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Neuroscience, the study of how the brain functions, is one of the most exciting and dynamic fields of modern science. Neuroscientists have developed sophisticated tools and technologies for analyzing brain function and determining the mechanisms underlying the development of neurological disease processes. Neuroscientists at the University of Missouri are moving ever closer to understanding how the brain and mind work and how we can translate that new knowledge to help those suffering from neurological problems.

Neurologic disorders and disability represent one of the most serious threats to global health. One out of five Americans suffers from a brain-related disease. Today at least 15 million Americans have a neurological disease or disorder. Alzheimer’s disease, Parkinson’s disease and stroke are the most costly and alarming neurodegenerative diseases. Alzheimer’s disease afflicts more than 10 percent of the population over age 65 and 40 percent over age 80. Stroke affects millions of Americans – impairing their ability to work and creating serious disabilities in their personal lives.

Expert neuroscientists have been invited to this symposium to share their ideas and strategies for unlocking the mysteries of the brain and mind and to develop networks of scientists who will work together to fight neurological problems. Discussions of neurodegenerative diseases will describe how fatty acids, lipids, and cholesterol are involved in signaling processes involved in neurodegeneration, and how oxidative stress and its reactive molecules injure the brain. We will hear how our genetic makeup, the environment, and nutrition are the key elements of the risk of developing these neurological problems, and what tools we can use to combat that risk. The distinguished Nobel Laureate Dr. Roger Tsien will describe how novel molecules are designed and built and how these molecules are used to understand signal transduction pathways inside living cells. His achievements have allowed us to take a look at new ways to approach and better understand many cellular processes, spying on the cells and molecules that make up our brains.

On behalf of the Symposium Organizing Committee, welcome to the University of Missouri as we engage in developing a better understanding of the brain and mind and translating that understanding into a better future.

Brady J. Deaton, PhD, Chancellor, University of Missouri

The University of Missouri is proud to host the MU Translational Neuroscience Symposium, which brings together internationally distinguished scientists to share the latest research findings regarding neurodegenerative diseases.

At MU, we believe in the value of translational – or bench to bedside – research. The Mizzou Advantage and its One Health, One Medicine initiative invests in efforts to bring discoveries made at laboratory benches to the bedside of patients in the form of new methods for treating, preventing and managing disease.

MU possesses unique resources for improving health through research. We are one of the few universities in the nation with schools and colleges of medicine, nursing, health professions, veterinary medicine, agriculture, engineering and a comprehensive academic medical center all on the same campus.

MU also is the only university with three NIH national centers in comparative medicine. In partnership with MU’s medical school, MU’s research reactor has become the largest U.S. producer of radioisotopes for biomedical and medical applications.

Our excellence and potential are acclaimed. MU is one of only 35 public universities, and the only public institution in Missouri, to be selected for membership in the Association of American Universities. Membership recognizes excellence in teaching and research and includes only the nation’s leading research institutions. MU also is designated as ‘comprehensive doctoral’ in medicine and veterinary medicine by the Carnegie Foundation for the Advancement of Teaching.

Just as MU strives to create meaningful dialogue and collaboration among campus faculty, this Translational Neuroscience Symposium supports a global community of superb neuroscientists. We hope the environment here catalyzes opportunities for advancing ideas, collaboration and cures for neurodegenerative diseases.

Douglas C. Anthony, MD, PhD, Director, Center for Translational Neuroscience
The University of Missouri has identified neurologic disorders as a major focus for clinical care and translational research and has created an environment to bring the latest advances to the heart of Missouri. A new neurosciences unit is under construction at University Hospital to provide care for patients with neurologic problems, and the Center for Translational Neuroscience at the MU School of Medicine opened in 2010.

The center houses a variety of researchers who work together toward therapies that target such prevalent health problems as Alzheimer’s disease and stroke. It occupies 9,000 square feet of renovated lab space on the seventh floor of MU’s Medical Sciences Building.

The space serves dual purposes – both as a home base for research teams and as the site of four new core facilities for neurosurgery, cell culture, neurobehavior and imaging analysis.

“The key value of this new facility is its ability to bring interdisciplinary researchers together in the area of neuroscience,” said Jamal Ibdah, MD, PhD, the medical school’s senior associate dean for research and director of MU’s Institute for Clinical and Translational Science. “Working in close proximity should help elevate researchers’ level of discovery, as well as benefit our educational programs for budding scientists.”

