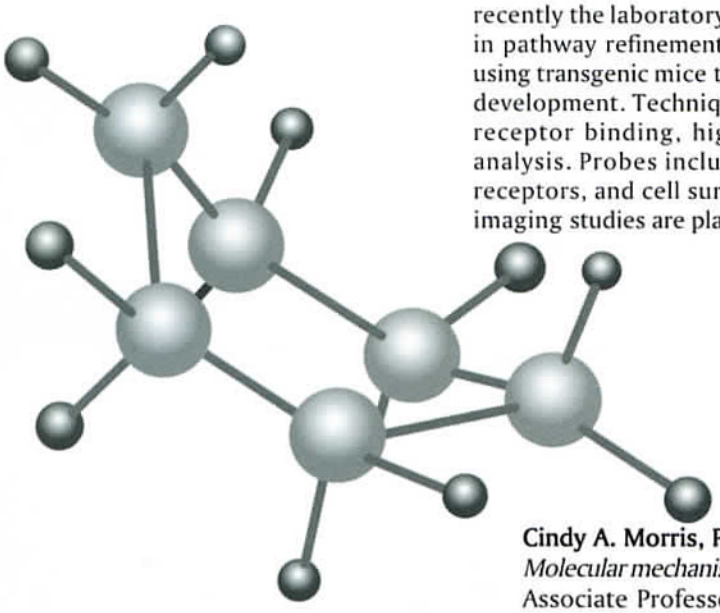
My research interests are concerned with cellular mechanisms involved in visual processing in the vertebrate retina. Recent studies done in this lab have focused on the role of intracellular calcium in teleost retinal horizontal cells using isolated cultured cells as well as isolated retinas. Calcium ions help regulate a wide variety of cellular functions and in the retina, voltage-activated calcium channels and neurotransmitter gated channels can play a key role in retinal visual processing. However, little is known about how calcium influx through these channels is regulated or modulated. One aspect of our research analyzes calcium entry and modulation of calcium through distinct voltage-activated calcium channels and specific neurotransmitter-gated channels found in horizontal cells of the teleost retina using a combination of whole-cell patch clamp techniques, single-channel analysis and calcium imaging techniques. Other pursuits in the lab examine the functional role of the voltage-gated and agonist-gated channels using an isolated retina. This preparation allows retinal cells to be examined with synaptic connections intact and can address the physiological significance of specific channels or receptors. Results obtained from these studies will greatly contribute to our understanding of the mechanisms involved in information processing by retinal neurons.

Jeffery Magee, Ph.D.
Synaptic integration and plasticity in the hippocampus
Assistant Professor, Cell Biology and Anatomy and Neuroscience

Dr. Magee is interested in neuronal information processing and storage at the cellular level. The lab is presently investigating how ion-channels located in the dendritic arborizations regulate synaptic efficacy and integration as well as action potential generation and propagation. We take two main approaches to these studies. 1) Various patch-clamp techniques are employed to characterize the types and distributions of dendritic voltage- and agonist-gated ion channels in hippocampal CA1 pyramidal neurons. 2) Dual whole-cell and optical techniques are used to study the physiological impact of these channel distributions. Using these techniques we have found that the wide variety of ion channels in the dendrites have a tremendous impact on the amplitude, shape and integration of synaptic input. Also dendritic channels allow action potential propagation into the arborizations and these backpropagating spikes are involved in the induction of long-term synaptic plasticities.

