Program Overview

Pharmacology is an extremely broad discipline that combines knowledge of chemistry and biology into an integrated approach for studying biological systems. Faculty research interests may range from studies at the molecular level to studies of animal behavior. Efforts may focus on the characterization of fundamental processes in biological systems through the actions of drugs on the system. In this department, emphasis is placed on elucidating molecular and cellular control mechanisms, including those present in the nervous system, such as second messengers, lipid mediators, and protein phosphorylation. Specialties emphasized in the department include molecular pharmacology, neurobiology, neuropharmacology, electrophysiology, substance abuse, lipid mediators, and cancer biology. The methodologies employed in these fields of study include molecular structure techniques, computational pharmacology, genomics, and proteomics. The scientific impact of research from this faculty is rated among the highest of all departments of pharmacology. The program of study leading to the Ph.D. degree ordinarily requires five years. Formal course work in other basic medical sciences, notably molecular biology and cell biology, neurobiology, and biochemistry, is encouraged. The Program is highly flexible and individualized to meet the particular requirements, interests, and abilities of each student.

Research Facilities

The department occupies over 43,000 square feet, consisting largely in laboratories fully equipped for pharmacological research. The modern instrumentation available to the department includes complete facilities for performing radioisotopic experiments; a cutting-edge NMR facility for protein structural studies (including one of the few 900MHz magnets currently available in the country); facilities for recombinant DNA expression, manual and automated sequencing, PCR amplification, microarray analysis, and oligonucleotide synthesis; computerized equipment for performing electrophysiological image analysis, and behavioral studies; mass spectrometers; a large variety of gas, high-performance liquid, and other forms of chromatographic equipment, spectrophotofluorometers, and spectrometers; and analytical and preparative ultracentrifuges. UCHSC Pharmacology provides a complete, state-of-the-art-technology environment for its students in the newly constructed Research Complex One facility on the Anschutz Campus.

Financial Aid/Cost of Study

Fellowships and traineeships are available for the entire period of graduate work for students who maintain satisfactory progress. Student support includes all tuition and fees, individual health and dental insurance, and provides an annual stipend of $27,000. Awards are made to select, accepted applicants who are citizens or permanent residents of the United States.

Cost of Living/Housing

Students generally have little difficulty finding suitable inexpensive housing close to the Health Sciences Center, which is located near several residential sections east of Denver. The cost of living in the Greater-Denver area is moderately lower than in many other metropolitan areas in the U.S.

Student Group

There are approximately 530 medical students, 145 dental students, 150 undergraduate students, 300 graduate nursing and 100 professional nursing students, 300 professional and 25 graduate pharmacy students, and 575 graduate students in the clinical and basic sciences at the University of Colorado Health Sciences Center. There are typically about 30 graduate students in the Department of Pharmacology at any given point in time, with an average admitted class size of 4-7 new students.

Location

Greater Denver has a population of approximately 2.5 million. The climate in Denver and its environs is exceptionally pleasant, with mild, sunny winters, warm, dry summers, and over 300 days of sunshine a year. Residents are able to take advantage of a tremendous variety of outdoor activities throughout the year. Denver sits nearly at the foot of the Rocky Mountains, where many facilities for skiing, hiking, and camping are open year-round. The city of Denver has a symphony orchestra, excellent natural history and fine arts museums, a noted performing arts center, and all of the other cultural and recreational facilities typical of large urban areas. Travel to and from Denver is facilitated by a large number of daily airline flights out of a newly-constructed international airport only minutes from the Anschutz Campus.

Health Sciences Center

The University of Colorado Health Sciences Center was founded on the Boulder campus in 1883 and moved to “the 9th Avenue” location in 1924. The School of Medicine is under the administration of the University of Colorado and maintains close academic ties with the campus at Boulder. The Medical Center has undergone considerable expansion in the past decade, with numerous medical research institutes now located the original 9th Avenue campus and the newest research facilities, both present and under construction, at the Anschutz Campus in Aurora. As new buildings rise, the Anschutz Campus will develop into a thoroughly modern, fully integrated research environment, including two large research complexes, a new library, medical school teaching facilities, new hospitals, including University Hospital and Cancer Center, Children’s Hospital, and likely, the VA Hospital. In addition, there is a Biotech Research Park focused on incubating start-up companies, as well as a planned town center with residential and retail components—all within a few minutes’ walk.

Applying

Applicants should apply before January 1 for admission for the following academic year, beginning in the fall. Suggested college courses include inorganic and organic chemistry; biology; mathematics, including calculus; and physics. Results of the General Test of Graduate Record Examinations (GRE) should be sent when the original application is submitted. More detailed information and application materials can be obtained from the website addresses listed below or by writing to the address provided below.