The new space is home to faculty members from many programs on campus, including biochemistry, pathology and anatomical sciences, biological sciences, psychological sciences, neurology and neurosurgery.

Basic scientists and clinical researchers study age-related neurodegenerative diseases such as Alzheimer’s and Parkinson’s as well as brain tumors, infectious diseases of the nervous system, autoimmunity and neurodevelopmental disorders.

Center experts serve as consultants and support teams for other scientists involved in related research, said Douglas Anthony, MD, PhD, center director and chair of pathology and anatomical sciences at MU’s medical school.

“With these facilities, we’ll be able to accomplish more and become more competitive for national grants and contracts,” Anthony said. “We’re creating a community of collaboration that makes everyone more effective at improving health for patients.”

Grace Sun, PhD, an MU professor of biochemistry and pathology, said the resources housed in the four cores will be essential to the continued success of her studies. She directs an Alzheimer’s program that has been supported by more than $10 million in NIH grants.

“We’re trying to understand the neurotransmission pathways that damage memory and cognitive functions and look into compounds that may help protect the brain cells and make them healthier,” Sun said.

Sun is developing strategies to protect neurons in the brain from oxidative stress, which causes damage that is thought to contribute to Alzheimer’s and other forms of neurodegeneration. Her lab is examining potentially protective compounds — such as those found in grapes, berries and curry powder — on a cellular level. Her team will then observe neurons in culture to determine how well the compounds inhibit damage.

Researchers will then investigate promising compounds in transgenic mice, which have plaques in the brain similar to patients with Alzheimer’s.

Renovations to create the new center began in September 2009 and were supported by $1.4 million in federal funding for construction of medical research facilities.

MU’S NEUROSCIENCE CENTER UNITES RESEARCHERS AND RESOURCES

photo left: Neurosurgeons collaborate with neuroscientists to support translational research at MU.
SCHEDULE OF EVENTS
Scientific Program
February 27–March 1, 2011
Christopher S. Bond Life Sciences Center

Sunday, February 27, 2011
4:00 – 6:00 p.m. On-site Registration (Life Sciences Atrium)

Monday, February 28, 2011
7:30 – 8:30 a.m. Breakfast and registration (Life Sciences Atrium)

8:30 – 8:45 a.m. Welcoming remarks – Dr. Brian Foster, Provost, University of Missouri (Monsanto Auditorium)

Introduction to the Center for Translational Neuroscience – Dr. Douglas Anthony, Center Director, University of Missouri

8:45 – 9:45 a.m. “Omega-3 fatty acids and neurodegenerative diseases” – Dr. Nicolas G. Bazan, Boyd Professor, Ernest C. and Yvette C. Villere Chair of Neurology, Biochemistry, Molecular Biology, and Director, Neuroscience Center of Excellence, Louisiana State University

9:45 – 10:30 a.m. “Glia-dependent modulation of sleep and cognition” – Dr. Philip G. Haydon, Annette and Gustav Grisdahl Professor and Chair of Neuroscience, Tufts University

10:30 – 11:00 a.m. Break

11:00 – 11:45 a.m. “Interactions between prenatal stress, genetics, and diet in the development of offspring social behavior” – Dr. David Q. Reversfeldt, Associate Professor of Radiology, Neurology, and Psychological Sciences, William and Nancy Thompson endowed Chair in Radiology, Thompson Center for Autism and Neurodevelopmental Disorders, University of Missouri

11:45 – 12:30 p.m. “Studying disease with ‘omics, from genomics to proteomics” – Dr. Siqi Liu, Professor and Director of the Proteomic Analysis Group, Beijing Institute of Genomics, Chinese Academy of Sciences, Beijing, China

12:30 – 2:00 p.m. Lunch

University of Missouri Alzheimer’s Disease Research Center Program Project Updates

“Targeting the oxidative pathways in Alzheimer’s disease” – Dr. Grace Y. Sun, Professor of Biochemistry, Pathology and Anatomical Sciences, Scientific Director, Center for Translational Neuroscience, University of Missouri

“Cholesterol family members in Alzheimer’s disease” – Dr. W. Gibson Wood, Professor of Pharmacology, Director of Graduate Studies in Pharmacology, Associate Director, Geriatric Research, Education and Clinical Center, VAMC, University of Minnesota, Minneapolis