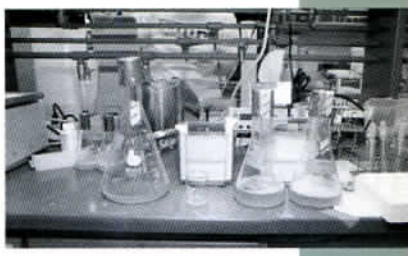
R. Ranney Mize, Ph.D.
Visual system neurotransmitter function
Professor of Cell Biology and Anatomy and Head of Cell Biology and Anatomy;
Co-Director, Interdisciplinary Neuroscience Training Program

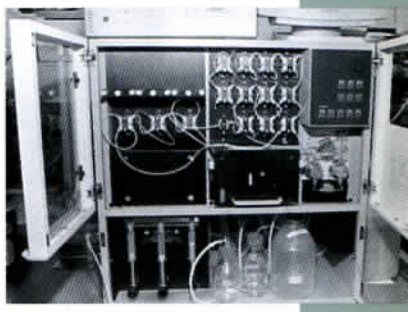
Dr. Mize's research focuses on the neurotransmitters and microcircuitry of the subcortical visual system of mammals and their alteration by activity-dependent modifications of the environment. Dr. Mize's laboratory identifies specific subclasses of cells and synapses and traces their microcircuitry in order to describe the neural networks which underlie visual function. Transmitter systems that have been studied include the excitatory and inhibitory amino acids, particularly glutamate and GABA, and their relationship to specific receptors. The laboratory examines both the distribution of these molecules and their alteration after monocular deprivation and other manipulations of the visual environment. Most recently the laboratory has been studying the role of nitric oxide and the NMDA receptor in pathway refinement during development and in long term potentiation and depression using transgenic mice to target disruption of these and other molecules involved in brain development. Techniques used include antibody immunocytochemistry, lectin transport, receptor binding, high affinity neurotransmitter uptake, and computerized image analysis. Probes include monoclonal and polyclonal antibodies to neurotransmitters, receptors, and cell surface antigens. Retrograde tracers are also used. Real time calcium imaging studies are planned in the future.



Cindy A. Morris, Ph.D.
Molecular mechanisms of HIV gene regulation, Tat-induced angiogenesis and AIDS dementia
Associate Professor, Clinical Laboratory Sciences (LSU School of Allied Health) and Neuroscience

Tat is best known as a regulatory protein encoded by HIV-1 that is essential for viral gene expression and replication. The predominant and most potent functional role of Tat is as a transcriptional transactivator. During acute infection of T cells by HIV-1, Tat is released extracellularly in a biologically active form that may be taken up by a wide variety of cells. How extracellular Tat and Tat that has been taken up by cells affect cellular gene expression, growth and differentiation is not well understood and is a major research focus of this laboratory. Areas of investigation include the elucidation of molecular mechanisms of Tat-mediated regulation of viral and cellular genes involved in HIV-1 replication, angiogenesis and AIDS dementia.





Robert N. Pechnick, Ph.D.
Neuropharmacology of drugs of abuse
Associate Professor, Pharmacology and Experimental Therapeutics and Neuroscience

The research of this laboratory centers on utilizing both in vivo and in vitro approaches to study the neuropharmacology of drugs of abuse. Currently, primary goals involve determining the neurochemical mechanisms underlying the effects of phencyclidine (PCP) and cocaine, and the pathophysiological and neurochemical consequences of repeated administration of these drugs. One project involves characterizing the effects of PCP and cocaine on neuroendocrine function, body temperature and behavior in the rat, and assessing the differential role of NMDA, dopamine and sigma receptors in the effects produced by PCP. Experimental approaches involve studying the effects of selective agonists and antagonists, and characterizing changes in neurotransmitter levels and receptors after acute and chronic drug administration. A second project involves developing an animal model to study the effects of perinatal exposure to PCP. Knowledge of the underlying fundamental mechanisms of drug action is imperative in order to develop strategies with which to prevent and possibly treat the sequelae of exposure to drugs of abuse.

Chandan Prasad, Ph.D.
Regulation of dopaminergic neurons
Professor of Medicine and Neuroscience, Vice Chairman (Research), Medicine, Research Director, Obesity Research Program

Regulation of nigrostriatal and tuberoinfundibular dopaminergic neurons at transcriptional, translational levels. Diet and Behavior: evaluation of the effects of short- and long-term manipulation in dietary levels of macronutrients and neurotransmitter precursors on serotoninergic and dopaminergic behaviors.

