RESEARCH INTERNSHIP EXPERIENCE AT SIU SCHOOL OF MEDICINE

Department of Pharmacology

Internship Description

The internship provides hands-on experience in biomedical research. Departmental research programs are broadly focused on understanding the mechanisms of disease with the intent of developing better approaches to disease prevention and/or treatment. Interns will work with faculty and their research teams to design and perform experiments, analyze and interpret data, and report findings. Based upon their own research interests, interns may choose to work in a specific lab. Below is a brief description of the ongoing research projects in the labs of participating faculty.

Experience Gained through Internship

Interns will gain a fundamental understanding of how biomedical research is conducted in an academic setting. Technical research skills will be acquired based upon the expertise available within participating labs. Examples of technical skills include animal handling, breeding strategies and use of genetically modified models for research questions, molecular techniques, cell culture, animal surgeries, electrophysiological techniques, animal behavior analysis, and immunostaining. Students will also develop skills in experimental design, data collection, and analysis.

Participating Faculty

Julio Copello, PhD. Dr. Copello’s lab studies calcium ion (Ca\(^{2+}\)) signaling in striated muscle (heart and skeletal muscle) with focus on Ryanodine receptor channels (RyRs; channels that release calcium from intracellular stores to the cytosol to trigger contraction) and the Ca\(^{2+}\) pump of intracellular stores (SERCA; which removes Ca\(^{2+}\) from the cytosol for muscle relaxation). The overall goal is to understand the role of RyRs and SERCA in diseases of the muscle (malignant hyperthermia) and the heart (arrhythmia, ischemia). Additional studies test intracellular Ca\(^{2+}\) signal in chemoresistant and chemosensitive cancer cells (collaboration with Dr. S. Tischkau). Methods: electrophysiological channel recordings, photometric assays of Ca\(^{2+}\) uptake, binding, cell culture and molecular biology methods.

Brandon Cox, PhD. Dr. Cox’s lab studies hearing loss and the regeneration of sensory hair cells in the inner ear. We have several projects focused on understanding the process of spontaneous hair cell regeneration that occurs in the newborn mouse ear, as well as how hair cell survival is regulated. All projects use genetically modified mice to delete or overexpress a gene in specific cell types. Techniques used in the lab are primarily immunostaining and confocal microscopy. Our ultimate goal is to identify drug targets to stimulate hair cell regeneration in humans who suffer from hearing loss.

Randolph Elble, PhD. Dr. Elble is a cancer cell biologist and pharmacologist. The lab studies study tumor suppression mechanisms in breast, lung, and oropharyngeal cancers. Currently they focus on factors that relate growth signaling to cell-cell interactions and sensitize cancer cells to chemotherapy. Students will learn cell culture, cell biological and molecular biological techniques, and some basic pharmacological principles.
Carl Faingold, PhD. The Faingold lab investigates brain function and how epilepsy, alcoholism, chronic pain, and anticonvulsants alter this function. A major goal of the lab is to identify anticonvulsant drugs that prevent abnormal brain activity without affecting normal function. Neurophysiology, neuroanatomy, neuropharmacology, and neuroimaging approaches in intact behaving animals are used to investigate these problems. Brain surgery and computer-assisted single cell recording test the effects of drugs on brain network sites.

Shelley Tischkau, PhD. Dr. Tischkau’s lab is interested in environmental factors that contribute to disease processes. There are two ongoing projects. The first project explores the contribution of environmental toxins to the development of endocrine disorders, including obesity and diabetes. The second examines how disruptions in sleep/wake cycles impact aging, including the development of dementia. Techniques ranging from whole animal behavior to molecular biological approaches in cultures cells are used to explore mechanisms that relate to disease processes with the goal of better understanding the physiology and pathology to develop novel therapeutic targets.

Time Commitment
Variable, but typically 20 h per week for 16 weeks; Internships are available in Fall, Spring, and Summer

Contact Information
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