

DAYTON MEDICINE, June 07

Neuroscience Research Advances at Wright State

By Judi Engle

Wright State University Boonshoft School of Medicine has established a Comprehensive Neuroscience Center (CNC) for improving research of neurological, developmental, cognitive, psychiatric, and trauma-induced nervous system disorders.

“The formation of this new center will substantially accelerate our progress in establishing Wright State University as a leader in neuroscience. The center will organize and support our neuroscientists and technical resources in ways that will advance our research of the nervous system at levels ranging from cellular and molecular mechanisms to behavior,” says Timothy C. Cope, Ph.D., chair and professor of the Department of Neuroscience, Cell Biology and Physiology, who will also serve as the center’s director.

The newly established center will integrate teams of scientists and clinicians across several disciplines – on and off campus – to collaboratively address fundamental issues in both basic science and clinical neuroscience research. Actively involved are faculty in the fields of biochemistry, cell biology, molecular biology, neuroscience, pharmacology, physiology, psychiatry, psychology, and toxicology.

Research of one of the core group of basic neuroscientists focuses on the structure, function, and development of synapses and neural circuits, particularly those necessary for normal sensorimotor behavior. A central point of interest is the spinal motoneuron, which is indispensable to normal movement and whose dysfunction is a

source of movement abnormalities in clinical problems ranging from paralysis to spasticity. Additional research foci include cellular and molecular mechanisms underlying cell volume control in neurons and glial cells; the neurobiology of psychoses and biomarkers for treatment response, with special emphasis on the study of schizophrenia; and the neuroendocrine system and its role in stress.

Pooled resources and advanced technologies include electron and confocal microscopy; both *in vivo* and *in vitro* electrophysiological methods; immunohistochemistry; PET and MRI imaging; computational modeling; proteomics using mass spectroscopy; and genomics technology for gene expression profiling and genotyping.

Most recently, the Comprehensive Neuroscience Center learned that it is one of a few national recipients of prestigious Program Project Grant from the National Institute of Neurological Disorders and Stroke (NINDS). The \$5 million grant is the first Program Project Grant Wright State University has received. These grants are designed to “encourage multidisciplinary research approaches to a diverse array of nervous system disorders,” according to NINDS, and the guidelines require at least three interrelated projects that contribute to the program objective. These grants are extremely competitive, and this award underscores the high caliber of neuroscience research being conducted at Wright State.

The goal of this Program Project Grant is “to understand how injury, regeneration, and alterations in neural activity affect synaptic and network function and to explore the mechanisms that either promote or impede recovery.” Five collaborative

projects, each led by an NIH-funded investigator, will work through a shared imaging core to better understand the recovery – or lack of it – from neurotrauma.

The CNC was made possible through a grant from the Boonshoft Innovation Fund, established when Oscar Boonshoft, a local philanthropist and long-time supporter, gave Wright State University School of Medicine a gift of \$28.5 million dollars in 2005. His goal was to provide new resources to spur innovative ideas and programs that would propel the school to national leadership in medical education, patient care and research.

This initiative builds upon the success of the Center for Brain Research, according to Robert E. W. Fyffe, Ph.D., associate dean for research affairs. The critical infrastructure for this field of research was established with assistance from the National Institutes of Health and, locally, by The Kettering Fund. Grants received from these sources helped coordinate neuroscience research and recruit additional outstanding research faculty to Wright State. The Kettering Fund has supported biomedical research at the Boonshoft School of Medicine since 1998 and was instrumental in advancing several key research areas at the medical school.

“The vision for this collaborative center is to continue to build upon our core strengths and infrastructure as well as leverage strategic resources,” explains Howard M. Part, M.D., dean for the Boonshoft School of Medicine. “We see neuroscience research as a significant growth area and an important component in educating our students and advancing patient care.”