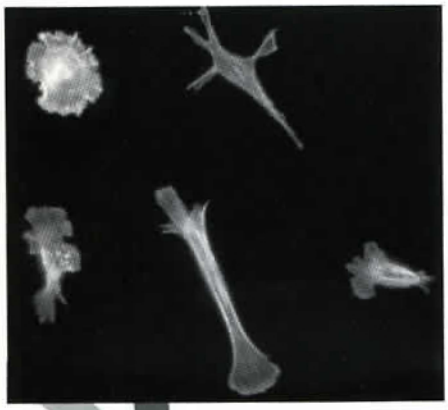
Neurochemistry of appetite regulation: The role of dopaminergic, serotoninergic, and peptidergic neuromodulators in the regulation of preference for different macronutrients, particularly fat. Neurobiology of Cyclo (His-Pro):Cyclo (His Pro) is a novel neuropeptide discovered in Dr. Prasad's laboratory several years ago. This peptide has been implicated in a variety of biologic activities including appetite suppression, alcohol intake, and modulation of pancreatic hormone release. We utilize multiple experimental approaches and research methods in our laboratory. These include Northern blot, Western blot, immunocytochemistry, electrophysiology, behavioral biology and receptor analysis.

Moshe Solomonow, Ph.D., M.D. (Hon)
Electrophysiology and biomechanics of movement, motor control of movement in health and disability including spinal cord injury, sports injuries, low back pain
Professor, Orthopedics and Physiology and Neuroscience

In this laboratory complex interactions of ligaments, spinal reflexes, muscles and joints are studied with special emphasis of development of various neuroprosthetic devices to assist individuals who sustained damage/injury to their movement system components, and are disabled. The laboratory systematically uses electromyography (EMG), electrical stimulation, biomechanical principles, and prosthetic/orthotic design as tools to understand and rehabilitate the neuromusculoskeletal system. Research in the laboratory is performed on animals "in vivo", or normal/healthy subjects, and on patients with various types of impairment of the neuromusculoskeletal system.

Kurt J. Varner, Ph.D.
Central nervous system control of sympathetic and cardiovascular function
Associate Professor, Pharmacology and Experimental Therapeutics and Neuroscience

Dr. Varner is currently involved in examining the sympathetic and cardiovascular responses elicited by the intravenous injection of cocaine and other psychostimulants in conscious and anesthetized rats. Additional projects involve 1) identification and characterization of the central sites and pathways controlling renal function, with particular reference to those involving opioid mechanisms, and 2) the involvement of the brain cytochrome P450 system in the pathophysiological responses to cerebal ischemia. Extracellular unit recording: conscious and acute sympathetic nerve recording; spike-triggered averaging; spectral analysis; electrical stimulation; microinjection; acute and chronic arterial pressure and heart rate recording; anatomical tract tracing; acute and chronic neurotoxic lesions.

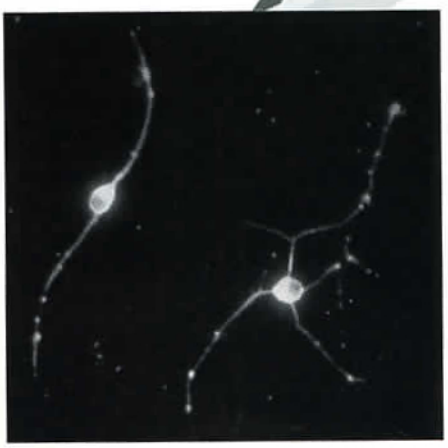


Wayne Vedeckis, Ph.D.
Molecular mechanism of glucorticoid hormone action
Professor, Biochemistry and Molecular Biology and Neuroscience