Contact Information

Elizabeth Bowen, Graduate Training Coordinator: 303 724 3565  
email: grad.pharm@ucdenver.edu, website: http://pharmacology.ucdenver.edu

UCD School of Medicine  
Dept. of Pharmacology, MSC 8303  
Aurora CO 80045-0508
K. Bayer, Associate Professor, Ph.D., Heinrich-Pette-Institute: Molecular memory mechanisms in cellular signal transduction and neuronal function; CaMKII and Ca2+ signaling

Timothy Benke, Associate Professor, M.D./Ph.D., Baylor College of Medicine: Mechanisms of synaptic plasticity and impacts of development and epilepsy

Mair Crammer, Professor, Ph.D., Johns Hopkins Univ.: Structure and mechanism in gene regulation; bioophysical and structural studies of protein-nucleic acid and protein-protein complexes in chromatin and bacterial pathogenesis

Scott Dell’Acqua, Professor and Vice Chair, Ph.D., Harvard Univ.: Organization of signaling complexes by protein kinase and phosphatase anchoring proteins; mechanisms regulating neuronal second messenger signaling in synaptic plasticity

Peter Henson, Professor, Ph.D., Case Western Reserve Univ.: Central molecular and lung progression receptor mechanisms controlling affective functions and suppressors of neuronal survival and cell biology in lung epithelial cells and human lung cancer cell lines

Jeffrey Kieft, Assistant Professor, Ph.D., Univ. of Colorado, Boulder: Molecular pharmacology; pharmacogenetics; neuroadaptation and neurotransmitter metabolism/ enzymology; CNS receptor molecular pharmacology and genomics/ genomics of addiction

Andrew Thorburn, Professor and Chair, D.Phil., Univ. of Oxford: Understanding the signaling mechanisms that control apoptosis in cancer development and during the response of tumor cells to cancer therapeutics

Timothy Benke, Associate Professor, M.D./Ph.D., Case Western Reserve Univ.: Signal transduction mechanisms regulating phospholipase A2 activation and the production of lipid mediators of inflammation

Robert Murphy, Distinguished Professor, Ph.D., Vanderbilt Univ.: Epigenetic regulation of heart failure; signaling and transcriptional mechanisms of muscle disease

Raphael Nemeth, Professor, Ph.D., Cornell Univ.: Signaling pathways controlling growth and differentiation of vascular smooth muscle cells; Role of eicosanoids in lung cancer

J. Port, Professor, Ph.D., Univ. of Utah: G-protein linked receptors and their regulation; regulation of mRNA stability

William Sather, Associate Professor, Ph.D., Univ. of Washington: Signaling through calcium channels in neurons

Natalie Serekova, Associate Professor, Ph.D., Univ. of Bremen: Animal Imaging (MRI, PET, CT); Magnetic Resonance Spectroscopy (MRS) based metabolomics; Cancer Metabolism and Physiology; Anti-Cancer Drugs; Ischemia/Reperfusion in Organs

Cynthia Leslie, Professor, Ph.D., Univ. of Georgia: Signal transduction mechanisms regulating phospholipase A2 activation and the production of lipid mediators of inflammation

Timothy McKinsey, Associate Professor, Ph.D., Vanderbilt Univ.: Epigenetic regulation of heart failure; signaling and transcriptional mechanisms of muscle disease

Christina Wu, Associate Professor, Ph.D., Univ. of Colorado, UCDHSC: Proteomic analysis of membrane proteins from complex biological samples using mass spectrometry; molecular mechanisms of intracellular trafficking and organellar biogenesis

Jeffrey Kieft, Assistant Professor, Ph.D., Univ. of Colorado, Boulder: Molecular pharmacology; pharmacogenetics; neuroadaptation and neurotransmitter metabolism/ enzymology; CNS receptor molecular pharmacology and genomics/ genomics of addiction

Sherry Ostrander, Professor, Ph.D., Univ. of Colorado, Boulder: Molecular pharmacology; pharmacogenetics; neuroadaptation and neurotransmitter metabolism/ enzymology; CNS receptor molecular pharmacology and genomics/ genomics of addiction

Andrew Thorburn, Professor and Chair, D.Phil., Univ. of Oxford: Understanding the signaling mechanisms that control apoptosis in cancer development and during the response of tumor cells to cancer therapeutics

Richard Trasymen, Distinguished Professor, Ph.D., Johns Hopkins Univ.: Neuroscience, cerebrovascular physiology, stroke, cardiac arrest/CPR, respiration, cardiopulmonary physiology

Chandra Tucker, Assistant Professor, Ph.D., Univ. of Washington: Study and manipulation of protein homeostasis and signaling pathways in live cells, optogenetic tools for controlling protein interactions, synthetic biology, cytosolic protein misfolding, yeast genetics/genomics

Mary Weiser-Evans, Associate Professor, Ph.D., Colorado State Univ.: Defining the molecular signaling mechanisms regulating vascular smooth muscle cell function in the setting of vascular fibroproliferative diseases, including restenosis and pulmonary hypertension

Christine Wu, Associate Professor, Ph.D., Univ. of Colorado, UCDHSC: Proteomic analysis of membrane proteins from complex biological samples using mass spectrometry; molecular mechanisms of intracellular trafficking and organellar biogenesis

Nancy Zahniser, Professor, Ph.D., Univ. of Pittsburgh: Cellular mechanisms regulating dopamine transporter trafficking and activity. Role played by dopamine and glutamate systems in individual differences in cocaine-induced behavioral activation and addiction. Interactions of adenosine and dopamine in the basal ganglia and limbic systems.