Graduate Student Affairs: (949) 824-7651 (Program administered by the Department of Pharmacology)

Geoffrey W. Abbott, Graduate Program Director/Advisor for the Interdisciplinary Program

Overview

The Department of Pharmacology in conjunction with the Department of Pharmaceutical Sciences offers an interdisciplinary program leading to a Ph.D. degree in Pharmacological Sciences. The Ph.D. degree prepares students for careers in academic research institutions, in the biotechnology and pharmaceutical industry, in federal and state agencies, and in private research institutions by providing a research-intensive approach to the study of pharmacology.

Faculty research programs in the Department of Pharmacology that are currently available through this program include molecular and cellular pharmacology, neurosciences, gene regulation, circadian rhythms, epigenetic modifications, neuropharmacology, psychopharmacology, cardiovascular pharmacology, structure-based drug design, and screening-based drug discovery. Emphasis is placed on providing an integrated understanding of drug receptors: their structure, location, and function; molecular aspects of drug action; receptor signaling mechanisms; structure-activity relationships and drug design; the influence of genetic variation on drug-receptor interactions; and the role of receptors and drugs in development and aging, plasticity, reinforcement and drug abuse, neural disorders, and cardiovascular physiology and disease. Information about the Department of Pharmacology faculty and their research programs is available at http://www.pharmacology.uci.edu/. For course descriptions see the Department of Pharmacology (catalogue.uci.edu/previouseditions/2013-14/schoolofmedicine/pharmacologyandtoxicology/#courseinventory) in the School of Medicine section of the Catalogue.

Faculty research programs in the Department of Pharmaceutical Sciences that are available through this program currently include organic, medicinal, and bioorganic chemistry; structural biology; structure-based drug design; high-throughput screening; molecular neuropharmacology; the pharmacology of aging; natural product biosynthesis and synthase engineering; cancer prevention and therapy; gene regulation and intercellular signaling; computational biology and bioinformatics; and nanomedicine for targeted drug and gene delivery. Information about the Department of Pharmaceutical Sciences faculty and their research programs is available at http://www.pharmsci.uci.edu. For course descriptions see the Department of Pharmaceutical Sciences (catalogue.uci.edu/previouseditions/2013-14/departmentofpharmaceuticalsciences/#courseinventory) in the Catalogue.

Program Requirements

Prerequisites for admission include a bachelor’s degree in one of the core disciplines of pharmacology, namely a physical science (including computer science), a biological science, biochemical or biomedical engineering, or allied field. Non-biological sciences majors must have passed a minimum of two quarters (or one semester) of introductory biology. In addition, courses in biochemistry, pharmacology, protein structure and function, biophysics, or related fields would be a plus regardless of major. The general Graduate Record Examination is required for admission; subject GRE exams are optional but can provide valuable additional information to the admissions committee in marginal applications. The graduate program requires a diverse group of classroom courses selected by the student in consultation with the Graduate Advisor. The departmental requirements leave the student a great deal of latitude in choosing an area of emphasis. In keeping with this principle and the highly interdisciplinary nature of pharmacology, and subject to the approval of the Graduate Advisor, students may take graduate courses in allied fields outside the Department such as Biological Sciences, Physical Sciences, Engineering, or Computer Science. Similarly, up to eight units of graduate courses taken through UCI University Extension and/or UCI upper-division undergraduate classes can be counted toward the elective course requirements with prior written approval from the Graduate Director. In addition, two lab rotations of one quarter in length are required.

Advancement to candidacy for the Ph.D. normally takes place in the third year and is based on an oral and written exam assessing overall performance and progress in the program. Students may also receive the M.S. degree after completion of appropriate requirements. The main additional requirement for the Ph.D. is the satisfactory completion and oral defense of a written dissertation based on original research carried out under the guidance of a faculty member. All candidates for the Ph.D. degree are required to engage in research activities throughout the course of their academic programs. This requirement applies to all students whether or not they are compensated for such services. An appointment as a graduate student researcher is awarded on the basis of scholarship and not as compensation for services rendered. The normative time for advancement to candidacy is three years, and all requirements for the Ph.D. degree should be completed within five years (the maximum time permitted is seven years). For more information, contact the Pharmacological Sciences Graduate Program Director/Advisor.