Nuclear receptor proteins (such as those for glucocorticoids, sex steroid hormones, thyroid hormone, and retinoic acid) are eukaryotic, ligand-dependent, transcription factors. In all cell types except for immature T-cells, chronic glucocorticoid treatment causes a down-regulation of glucocorticoid receptor (GR) mRNA and protein levels. Our lab has found that there is a coordinate regulation of GR and c-jun mRNA levels in a variety of cell types treated with glucocorticoids. The c-jun gene is a proto-oncogene that codes for the cJun protein, a potent transcription factor, and the expression of a mutant cJun protein can result in neoplastic transformation. Based on in vitro studies, others have proposed that the GR and Jun proteins form inactive heterodimers, thereby blunting expression of both glucocorticoid- and AP-1 (Fos/Jun)-responsive genes via transcriptional interference. Because AP-1 response elements occur in the 5' promoters of both the c-jun and GR genes, the AP-1 transcription factor (Fos/Jun) may be required for basal transcription of both genes. Conversion of the GR to its monomeric species could result in the formation of GR/Jun complexes, thereby decreasing the intracellular concentration of functional Fos/Jun and Jun/Jun complexes and causing a coordinate down-regulation of both GR and c=ADjun gene expression. Studies in our lab have shown that the AP-1 site in the GR promoter is responsive to serum-stimulation, but that it is not involved in the autologous down-regulation of GR gene expression by corticosteroid hormones. On the contrary, the two AP-1 sites in the c-jun gene promoter are both targets for glucocorticoid-mediated down-regulation of c-jun gene expression. Thus, glucocorticoid inhibition of inflammation and proliferation, which are both mediated by AP-1-driven genes, may be due to the hormone/GR complex inhibiting the expression of the cJun transcription factor itself.

Kristine Vogel, Ph.D.
Use of targeted mutations in mice to understand the roles of tumor suppressor genes in cell signaling and apoptosis during neural development
Assistant Professor, Cell Biology and Anatomy and Neuroscience

My research focuses on the effects of cell interactions on cell behavior during development and tumorigenesis. I am particularly interested in the regulation of signal transduction and apoptosis by the products of tumor suppressor genes in neural crest cells and neural crest-derived tumors. To study cooperativity between two tumor suppressor genes, I have generated a recombinant mouse strain that is heterozygous for targeted alleles of the Nf1 and p53 genes. Current projects in my laboratory focus on characterizing apoptosis and proliferation of neural crest derivatives in Nf1;p53 compound mutant embryos, and on defining the growth factor responsiveness of tumor cell lines isolated from the compound heterozygous adult mice. My recent results indicate that the Nf1;p53 mice develop tumors derived from the neural crest, and thus provide a possible animal model for malignancies associated with neurofibromatosis type 1.



Theodore G. Weyand, Ph.D.
Visuomotor integration
Associate Professor, Cell Biology and Anatomy and Neuroscience

Dr. Weyand's primary research interest is in vision and visuomotor integration, how visual inputs become motor outputs. Several projects are currently active. One is investigating how the activity of the lateral geniculate nucleus (a thalamic structure which relays retinal inputs to visual cortex) filters activity during sleeping, waking and states of vigilance. This project involves recording the activity of single neurons from awake behaving animals, as well as recording electroencephalographic (EEG) signals, and monitoring eye position using the magnetic search coil method. A second project is investigating how the basal ganglia (several large nuclei in the forebrain) are involved in sequencing motor behaviors from visual cues. This project involves recording the activity of single neurons from mobile arrays of microelectrodes in trained rhesus monkeys. The goal of this project is to understand the 3-dimensional computational architecture of the basal ganglia.