“P2Y2 Nucleotide receptors mediate pro-inflammatory and neuroprotective responses” – Dr. Gary A. Weisman, Professor of Biochemistry, and Director of Graduate Studies in Biochemistry, University of Missouri

4:00 – 5:30 p.m. Poster Session and tours of Mizzou campus and the MU Center for Translational Neuroscience

Tuesday, March 1, 2011
7:30 – 8:45 a.m. Breakfast and Registration (Life Sciences Atrium)

8:45 – 9:00 a.m. Announcements – Dr. Douglas Anthony (Monsanto Auditorium)

9:00 – 9:45 a.m. “Translating animal studies on brain inflammation into treatments for Alzheimer’s disease” – Dr. Gary L. Wenk, Professor of Psychology, Neuroscience, Genetics, and Molecular Virology and Immunology, The Ohio State University

11:00 – 11:45 a.m. “Vesicular storage of neurotransmitters in Parkinson’s disease” – Dr. Roger Y. Tsien, Professor of Chemistry, Biochemistry, and Pharmacology, University of California, San Diego, Howard Hughes Medical Institute Investigator, and 2008 Nobel Laureate in Chemistry

11:45 – 12:30 p.m. “Nitrosative/oxidative stress contributes to protein aggregation in Parkinson’s disease” – Dr. Zezong Gu, Assistant Professor of Pathology and Anatomical Sciences, University of Missouri

12:30 – 1:30 p.m. Lunch

2:15 – 3:00 p.m. “Role of COX-2/PPAR-y axis in cerebral ischemia” – Dr. Teng-Nan Lin, Research Fellow of the Academia Sinica Institute of Biomedical Sciences, Taipei, Taiwan

3:00 – 4:00 p.m. Break and Networking

4:00 – 4:10 p.m. Introduction of Nobel Speaker – Dr. Brady J. Deaton, Chancellor, University of Missouri

4:10 – 5:10 p.m. “Breeding and building molecules to spy on cells and disease processes” – Dr. Roger Y. Tsien, Professor of Chemistry, Biochemistry, and Pharmacology, University of California, San Diego, Howard Hughes Medical Institute Investigator, and 2008 Nobel Laureate in Chemistry

5:15 – 6:30 p.m. Remarks and Social Event

6:30 – 9:00 p.m. Banquet (Life Sciences Atrium)
Nicolas Bazan, MD, PhD, is Boyd Professor, Ernest C. and Yvette C. Villere Chair of Ophthalmology, Professor of Neurology, Biochemistry, Molecular Biology, and Director of the Neuroscience Center of Excellence at Louisiana State University Health Sciences Center in New Orleans. Dr. Bazan received his medical degree from the University of Tucuman in Argentina in 1965. In 1970, he received his PhD from the same university after completing his thesis work at Harvard Medical School.

In the 1960s, Dr. Bazan discovered that seizures trigger the rapid release of unesterified essential fatty acids, namely arachidonic acid (AA) and docosahexaenoic acid (DHA) from membranes through phospholipase A2. This finding became a classic citation, and is now often referred to as the “Bazan effect.” This early work also led to the discovery that platelet-activating factor (PAF) is a major signaling event of inflammatory responses in the brain and eyes, and that PAF exhibit binding sites in synaptic and intracellular membranes.

Dr. Bazan and colleagues also discovered the synthesis and bioactivity of neuroprotectin D1 (NPD1) from DHA. NPD1 can arrest apoptosis in retinal pigment epithelial cells, and it is neuroprotective in brain ischemia-reperfusion and in cellular models of Alzheimer’s disease. He and colleagues further observed a decrease in NPD1 levels in the CA1 area of Alzheimer’s patients, and ability for NPD1 to down-regulate pro-inflammatory genes, pro-apoptotic Bcl-2 proteins, and mediate neuronal and glial cell survival from Aβ toxicity. Dr. Bazan holds more than 20 patents that include a family of new analgesics; novel PAF antagonists that protect the brain from inflammation and damage; and applications for NPD1 in brain and retina injury, aging, and neurodegenerative diseases and macular degeneration.

Dr. Bazan established the LSU Neuroscience Center of Excellence in New Orleans and is the founder of several academic centers and programs at the University of the South, Argentina. He is internationally recognized, elected as a member of the Royal Academy of Medicine in Spain in 1996 and as a fellow of the Royal College of Physicians of Ireland in Dublin in 1999. He received the NIH’s Javits Neuroscience Investigator Award in 1989, the Endre A. Balazs Prize from the International Society of Eye Research in 2000 and the Proctor Medal in 2007 - the highest honor bestowed by The Association for Research in Vision and Ophthalmology – in 2007.

