



The department of pharmacodynamics is highly integrative and collaborative, spanning the gap between cellular and systems pharmacology and physiology. Faculty study drug action at the molecular, physiological and behavioral levels across normal and disease states, with interests in cancer, stress, anxiety, addiction, pain, neuroinflammation, cardiovascular disease, feeding and metabolic dysfunction. At one time, all 11 tenure-track faculty members had at least one grant from the National Institutes of Health.

Education and Training

The Ph.D. in pharmaceutical sciences is offered with a concentration in pharmacodynamics, allowing aspiring scientists to study under the direction of the department's faculty and collaborate across University of Florida Health, the university's academic health center. The Center for Integrative Cardiovascular and Metabolic Diseases is housed within the department and supports an emerging group of faculty across UF, researching diseases such as Type 2 diabetes, obesity, chronic kidney disease, stroke and atherosclerosis.

Faculty are currently principal investigators or co-investigators on grants from the National Institute of Mental Health, the National Institute on Drug Abuse, the National Heart, Lung and Blood Institute, the National Institute of Child Health and Human Development, the National Institute on Alcohol Abuse and Alcoholism, the National Cancer Institute, the National Institute of Diabetes and Digestive and Kidney Diseases, the National Center for Advancing Translational Sciences, the Department of Defense, and the American Heart Association. Faculty in the department of pharmacodynamics use a wide variety of in vitro and in vivo techniques and approaches, including genomics, transcriptomics, proteomics, metabolomics, electrophysiology, behavioral pharmacology, microdialysis sampling, optogenetics, genome editing, chemogenetics, viral-based circuit mapping and in vivo imaging. The ultimate goal is to better understand drug action across a range of conditions.

Faculty funding and focus are in the following core areas:

- ▶ **Stress/Endocrinology:** Oxytocin and stress responsiveness, limbic system physiology and mood disorders, neurological regulation of cardiovascular function, and systemic responses to chronic stress
- ▶ **Peripheral Nervous System:** Molecular mechanisms of vagal sensing from peripheral organs to the brain, defining neural subpopulations based on visceral, molecular and genetic patterns, and viral tract tracing to map neural circuitry of peripheral nerve signaling
- ▶ **Addiction/Pain:** Drug addiction, reward signaling, novel therapeutics for the treatment of substance use disorders, pain neurobiology and novel pain treatments
- ▶ **Neurodegeneration/Inflammation/Toxicity:** Aging, neurodegenerative disorders such as Parkinson's and Alzheimer's, human immunodeficiency virus, or HIV, HIV-1 Tat protein and HIV-associated neurologic disease and alcohol neurotoxicity
- ▶ **Cancer Drug Discovery:** Novel drug targets and development of new senolytic agents and anti-tumor agents, including proteolysis targeting chimeras, or PROTACs, for aging, age-related diseases and cancer
- ▶ **Cardiovascular / metabolic signaling:** Small molecule positive modulators targeting natriuretic peptide receptors and chemokine receptors as novel therapeutics for hypertension, cardiac fibrosis and diabetic wound healing, and development of microphysiological system to study muscle degeneration.

Top 5

UF is ranked among the top public universities and pharmacy colleges by U.S. News & World Report

DEPARTMENTAL FACTS

17

Ph.D. students

6

postdoctoral fellows

11

tenured and tenure-track faculty

79

publications in 2020-21

\$7.3 million

in research awards, academic year 2020-21

Tenured, Tenure-Track and Clinical Faculty



Lance McMahon, Ph.D.
Professor and Chair

The McMahon lab uses quantitative in vivo pharmacology to develop new drug treatments to help individuals who abuse and become dependent on drugs, and new therapeutics devoid of abuse and dependence liability.



Bin Liu, Ph.D.
Associate Professor and Graduate Coordinator

The Liu lab uses molecular, cellular and animal models to study the role of neuroinflammation in the pathogenesis of neurological disorders induced by environmental toxicants and substances of abuse, with the ultimate goal of identifying novel therapeutic targets.



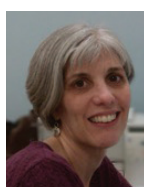
Guillaume de Lartigue, Ph.D.
Assistant Professor

The de Lartigue lab's research revolves around the neurobiology of feeding, specifically the peripheral neurons that make up the sensory arm of the vagus nerve. Molecular and genetic tools are used to target, image and trace projections from subpopulations of sensory vagal neurons that innervate the gut to study the signals that activate them and the circuits they recruit.



Charles Jason Frazier, Ph.D.
Associate Professor

The Frazier lab focuses on cellular neurophysiology, leveraging state-of-the-art electrophysiological and optical tools to better understand how aging alters cortical signaling and to reveal novel central effects of endogenous oxytocin relevant to stress response and social behaviors.



Maureen Keller-Wood, Ph.D.
Professor and Associate Dean for Research and Graduate Education

Dr. Keller-Wood's research interest is maternal-fetal interactions in health and disease. Her current research focus is the adverse effects of glucocorticoids and maternal hyperglycemia on fetal cardiac maturation and risk of stillbirth and the development of therapeutic strategies to reduce these adverse effects.



Eric Krause, Ph.D.
Associate Professor and Director of the Center for Integrative Cardiovascular and Metabolic Diseases

The Krause lab focuses on integrative systems neuroscience and neuropharmacology and uses a variety of advanced genetic, anatomical and behavioral approaches to identify novel therapeutic targets for stress-related pathologies like anxiety, depression and cardiovascular disease.



Siobhan Malany, Ph.D.
Associate Professor

The Malany lab seeks to implement improved in vitro cell-based systems to better predict human drug efficacy, particularly for age-related diseases. With funding from NIH's National Center for Advancing Translational Sciences Tissue Chip Program, the lab is developing a microphysiological system for sarcopenia.



Jay McLaughlin, Ph.D.
Professor

The McLaughlin lab screens novel compounds for safer painkillers with fewer liabilities of use and as new treatments to counter opioid and substance abuse. Additional research examines mechanisms by which HIV mediates neuropathology and alters behavior.



Joanna Peris, Ph.D.
Associate Professor and Associate Director of the Center for Addiction Research and Education

The Peris lab studies the neurobiology of addiction, including regulation of ethanol reward signaling. One goal is to assess the impact of binge ethanol intake on neuronal activity in reward circuitry using optogenetic and microdialysis techniques.



Brandon Warren, Ph.D.
Assistant Professor

The Warren lab focuses on decoding how drug addiction is stored in memory. Since strong neuronal activity drives expression of the immediate early gene Fos, the lab uses Fos expression to identify neuronal ensembles activated during behavior. The goal is to understand how these memories are encoded to strengthen or weaken them as part of treatment.



Lihui Yuan, Pharm.D., Ph.D., R.Ph.
Clinical Lecturer

Yuan's research interests include diabetes, bacterial pathogenesis and hypertension, and cardiovascular disease. Her recent research with the department of pathology at UF has focused on establishing associations of viral infections and Type 1 diabetes.



Daohong Zhou, M.D.
Professor of Pharmacodynamics and Radiation Oncology
Henry E. Innes Professorship of Cancer Research

Dr. Zhou's studies have led to a better understanding of the cellular and molecular mechanisms by which interventional radiology and chemotherapy cause normal tissue damage and the discovery of the first potent and broad-spectrum senolytic drug and a BCL-XL PROTAC.