Peter Winsauer, Ph.D.
Behavioral pharmacology of serotonin
Research Associate Professor, Pharmacology and Experimental Therapeutics and Neuroscience

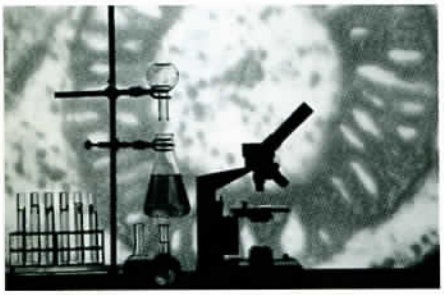
Current research projects include studies on the behavioral pharmacology of serotonin receptor subtype agonists and antagonists. Specific interests include the effects of 5HT1A agonists on learning and memory processes and the effects of 5HT1A agonists and 5HT3 antagonists on measures of food intake. In general, the behavioral effects of these serotonin drugs are compared with the effects of drugs from other pharmacological classes such as the benzodiazepines. A wide range of behavioral procedures are used to assess the effects of all the compounds in question. For example, complex operant procedures are used to assess the ability of various drugs to disrupt learning in highly-trained experimental animals. These disruptions are then directly compared with the same drug's ability to disrupt more well-learned information or performance. Previous research interests include neurotoxicology and the behavioral effects of ionizing radiation. Studies in these areas identified radiation-induced behavioral changes in learning or acquisition behavior, determined how behavioral and environmental variables could modify these changes, and evaluated radiobiological and pharmacological factors that mediate or modulate these changes.

Lions - LSU Clinics

Eugene A. Woltering, M.D. F.A.C.S.
Trophic and inhibitory effects of somatostatin on tumor growth and angiogenesis
Chief, Section of Surgical Endocrinology, The James D. Rives Professor of Surgery, and Neuroscience

Our laboratory studies the effects of somatostatin-like peptides in the development of new blood vessel growth. Our laboratory was the first to report that somatostatin and stomatostatin-like peptides inhibit angiogenesis in the chorioallantoic membrane of the chicken egg. We have also shown that the degree of inhibition of angiogenesis produced by various analogs is highly structurally dependent. Critical determinants of somatostatin inhibition of angiogenesis include the appropriate presentation of the d-try-lysine for receptor binding. Somatostatin analogs containing ornithine in position five are biologically inactive and do not inhibit angiogenesis. Recently, our laboratory has delineated that somatostatin induced inhibition of angiogenesis is G-protein, calcium and adenylate cyclase/cAMP dependent. Angiogenesis appears to be tyrosine kinase- and protein kinase-C independent. Animal models of proliferative retinopathy have been developed which will allow the testing to somatostatin-like peptides in vivo to confirm these observation. Recently, our laboratory has developed a human tissue target angiogenesis assay with high throughput capacity. Current research directions include the regulation of growth factor and growth factor receptor expression by somatostatin-like peptides. The long-term goal of these studies is to improve our understanding of the basic mechanisms involved with somatostatin induced inhibition of angiogenesis and to be able to develop a pharmacologic intervention for use in retinopathy and tumor models.

Neuroscience Center Retreat



Other Faculty Available for Rotations

England, John, M.D.; Professor of Neurology
Neuromas; hyperexcitability; voltage-gated ion channels
Gebhardt, Bryan, Ph.D.; Professor, Department of Opthalmology
Neuroimmunology
May, James, Ph.D.;Professor, Department of Psychology, (University of New Orleans)
Visual perception and human electrophysiology
Meneray, Michele, Ph.D.; Professor, Department of Physiology
Regulation of synthesis and secretion of protein and peptide components of the aqueous layer of the pre-corneal tear film; G-protein dependent signal transduction pathways
Paul, Dennis, Ph.D.; Associate Professor of Pharmacology
Opioid receptor pharmacology and neuroanatomy; mechanisms of pain and analgesia
Reddix, Rhoda, Ph.D.; Assisant Professor, Department of Pharmacology
Reactive oxygen species and neuroendocrine control of gastrointestinal ion secretion

Other Faculty Associated with the Neuroscience Center

(including clinical neuroscientists)