In 2008, Dr. Bazan published his first novel – “Una Vida: A Fable of Music and the Mind” – about a gifted jazz musician whose memory is slipping into the abyss of Alzheimer’s disease.

Philip Haydon, PhD, is the Annetta and Gustav Grisard Professor and Chair of the Department of Neuroscience at Tufts University School of Medicine in Boston. Dr. Haydon received his bachelor’s degree in 1979 and his doctorate in physiology in 1982 from the University of Leeds in England.

The goals of Dr. Haydon’s research are to identify the mechanisms by which astrocytes regulate synaptic transmission and neuronal circuits, and their critical role in controlling behavior. Studies in his laboratory also focus on the roles of these glial cells in disorders of the nervous system; including epilepsy, sleep disorders, and depression, among others. In addition to studying synaptic transmission, Dr. Haydon and colleagues are applying two-photon excitation laser microscopy to study the development of amyloid plaques in mouse models of Alzheimer’s disease. Using this technology, Dr. Haydon and colleagues are able to repeatedly image the development of individual identified plaques and, using adeno-associated virus to selectively transduce neurons as well as astrocytes, observe and manipulate cellular signaling within neurons and glia to identify the roles of different cell types in the development of the disorder. To these ends, his laboratory employs a variety of experimental strategies to study astrocyte-synapse interactions including molecular genetic manipulations of the astrocyte, in vivo and slice electrophysiology, two-photon microscopy, and behavioral studies.
David Beversdorf, MD, is William and Nancy Thompson Endowed Chair in Radiology at the University of Missouri School of Medicine. Dr. Beversdorf is also an associate professor of neurology and psychological sciences and a researcher at MU’s Thompson Center for Autism and Neurodevelopmental Disorders.

Dr. Beversdorf received his medical degree from Indiana University and completed his neurology residency at Dartmouth University. He completed a research-oriented fellowship in cognitive and behavioral neurology at the University of Florida. After 10 years on the faculty at The Ohio State University, he joined MU to help expand research at the Thompson Center.

Dr. Beversdorf is involved in research on autism, drug abuse, dementia, cognitive effects of stress, the cognitive neuroscience of problem-solving ability, functional neuroimaging, and pharmacological modulation of cognition. He has a particular interest in pharmaco-functional neuroimaging as a potential treatment marker, as well as gene and stress interactions in the development of autism. Dr. Beversdorf has received funding from the NIH, the National Alliance for Autism Research, and the Health Resources and Services Administration for his work on problem solving, neuropsychopharmacology, and pharmaco-OMI with applications in autism and cocaine withdrawal. Additional funding comes from the MU Research Board, Mizzou Advantage and the Kansas City Area Life Sciences Foundation. In addition, Dr. Beversdorf has a Research Enrichment Dissemination grant from the MU Interdisciplinary Center on Aging to examine stress and diet interactions in dementia.

Dr. Beversdorf is the graduate studies chair of MU’s Interdisciplinary Neuroscience Program. He is a member of the American Academy of Neurology Science Committee and Translational Science Subcommittee and is the chair of the American Academy of Neurology Animal Research Task Force. Dr. Beversdorf also serves on the editorial board for the Journal of Autism and Developmental Disorders. He is a member of the National Institute of Mental Health Biobehavioral Research Awards for Innovative New Scientists (BRAINS) study section and a regular ad hoc member of the NIH Behavioral Medicine: Interventions and Outcomes (BMIO) study section.

Siqi Liu, PhD, has been the director of the Proteomic Analysis Center at Beijing Institute of Genomics at the Chinese Academy of Sciences since 2003. He is also a visiting professor in the Department of Medicine at the University of Louisville, Kentucky.

Dr. Liu received his doctorate in molecular biology and biochemistry from the University of Texas in 1994. In 1998, he co-founded the Beijing Institute of Genomics, one of the world’s largest genomics centers. Dr. Liu now serves on the institute’s board and oversees proteomics research there. His research is focused on studying the regulation mechanisms of gene expression, gene products, and the relationship between protein structures and their functions, especially for the cancer-related genes. Dr. Liu is overseeing more than 10 research projects and has published more than 70 academic papers.

