UCI, UCSD RESEARCHERS RECEIVE PRESTIGIOUS BRAIN INITIATIVE AWARD

NIH grant to fund study of brain region implicated in Alzheimer’s, epilepsy

The National Institutes of Health has awarded Xiangmin Xu, PhD, associate professor in the Department of Anatomy and Neurobiology at the University of California, Irvine School of Medicine, and Douglas Arthur Nitz, PhD, professor in the Department of Cognitive Science at the University of California, San Diego, a $2.5-million, five-year grant to study new neural circuit pathways in a region of the brain associated with learning and memory, as well as epilepsy.

The proposed research is part of the Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative. Using recent technological advancements, the team will focus on newly discovered neural pathways in the brain structure called the hippocampal formation. This brain region plays essential roles in learning and memory, and spatial navigation, and is implicated in many neurological diseases including Alzheimer’s disease and temporal lobe epilepsy.

The proposed studies of new and functionally significant hippocampal circuits are aligned with the specified goals of Targeted Brain Circuits Projects of the BRAIN Initiative, and will address mechanisms of circuit function in the context of specific neural systems and seek to understand circuits of the central nervous system by systematically controlling stimuli and behavior.

“Our research will add to work already underway to create a deeper understanding of neural circuits and dynamic network interactions in the brain. In particular, mapping the hippocampal formation will enable us to better ascertain the neural circuit mechanisms that underlie neurological disorders including Alzheimer’s and epilepsy,” said Xu. “It could open the door to new therapeutic interventions of the progression of Alzheimer’s and temporal lobe epilepsy.”

The research proposal, entitled, “Subiculum circuits for cortical feedback regulation of spatial mapping and learning,” will specifically focus on the synaptic circuit organization and functional implications of the “top-down” and feedback pathway from the retrosplenial cortex, to the subiculum and the hippocampal CA1. The subiculum is an under-investigated brain structure well positioned to mediate circuit interactions between the hippocampal and neocortical systems.

Xu and Nitz’s research will contribute to a mechanistic understanding of how dynamic patterns of specific subiculum neural activity are transformed into spatial navigation and cognition. Highly significant, Xu and Nitz’s research represents one of many strengths of neuroscience research at both UCI and UCSD.

“Understanding the way the brain processes information and how it lays down memories and retrieves them will be instrumental for understanding brain health, and ultimately, preventing brain disease,” said NIH Director Francis S. Collins, MD, PhD.

About the NIH BRAIN Initiative: The Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative is aimed at revolutionizing our understanding of the human brain. By accelerating the development and application of innovative technologies, researchers will be able to produce a revolutionary new dynamic picture of the brain that, for the first time, shows how individual cells and complex neural circuits interact in both time and space. Long desired by researchers seeking new ways to treat, cure, and even prevent brain disorders, this picture will fill major gaps in our current knowledge and provide unprecedented opportunities for exploring exactly how the brain enables the human body to record, process, utilize, store, and retrieve vast quantities of information, all at the speed of thought. For more information, visit: https://www.braininitiative.nih.gov/

About the University of California, Irvine: Founded in 1965, UC Irvine is the youngest member of the prestigious Association of American Universities. The campus has produced three Nobel laureates and is known for its academic achievement, premier research, innovation and anteater mascot. Led by Chancellor Howard Gillman, the university has more than 30,000 students and offers 192 degree programs. Located in one of the world’s safest and most economically vibrant communities, UC Irvine is Orange County’s second-largest employer, contributing $5 billion annually to the local economy. For more about UCI, visit www.uci.edu