Graduate Program Faculty–Pharmacology

Geoffrey W. Abbott: Biology and pharmacology of voltage-gated potassium channels, voltage-independent potassium channels, and ion transporters

Emiliana Borrelli (Joint): Dopamine signaling and drugs of addiction; mouse models of neurological and neuropsychiatric disorders

Oliver Civelli: Molecular biology of G protein-coupled receptors; discovery of novel neuropeptides; functional characterization of novel neuropeptides, discovery of active components of traditional Chinese medicines

Frederick J. Ehliert: Muscarinic receptor coupling mechanisms; functional role of muscarinic receptor subtypes; pharmacological methods of analysis; analysis of drug receptor interactions

Pietro R. Galassetti (Joint): Physiological and altered adaptive responses to stress in healthy and dysmetabolic children and adults; non-invasive monitoring of metabolic variables through analysis of exhaled gases

Kelvin W. Gee: Pharmacology of allosteric modulators of the GABAA receptor, selective modulation of GABAA receptor subtypes; novel molecular targets for neuropharmacological agents and drug discovery
Naoto Hoshi: Physiological role and regulation of the M-channel, molecular biology, electrophysiology and live cell FRET imaging

Frances M. Leslie: Addiction, drugs of abuse and brain development

Z. David Luo (Joint): Molecular mechanisms of pain transduction; study gene regulation and signaling pathways in chronic pain processing using animal models, and molecular biology techniques

Daniele Piomelli (Joint): Lipid-derived signaling, special emphasis on endogenous cannabinoids; role in pain, mental health and inflammation; cellular and system pharmacology and medicinal chemistry used to identify pharmacological agents that interfere with the functions exerted by endocannabinoids and other signaling lipids

Qun-Yong Zhou: Pharmacology and physiology of prokineticins and prokineticin receptors

Xiaolin Zi (Joint): Cancer prevention and treatment using novel naturally occurring compounds and the study of their underlying molecular mechanisms; secreted Wnt antagonists in cancer growth and metastasis

Shiou-Chuan (Sheryl) Tsai: Biochemistry, chemical biology, structural biology, enzymology, microbiology

Weian Zhao: Stem cell therapy, diagnostics, biosensors, nano- and microtechnology, aptamers

Graduate Program Faculty–Pharmaceutical Sciences

Bruce Blumberg: Molecular embryology, molecular biology, developmental biology, functional genomics, endocrinology, pharmacology, high-throughput screening

Richard Chamberlin: Organic synthesis, chemical biology, medicinal chemistry

John Fruehauf: Mechanisms of drug action and resistance with the goal of improving therapeutic outcomes for cancer patients

Celia Goulding: Structural biology, biochemistry, proteomics, microbiology, X-ray crystallography

Stephen Hanessian: Organic, bioorganic, and medicinal chemistry

Mahtab Jafari: Anti-aging effects of botanicals and pharmaceutical compounds; the impact of botanical extracts on mitochondrial bioenergetics, oxidative stress, and other pathways of aging using cell culture and Drosophila

Young Kwon: Gene therapy, drug delivery, cancer-targeted therapeutics, combined molecular imaging and therapy, cancer vaccine

Andrej Luptak: RNA biology and chemistry

David Mobley: Computational techniques for drug discovery, free energy calculations, molecular simulations, solubility

Thomas Poulos: Protein crystallography, protein engineering, heme enzyme structure and function

Jennifer Prescher: Chemical biology, molecular imaging, organic chemistry, immunology, bioorthogonal chemistry, post-translational modifications

Rainer Reinscheid: Neuropharmacology of peptide transmitters involved in stress, sleep, and memory using cellular and transgenic animal models

Paolo Sassone-Corsi: Signal transduction and gene expression; chromatin remodeling and epigenetics; germ cell differentiation; circadian clock and rhythms