Over the past decade, Dr. Liu has actively participated in many genomics projects, such as the human genome project, the hybrid rice genome and cancer genomics. Dr. Liu is an active scientist working on the proteomic frontier, and his laboratory is key in the human liver proteome project. Dr. Liu fully realizes the importance of post-translational modified proteins and their functions. He has carried out projects to generate monoclonal antibodies recognizing the specific sites of modified proteins and to develop the affinity techniques for enrichment of the modified proteins. His group is currently developing the bioinformatical means to effectively annotate the MS/MS data upon the accuracy mass spectrometry and to create databases for the differential and quantitative proteomics.
Grace Sun, PhD, is a professor of biochemistry at the University of Missouri and scientific director of the MU Center for Translational Neuroscience. She holds joint appointments with MU Departments of Pathology and Anatomical Sciences and Nutritional Sciences and is a member of the Interdisciplinary Neuroscience Program. She is also a project leader at MU’s NIH-funded Center for Botanical Interaction Studies, one of five of its kind in the country.

Dr. Sun received her bachelor’s degree in chemistry from Seattle Pacific University and her doctorate in biochemistry from Oregon State University. She carried out postdoctoral research with the late Dr. Lloyd Horrocks at Cleveland Psychiatric Institute in Ohio.

Dr. Sun initiated pioneering work in neurochemistry and maintains a research focus on brain lipids and signaling pathways in relation to aging and neurodegenerative diseases, including Alzheimer’s disease, alcoholism and stroke. Her recent research focuses on aberrant biochemical mechanisms and signaling pathways underlying oxidative stress in brain cells, with the hope of developing novel therapeutic strategies to combat neurodegenerative diseases. Throughout her more than 35-year tenure in the MU biochemistry department, Dr. Sun’s research has been continuously funded. She serves as the program director for the NIH-funded MU Alzheimer’s Program Project.

Dr. Sun has participated in and organized many national and international symposia as well as edited and contributed to book chapters. Her active research program has led to the publication of more than 270 original peer-reviewed papers and book chapters. Besides serving as a reviewer for the Journal of Neurochemistry, the Journal of Lipid Research, and Brain Research, she has served on the editorial board for Neurochemical Research and Neurochemistry International. Dr. Sun has been a faithful member of the American Neurochemistry Society, the International Neurochemistry Society, the Society for Neuroscience, and the American Society for Biochemistry and Molecular Biology. She has served as a board member of the mid-Missouri chapter of the Alzheimer’s Association.

She was the recipient of Seattle Pacific University’s distinguished alumni Medallion Award in 2001, MU’s William H. Byler Distinguished Professor Award in 2003, and the Altrusa Award in Health in 2004.
Gary Weisman, PhD, is a professor and director of graduate admissions in the Department of Biochemistry at the University of Missouri. He received his bachelor’s degree from the Polytechnic Institute of Brooklyn and his doctorate in chemistry from the University of Nebraska. He was a postdoctoral associate at Cornell University where he investigated the biochemical actions of extracellular nucleotides. He is the leader of the Inflammation and Environmental Stress Research Group at MU’s Christopher S. Bond Life Sciences Center. Since joining MU, his research group has performed pioneering studies on the identification of receptors for extracellular nucleotides.

Dr. Weisman’s current research interests still involve nucleotide receptors, or P2 receptors, which are present in nearly all cells and tissues where they mediate diverse functions, including the regulation of platelet aggregation, muscle contraction, neurotransmission, insulin secretion, epithelial ion transport, wound healing and cell growth. Dr. Weisman is concerned with the involvement of these receptors in the development and progression of Alzheimer’s disease. Other research in his laboratory is investigating the role of the P2 receptors in inflammatory diseases, including atherosclerosis, obesity, diabetes, and Sjögren’s syndrome.

Dr. Weisman has published more than 100 papers in peer-reviewed journals. The NIH, the American Diabetes Association, the American Heart Association, the Cystic Fibrosis Foundation, and MU’s Food for the 21st Century Program have funded his research.

W. Gibson Wood, PhD, is a professor of pharmacology and director of graduate studies in the Department of Pharmacology at the University of Minnesota in Minneapolis, and the associate director of the Geriatric Research, Education and Clinical Center with the city’s VA Medical Center.

Dr. Wood received his bachelor’s degree and doctorate from Texas Tech University in Lubbock. His academic interests include psychology, biology, psychopharmacology, and neurobiology. As a post-doctoral fellow at Syracuse University, he studied aging and genetics.