Barbee, James, M.D.; Associate Professor, Department of Psychiatry
Berlin, Charles I., Ph.D.; Professor, Department of Otolarygology; Director, Kresge Laboratories
Bologna, Nancy, Ph.D.; Assistant Professor, Department of Psychiatry
Carey, Michael, M.D.; Professor, Department of Neurosurgery
Carver, Larry, M.D.; Associate Professor, Department of Psychiatry, Director, Brain Tissue Bank
Cefalu, Charles, M.D.; Professor and Chief, Department Geriatrics, Vice-Chair, Department Family Medicine
Chutkan, Norman, M.D.; Assistant Professor, Department of Orthopedics
Conway, Mandi, M.D.; Associate Professor, Department of Opthalmology
DeCoster, Mark, Ph.D.; Research Assistant Professor, Department of Opthalmology
Dehne, Mark, M.D.; Associate Professor, Department of Orthopedics
Freistadt, Marion, Ph.D.; Associate Professor, Department of Microbiology
Gould, Harry, M.D.; Associate Professor of Neurology
Greve, Kevin, Ph.D.; Assistant Professor, Department of Psychology, (University of New Orleans)
Gordon, William, Ph.D.; Research Assistant Professor, Department of Opthalmology
Happel, Leo T., Ph.D.; Associate Professor, Departments of Neurology, Neurosurgery, and Physiology
Harris, Mitchell, M.D.; Associate Professor, Department of Orthopedics
Hart, Darren, Ph.D.; Department of Psychology (Tulane University Medical Center)
Hood, Linda, Ph.D.; Research Associate Professor, Department of Otorhinolaryngology
Jacob, Jean, Ph.D.; Associate Professor, Department of Opthalmology
Johnson, Janet, Ph.D.; Department of Psychology (Tulane University Medical Center)
Kaufman, Herbert E., M.D.; Boyd Professor and Head, Department of Opthalmology
King, Andrew, M.D.; Professor, Department of Orthopedics
King, Bruce, Ph.D.; Professor, Department of Psychology, (University of New Orleans)
Kline, David, M.D.; Boyd Professor and Head, Department of Neurosurgery
LaHoste, Gerald, Ph.H.; Associate Chair and Professor, Department of Psychology (University of New Orleans)
LeBlanc, Hector, M.D.; Assistant Professor, Departments of Pathology and Neurosurgery
Liles, Samuel, Ph.D.; Associate Professor, Department of Physiology
Luftig, Ronald, Ph.D.; Professor and Head, Department of Microbiology
Moerschbacher, Joseph, Ph.D.; Professor, Department of Pharmacology, Vice Chancellor of Academic Affairs
Osofsky, Howard, M.D.; Professor, Department of Psychiatry
Peyman, Gholam, M.D.; Prince Abdul Aziz Bin Ahmed Al Saud Professor, Department of Opthalmology
Porter, Johnny, Ph.D.; Professor, Department of Physiology
Penn, David, Ph.D.; Department of Psychology (LSU Baton Rouge)
Rao, Jayaraman, Ph.D.; Carl Baldridge Professor of Neurology, Director, Parkinson's Disease Center
Robertson, Hugh, M.D.; Professor, Department of Neuroradiology
Rodriguez de Turco, Elena, Ph.D.; Associate Professor, Department of Opthalmology
Roskoski, Robert, Ph.D., M.D.; Professor and Head, Department of Biochemistry and Molecular Biology
Sakauye, Kenneth, M.D.; Professor of Clinical Psychiatry, Director, Geriatric Psychiatry
Smith, Diane, Ph.D.; Professor, Department of Anatomy and Cell Biology
Sumner, Austin, M.D.; Richard M. Paddison Professor and Head, Department of Neurology
Thomas, Jocelyn, Ph.D.; Assistant Professor, Department of Psychology, (University of New Orleans)
Thompson, Hilary, Ph.D.; Associate Professor, Department of Opthalmology
Vaccarino, Anthony, Ph.D.; Assistant Professor, Department of Psychology, (University of New Orleans)
Whitworth, Richard, Ph.D.; Associate Professor, Department of Cell Biology and Anatomy
Williams, Mary C., Ph.D.; Professor, Department of Psychology, (University of New Orleans)

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