

MEMORANDUM

TO: High School Science Instructors, College Counselors, Students, and Parents

FROM: Drs. Anne Theibert & Carl McFarland

SUBJECT: Neuroscience Major at UAB

It is our pleasure to announce a new and very special major at the University of Alabama at Birmingham: Neuroscience. As you may know, neuroscience is the study of the structure and function of the nervous system with a special focus on the brain and its role in behavioral processes, the mechanisms of behavior, and the nature of cognitive function. There does not exist an area of science “hotter” than this one. Even a highly successful writer like Tom Wolfe has said, “If I were a college student today, I don’t think I could resist going into neuroscience!” Nobel Laureate, James Watson, proclaims “The brain is the last and grandest biological frontier, the most complex thing we have yet discovered in our universe. It contains hundreds of billions of cells interlinked through trillions of connections. The brain boggles the mind.”

We invite you to visit our website <http://www.unp.uab.edu/> and review the program information to determine if you have students who might be interested in such a major. This is a selective major, so we are especially interested in talented and highly motivated students. We offer the only neuroscience major in the State of Alabama, and one of the few in the entire Southeast. The field of neuroscience provides excellent career opportunities as a field of study in itself, or as preparation for medical school, dental school, and other professional pursuits. What is especially unique about our program is that it is the first undergraduate program in Alabama jointly sponsored by a School of Medicine and traditional Academic Affairs. This groundbreaking collaboration provides students with an opportunity to benefit from one-on-one research training with some of the nation’s premier neuroscientists. Below we have listed just a few of UAB’s top neuroscientists to provide you with an idea of the stature of our faculty and research mentors.

David Sweatt, Ph.D. is the Evelyn F. McKnight Professor of Neurobiology, Director of the McKnight Brain Institute, and Chair of the Department of Neurobiology in the UAB School of Medicine. Dr. Sweatt studies the molecular mechanisms underlying long-term memory formation. Recently, his laboratory discovered new ways in which altered gene structure and function is involved in memory formation and stabilization. These discoveries are likely to lead to the development of innovative treatments for memory disorders such as learning disabilities and Alzheimer’s disease.

Edward Taub, Ph.D. is University Professor of Psychology, and the recipient of many prestigious international research awards. The Taub laboratory has developed a neuro-rehabilitation technique, termed CI therapy, which is more effective in improving the ability to use a debilitated limb after stroke and traumatic brain injury than other any

rehabilitation therapy. Work is now being continued to explore what changes the therapy makes in the injured brain that are responsible for its effectiveness. Dr. Taub's research program was named by the Society for Neuroscience as one of the top ten "translational" research programs in history.

Bruce R. Korf, M.D., Ph.D. is Professor and Chair of the Department of Genetics in the UAB School of Medicine. Dr. Korf is a clinical investigator with a focus on study of neurogenetic disorders. Current projects include study of genotype-phenotype correlations in neurofibromatosis type 1 (NF1); study of the natural history and growth rate of tumors in patients with NF1; and conducting clinical trials concerning major manifestations of NF1 and tuberous sclerosis complex.

James H. Meador-Woodruff, M.D. is the Heman E. Drummond Professor and Chair of the Department of Psychiatry and Behavioral Neurobiology. His laboratory focuses on understanding how different parts of the brain communicate with other parts via chemical signals, and how this communication is disrupted in schizophrenia and other serious psychiatric illnesses. His current research projects include studying the expression of genes associated with neurotransmission within individual cells in the nervous system using cutting-edge techniques in brain samples, and how neurotransmitter-associated proteins are abnormally modified within the brain in psychiatric disorders.

Alan Randich, Ph.D. is Professor of Psychology and Director of the Behavioral Neuroscience Doctoral Program. Pain is the leading reason why people go to see a doctor and normally arises from tissue injury. The brain has systems in place that try to suppress or inhibit the incoming pain signals and Dr. Randich's laboratory examines how these brain inhibitory systems normally work and the circumstances under which they sometimes fail to operate properly leading to chronic pain conditions. His particular area of interest is in pain arising from a disease called interstitial cystitis which affects the bladder of primarily women. Dr. Randich is studying whether this bladder pain arises from an early-in-life developmental disruption of the brain mechanisms that might suppress bladder pain such that the bladder becomes hypersensitive and painful in adulthood.

David G. Standaert, M.D., Ph.D. is the John and Juanelle Strain Professor of Neurology, Director of the Center for Neurodegeneration and Experimental Therapeutics, Director of the Division of Movement Disorders, Director of the UAB Comprehensive Neuroscience Center, and Vice-Chair of the Department of Neurology. He specializes in the treatment of Parkinson's disease and similar disorders. His laboratory studies both the root causes of Parkinson's disease as well as the origin of the disabling symptoms that appear after long term treatment of the disease. Recently, his group has focused on approaches to reducing the toxicity of the protein synuclein, which seems to be central to the disease, and on studies of the role of neuroinflammatory reactions in disease progression. The goal of his work is to develop new treatments and cures for Parkinson's and related conditions.

Harald Sontheimer, Ph.D. is Professor of Neurobiology, Director of the Civitan International Research Center, and Director of the Center for Glial Biology in Medicine. The Sontheimer laboratory studies the role of brain support cells, also called glia, in brain health and disease. Their research has demonstrated that glial cells are important housekeepers clearing ions and neurotransmitters released from active nerve cells. When the brain or spinal cord is injured, however, glia cells lose these functions and contribute to brain edema. The Sontheimer lab has made great strides in understanding the glial response to injury and found novel ways to modify it so as to help the brain and spinal cord to recover after injury. Glia cells are also responsible for most of the cancers that form in the brain. These are called gliomas and constitute the most deadly cancer in humans. This is the cancer that Senator Ted Kennedy died from. The Sontheimer laboratory has developed two drug treatments for the treatment of gliomas and both have been used in patients through clinical studies. One of these drugs, a peptide isolated from the venom of a scorpion, has shown great promise and led to a one hour documentary that aired on the National Geographic's channel.

Kevin Roth, M.D., Ph.D. is Professor and Chair of the Department of Pathology. The Roth lab studies the molecular regulation of neuronal cell death. Ongoing projects are focused on discovering neuroprotective agents for treating neurodegenerative diseases and on developing more effective chemotherapeutic agents for the treatment of brain tumors.

John J. Hablitz, Ph.D. is Professor and Vice Chair of the Department of Neurobiology. The Hablitz lab investigates mechanisms in the brain that cause people to have epileptic seizures. Animal models of epilepsy are to study abnormal brain development. A variety of neuroimaging and electrophysiological recording techniques are employed to understand how changes in neuromodulators and neurotransmitters can produce hyperexcitability in the brain.

By now, you should have some idea of the overall caliber of the neuroscience faculty at UAB, but this is just a small sample of the scientists participating in our new undergraduate major. We will always have a greater number of faculty members than we have students in the program! So, please spread the word! We would be happy to meet with, or communicate via email with, anyone interested. cmcfarla@uab.edu

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