Dr. Wood’s laboratory is studying cholesterol regulation in the brain, the role of cholesterol in cell structure and function, its involvement in neurodegenerative diseases, and mechanisms of neuroprotection afforded by cholesterol-lowering drugs. Cholesterol plays many roles in the brain, and it is required for optimal functioning. As with cholesterol outside of the brain, regulation of this molecule in the brain can go awry as demonstrated most poignantly in human malformation syndromes of inborn errors of cholesterol synthesis and Niemann-Pick type C disease. Furthermore, there is evidence suggestive of cholesterol being a factor in neurodegenerative diseases such as Huntington’s disease, Alzheimer’s disease, and pathophysiology occurring with increasing age. Dr. Wood’s group uses multiple approaches such as molecular and cellular biology, transgenic animals and cell lines in understanding the dynamics of brain cholesterol.
Edward Koo, MD, is a professor of neurosciences at the University of California, San Diego, School of Medicine, and associate director of the university’s Alzheimer’s Disease Research Center. Dr. Koo received his undergraduate degree in 1976 from Amherst College and his medical degree from Duke University School of Medicine in 1980. With training in neurology and neuropathology, Dr. Koo has research interests in the cellular and molecular biology of neurodegeneration. He focuses primarily on laboratory research, but also sees patients in neurology clinics and assesses Alzheimer’s disease research participants.

Dr. Koo’s lab focuses on understanding the pathophysiology of Alzheimer’s disease, with the hope of translating findings from basic cellular and molecular biological studies to the clinical setting to better understand the causes of the disease and their impact on patients’ lives. He has been recognized for his studies on characterizing the physiological function of the amyloid precursor protein (APP) and how it might contribute to Alzheimer’s pathogenesis in ways unrelated to amyloid production, as well as the functions, processing and trafficking of APP. His work helped identify the role of presenilin-1, a protein that has been linked to hereditary Alzheimer’s disease in intracellular signaling pathways and modifications of beta-catenin. More recently, he has focused his attention on how synapses are damaged in Alzheimer’s disease.

Gary Wenk, PhD, is a professor of psychology, neuroscience and molecular virology, as well as immunology and medical genetics at The Ohio State University and Medical Center. He is a leading authority on the consequences of chronic brain inflammation and animal models of Alzheimer’s disease.

Dr. Wenk received his bachelor’s degree in psychology and biology from Albion College and his doctorate in neurotoxicology from the University of Cincinnati. He was then trained as a postdoctoral fellow in the laboratory of Drs. Peter Davies and Robert Terry at the Albert Einstein College of Medicine of Yeshiva University. Dr. Wenk joined the faculty of the Departments of Psychology and Pathology at The Johns Hopkins University for nine years and served as a program director for the Neurobiology of Learning and Memory and Biological Basis of Behavior Program, Division of Behavioral and Neural Sciences, at the National Science Foundation. He joined the faculty of the University of Arizona and was a research scientist in the Division of Neural Systems, Memory and Aging for 15 years prior to joining Ohio State.

Dr. Wenk’s research is focused on the investigation of drugs that can slow the progression of Alzheimer’s disease and rescue the brain from the consequences of normal and pathological aging associated with chronic neuroinflammation. He is a recipient of the Vernon and Virginia Furrow Excellence in Teaching Award and the Five Star Faculty Teaching Award.
Gary Miller, PhD, is a professor of environmental health and the associate dean for research at the Rollins School of Public Health at Emory University. He is also professor of neurology and pharmacology in the Emory University School of Medicine. Dr. Miller received his doctorate in pharmacology and toxicology from the University of Georgia in 1995 and completed postdoctoral training in molecular neuroscience at Emory University.

Dr. Miller is interested in the role of environmental and genetic factors in the development of Parkinson’s disease. His laboratory has shown that disruption of vesicular storage of monoamines can increase vulnerability of the neurons that die in the disease. Based upon these findings, his laboratory has developed a mouse model of Parkinson’s disease that displays progressive loss of dopamine and norepinephrine neurons and a variety of motor and non-motor symptoms of the disease.

Dr. Miller is director of the National Institute of Environmental Health Sciences (NIEHS)-funded P01 Emory Parkinson’s Disease Collaborative Environmental Research Center. He is also director of the NIEHS-funded T32 Training Grant in Toxicology. Dr. Miller has served on several NIH review panels. He is currently associate editor of the journal *Neurotoxicology*. He serves on editorial boards of *Toxicology Letters*, the *Journal of Pharmacology and Experimental Therapeutics*, and *Toxicological Sciences*.

