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Stockton University Receives Federal Grant for Brain Development Research

Over $380,000 from National Institute of Neurological Disorders & Stroke

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Galloway, N.J. - Stockton University has received a grant from the National Institute of Neurological Disorders and Stroke (NINDS), part of the federal government's National Institutes of Health (NIH), to examine a neurodevelopmental pathway in the brain.

The project will investigate the mechanisms in neural stem cells (NSCs) that can lead to neurological pathologies. The three-year project, with total funding of $380,133, is titled "Akt-mTOR Pathway Impact on Neural Stem Cell Fates."

"Stockton students will have a major role in the research, with at least two students working full time each summer during the project," said President Harvey Kesselman. "This reflects Stockton's commitment to providing opportunities for faculty-mentored student research and to keeping our focus on 'students first.'"

Nathaniel Hartman, assistant professor of Biology, is the principal investigator for the project. Peter Straub, dean of the School of Natural Sciences and Mathematics (NAMS), is a co-investigator. Other participants in the research include collaborators from the Yale University School of Medicine and Clemson University.

Neural stem cells are the building blocks of the brain, lying at the core of brain development and function. Small changes in how these cells grow and divide can lead to profound defects and disorders. Dysfunction in both the Akt and mTOR pathways is known to contribute to the development of Tuberous Sclerosis and Autism Spectrum Disorder in the developing brain. Despite a wealth of studies on brain development, very little is known about Akt and mTOR function in neural stem cells. This project will focus on how Akt and mTOR interact to control neural stem cell behavior.

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Hartman received a Ph.D. in Biology from Wesleyan University and conducted postdoctoral studies in neuroscience at the Yale University School of Medicine. His background is in cellular neuroscience and molecular biology, with an expertise in developmental timing and stem cells. He was awarded the 2010 Barry Kiefer prize for Graduate Research for his work at Wesleyan University.

"I appreciate that Stockton has provided the crucial early financial and physical means to pursue both this work and to mentor undergraduates as they develop their scientific careers," Hartman said. "I established an independent laboratory at Stockton University three years ago. My goals are to conduct novel and important neural development research, provide professional-level research experiences for students, and to mentor and train the next generation of neuroscientists."

Hartman joined the faculty of the Biology program in 2013. He has extensive experience mentoring undergraduates as a faculty member at Stockton, as a postdoctoral fellow at Yale University School of Medicine, and as a graduate student at Wesleyan University. Several of his students have gone on to be accepted into graduate degree programs.

Straub received both an M.S. and a Ph.D. in Marine Biology/Biochemistry from the University of Delaware. He conducted postdoctoral studies in Molecular Biology at Washington University in St. Louis. He is a graduate of Stockton, earning a B.S. in Marine Science. Straub brings to the project over 20 years of undergraduate teaching and research experience in molecular biotechnology.

Straub has been training undergraduates in automated DNA sequencing for over 12 years, beginning with a Major Research Infrastructure (MRI) grant from the National Science Foundation that introduced this technology at the undergraduate level. He has worked with many students, and many have gone on to earn advanced degrees. Straub's roles on this grant will be to serve as a mentor to the undergraduate students, support Hartman's professional development, and assist with some of the technical analysis.

As both a faculty member, and now a dean, Straub has made a strong commitment to procure and maintain excellent facilities for undergraduate research at Stockton. This collaborative project will strengthen that mission at Stockton, a primarily undergraduate institution.

NAMS awards about 22 percent of all the science and mathematics undergraduate degrees at New Jersey's senior public colleges and universities. The Unified Science Center 2, a $28.62 million expansion of the world-class facilities of the Unified Science Center, will house teaching and research labs for various disciplines in the sciences, a vivarium, a large greenhouse, a multi-purpose room and faculty offices. It is scheduled to open in spring 2018.

"This is an exciting time for Stockton," Straub said. "We are taking our research and scholarly activities to a new level. We are building upon past successes and establishing a better infrastructure. This creates a heightened and more practical educational experience for our students. This gives them the opportunity to be better prepared for life after Stockton, whether that involves graduate school or entry into the workforce."

The mission of NINDS is to seek fundamental knowledge about the brain and nervous system and to use that knowledge to reduce the burden of neurological disease. The knowledge gained by this project will provide new insight into how Akt-mTOR signaling in NSCs can progress to pathological states observed in diseases like Tuberous Sclerosis and Autism Spectrum Disorder. The long-term goal is to advance the understanding of the molecular mechanisms that influence the progression of neurodevelopmental disorders. # # #