In 2010, Dr. Miller received the Achievement Award from the Society of Toxicology for his outstanding contributions to the field and the Outstanding Mentor of the Year Award from the Emory Graduate Division of Biomedical and Biological Sciences.

Zezong Gu, MD, PhD, is an assistant professor in the Department of Pathology and Anatomical Sciences at the University of Missouri School of Medicine and is a co-founder of the MU Center for Translational Neuroscience.

Dr. Gu received his medical degree from Tianjin Medical University in China and his doctorate in cell biology and neuroscience from the University of Texas Medical Branch in Galveston. He then joined Dr. Stuart Lipton in the Sanford-Burnham Medical Research Institute at La Jolla, Calif., where he advanced from postdoctoral fellow to research assistant professor, before being recruited to MU to help create the Center for Translational Neuroscience.

Dr. Gu’s interests include aging and neurodegenerative diseases with a focus on nitrative and oxidative stress-mediated redox signal transduction, particularly posttranslational modifications of critical protein cysteine residues (as its multi-functions in structure/conformation and regulation of the activity of proteins) and their impact on protein proteolysis, aggregation, and neuronal cell death. He and his colleagues discovered that reactive nitrogen/oxygen species (RNS/ROS)-induced nitrosative/oxidative stress alters functions of both extracellular and intracellular key molecular events in neurodegenerative disorders. Dr. Gu’s lab uses multidisciplinary approaches that include microsurgery, pharmacology, genetics, protein biochemistry and proteomics, molecular imaging and structural modeling.

Dr. Gu is actively engaged in teaching neuroscience curricula to medical and graduate students, and he is training 10 undergraduate and graduate students, medical students and residents in his laboratory. He is the director of the Translational Neuroscience Seminar series and a member of the executive committee of the Interdisciplinary Neuroscience Program.

Dr. Gu is the recipient of the Dana Foundation grant for young investigators, the American Heart Association grant from the National Scientist Development program, an NFL Charities grant for sports medicine research in collaboration with the University of Notre Dame, as well as an NIH grant in collaboration with the Sanford-Burnham Medical Research Institute. Dr. Gu is co-investigator of Research Project 2 and the Proteomic Core of the MU Center for Botanical Interaction Studies, one of five botanical research centers supported by the NIH.
SANDRA J. HEWETT, PHD

Sandra Hewett, PhD, is a professor of neuroscience at the University of Connecticut Health Center. She received her undergraduate degree from Providence College and her doctorate in pharmacology and toxicology from Michigan State University. Dr. Hewett’s research focuses on the mechanisms underlying cell death and the involved interplay between excitotoxicity and inflammation in the central nervous system.

Dr. Hewett’s laboratory seeks to elucidate the molecular and biochemical mechanisms by which post-ischemic inflammation contributes to the progression of the neuronal injury that follows stroke. Brain damage associated with cerebral ischemia is mediated by overstimulation of excitatory amino acid receptors such as excitotoxicity, oxidative and nitrosative stress and inflammatory factors. Her laboratory has been at the forefront of studying these problems for the past two decades. She has demonstrated that it is unlikely an ‘either or’ situation and that these processes operate concurrently. Molecules of interest in her laboratory include inducible forms of nitric oxide synthase (NOS) and cyclooxygenase (COX), L-12/15 lipoxygenase (12/15 LO) and Interleukin-1β (IL-1β). Both in vitro and in vivo models of injury are employed, taking a ‘molecules to mouse’ and ‘mouse to molecules’ approach to the essential questions posed. Importantly, many of her studies point to the central role of astrocytes, when activated, to injury.

Dr. Hewett’s research program is internationally recognized. She has been honored with the Donaghue Investigator Award from the Patrick and Catherine Weldon Donaghue Medical Research Foundation, the American Heart Association’s Established Investigator Award, the American Society for Neurochemistry’s Jordi Folch Pi Memorial Award, and Michigan State University’s Kenneth E. Moore Distinguished Alumna Award. She has served consistently on NIH study sections since 1999. She is currently an associate editor of Prostaglandins and Other Lipid Mediators and a deputy chief editor of the Journal of Neurochemistry.

TENG-NAN LIN, PHD

Teng-Nan Lin, PhD, is a research fellow at the Institute of Biomedical Sciences at Academia Sinica in Taipei, Taiwan. He is also an adjunct associate professor in the molecular medicine program in the Life Science College, National Yang-Ming University and Graduate Institute of Medical Sciences, Taipei Medical University.

Dr. Lin’s research interests focus on areas related to the mechanisms of angiogenesis – gene regulation of growth factors and their receptors; cellular and molecular mechanism of neuronal injury and recovery; and gene transfer in the central nervous system.

Dr. Lin received his undergraduate degree in chemistry from Tunghai University in Taiwan and his doctorate in biochemistry from the University of Missouri. He completed postdoctoral training at Baylor College of Medicine in Houston before joining the Institute of Biomedical Science. Since no treatment is yet available to limit brain damage after stroke, a major goal for Dr. Lin’s research is to unravel the cellular and molecular mechanism of neuronal injury in addition to recovery following ischemia-reperfusion. His recent interest points to angiogenesis – promoting new vessel growth to treat ischemic disorders – as a therapeutic mechanism to combat cerebrovascular diseases.

This research has led to studies on cyclooxygenase-1 (COX-1)-based gene transfer to augment the angiogenic factor PGI2, and subsequent activation of Peroxisome Proliferator-Activated Receptor-γ (PPAR-γ) in attenuating inflammation and treatment of ischemic stroke. PPAR-γ can also inhibit ischemia-induced Bcl-2/Bcl-xl degradation and formation of ROS and ROS-related genes, thus associated mechanisms that enhance neuronal survival.
Roger Tsien, PhD, was awarded the Nobel Prize in Chemistry in 2008 for the discovery and development of the green fluorescent protein, GFP. The protein first observed in the jellyfish Aequorea victoria in 1962 is one of the most important tools used in contemporary bioscience. With the aid of GFP, researchers have developed ways to watch processes that were previously invisible, such as the development of nerve cells in the brain or how cancer cells spread.

Dr. Tsien is an investigator with the Howard Hughes Medical Institute and a professor of pharmacology, chemistry and biochemistry at the University of California, San Diego. He attended Harvard College on a National Merit Scholarship, graduating at the age of 20 with a degree in chemistry and physics in 1972. Dr. Tsien received his doctorate in physiology in 1977 from the University of Cambridge and remained there as a research fellow until 1981. Following faculty appointments at the University of California, Berkeley, he joined the University of California, San Diego, in 1989.

Dr. Tsien is best known for designing and building molecules that either report or perturb signal transduction inside living cells. These molecules, created by organic synthesis or by engineering naturally fluorescent proteins, have enabled many new insights into signaling via calcium, sodium, pH, cyclic nucleotides, nitric oxide, inositol polyphosphates, membrane and redox potential changes, protein phosphorylation, active export of proteins from the nucleus, and gene transcription. He is now developing new ways to target contrast agents and therapeutic agents to tumor cells based on their expression of extracellular proteases.

Dr. Tsien was a scientific co-founder of Aurora Biosciences Corporation (ABSC), which went public in 1997 and was acquired by Vertex Pharmaceuticals (VRTX) in 2001. He was also a scientific co-founder of Senomyx Inc. (SNMX) in 1998, which went public in 2004. His honors include First Prize in the Westinghouse Science Talent Search (1968), Searle Scholar Award (1983), Artois-Baillet-Latour Health Prize (1995), Gairdner Foundation International Award (1995), Award for Creative Invention from the American Chemical Society (2002), Heineken Prize in Biochemistry and Biophysics (2002), Wolf Prize in Medicine (shared with Robert Weinberg, 2004), Rosenthal Award (2006), E.B. Wilson Medal of the American Society for Cell Biology (shared with M. Chalfie, 2008), and Nobel Prize in Chemistry (shared with O. Shimomura and M. Chalfie, 2008). He is a member of the National Academy of Sciences and the Royal Society.
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Symposium Parking

The Christopher S. Bond Life Sciences Center is located on the northwest corner of College Avenue and Rolls Street. Limited complimentary on-campus parking hangtags for the Virginia Avenue Garage will be available at the symposium registration desk. Registrants may pick up a parking hangtag during Sunday registration time, which will not require a permit, or make time to visit the registration desk and return their hangtag to their vehicles prior to the start of the symposium on Monday.

Visitors must display parking hangtags in their vehicles to avoid tickets or towing.