Graduate Study in Pharmacology and Toxicology

The University of KANSAS

The program in pharmacology/toxicology at the University of Kansas appeals to students who want to teach and/or do research in a university or do research in a pharmaceutical/biotechnology company or government laboratory. We attract students who wish to work out individual programs of study by taking advantage of the opportunities available at a major research university. Our students can look forward to personal development in an atmosphere that fosters strong collaborative activities as well as independent scholarship.

If this type of program fits your professional training expectations, we invite you to join us.

Forward-Looking Research Programs

KU's School of Pharmacy consistently ranks in the top three schools in the nation in NIH funding. The department's research programs and faculty place it at the leading edge of research in the biomedical sciences. In addition to receiving strong training in modern pharmacology and toxicology, students are encouraged to use the expertise and courses available in the Departments of Medicinal Chemistry, Molecular Biosciences, and Pharmaceutical Chemistry. The university has strong programs in neurobiology, molecular biology, and bioanalytical chemistry. Some of our students participate in collaborative interdisciplinary research in these fields of biomedical science.

Several faculty members are affiliated with KU's Higuchi Biosciences Centers and the Institute for Life Span Studies.

Higuchi Biosciences Centers focus on interdisciplinary research in the molecular and cellular approaches to drug discovery. Faculty members work on isolation of brain proteins, regulation of gene expression, neural stem cells, Ca2+ signaling in cells, DNA arrays, proteomics, signal transduction pathways in neuronal and other types of cells, the molecular biology of drug metabolism and toxicity, development of transgenic animals as models of disease, and high throughput drug screening.

The Institute for Life Span Studies focuses on interdisciplinary research in behavioral sciences with special emphasis on behavioral biology, behavioral pharmacology, neuropharmacology, and neurotoxicology. Participating faculty members study potential interventions for developmental disabilities, drug-induced behavioral anomalies such as dyskinesias, neurobiological mechanisms underlying self-injurious behavior, and many other issues that require expertise in both neuropharmacology and behavioral biology.

These well-established opportunities for interdisciplinary research training in the pharmaceutical, biological, and behavioral sciences make the program at KU unique in its breadth and in the array of disciplines students may draw upon in designing their own programs to fit their own career plans.

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Programs of Study

The majority of students enter the department to pursue the Ph.D. degree. However, an M.S. degree also is offered. The department trains a number of postdoctoral research associates. To enter the department as a graduate student, an applicant must hold an undergraduate degree in biological, chemical or physical sciences, pharmacy, or the equivalent. All students undertake course work in a core of basic courses in pharmacology, toxicology, biochemistry, cell and molecular biology, and medicinal chemistry. Each student also takes elective courses that fit individual interests and career objectives. The final step in either the M.S. or the Ph.D. degree program is the presentation of a thesis or dissertation describing original work. The thesis work is carried out under the direction of a faculty member or members. The thesis research is the most significant aspect of a student's preparation for a career in pharmacology/toxicology.

The Department

Malott Hall, on the Lawrence campus, houses the Department of Pharmacology and Toxicology as well as the Departments of Medicinal Chemistry and Chemistry. The Department of Molecular Biosciences is in adjacent Haworth Hall. The faculty includes eight full-time members as well as several courtesy faculty members from the Departments of Chemistry, Molecular Biosciences, Pharmaceutical Chemistry, and the Higuchi Biosciences Centers. There are about 20 graduate students, 10 postdoctoral research associates, and several undergraduate research students working in department laboratories.

Financial Aid

Research or teaching assistantships are available through the department to qualified applicants. KU also offers a limited number of special fellowships for outstanding U.S. students, one of which is the prestigious Self Fellowship.

Applications

Inquiries and applications are welcome at any time. Most students enter the program in August. Full consideration for August admission can be assured for all applications received before January 5. Graduate application fees are as follows:

Domestic students applying online: $45
Domestic students applying on paper: $55
International students applying online: $55
International students applying on paper: $60

For further information, contact

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Web site: *www.pharm.ku.edu/pharmtox*
Online Graduate School application: *www.graduate.ku.edu*

PHARMACOLOGY AND TOXICOLOGY

The University of Kansas

Faculty Members and Their Research

Kenneth L. Audus. Prof., Pharmaceutical Chemistry, Ph.D., Univ. of Kansas. Development of tissue culture systems for brain microvessel endothelium (blood-brain barrier); gastric and placental epithelium as *in vitro* models for drug transport, metabolism, pharmacology, and toxicology.

Charles J. Decedue. Prof., Chemistry, Pharmacology and Toxicology; Executive Director, Higuchi Biosciences Centers; Ph.D., Louisiana State Univ. Protein chemistry, enzymology, and analytical biochemistry.

Rick T. Dobrowsky. Assoc. Prof., Pharmacology and Toxicology, Ph.D., North Carolina State Univ. Signalling pathways mediating growth suppression, lipids as second messengers in growth and differentiation, pathways leading to survival or apoptosis in neurons.

Morris D. Faiman. Prof., Pharmacology and Toxicology, Ph.D., Minnesota. Central mechanisms in alcohol addiction and new pharmacotherapies; mechanism(s) of oxygen toxicity; free radical formation; antioxidant defense mechanisms.

Stephen C. Fowler. Prof., Pharmacology and Toxicology, Ph.D., Princeton Univ. Behavioral pharmacology, chemically induced alterations in motor function, drugs affecting dopaminergic activity in the brain, instrumentation design for behavioral studies with transgenic mice.

Keshava Kumar. Assoc. Prof., Pharmacology and Toxicology, Ph.D., Mysore. Molecular mechanisms in synaptic function, growth factors and glutamate receptors.

Elias K. Michaelis. Prof., Chair, Dept. of Pharmacology and Toxicology; Director, Higuchi Biosciences Centers; M.D., St. Louis Univ; Ph.D., Univ. of Kentucky. Isolation and characterization of glutamate receptor proteins, immunochemistry and molecular biology of these receptors, patch clamp and biophysical studies of receptors in neurons and reconstituted receptors, effects of age on glutamate receptors in brain.

Mary L. Michaelis. Prof., Pharmacology and Toxicology, Ph.D., Univ. of Kansas. Molecular aspects of neuronal death in Alzheimer's disease, role of Ca^{2+} in age-related brain changes, and effects of alcohol on Ca^{2+} regulation in primary neuronal cultures.

Kathy E. Mitchell. Asst. Prof., Pharmacology and Toxicology, Ph.D., Univ. of Nevada–Reno. Role of ion channels and signaling molecules in stem cell differentiation, ion channels in macromolecular signaling complexes, and ion channel trafficking in polarized epithelia.

Kim M. Mitchell. Asst. Prof., Pharmacology and Toxicology, Ph.D., Univ. of Kansas. Development of biosensors for measuring neurotransmitters, superoxide anions, and NO in the brain and in neuronal tissue culture systems.

Roland J. Seifert. Assoc. Prof., Pharmacology and Toxicology, Ph.D., Free Univ. of Berlin. Molecular biology of G-proteins and the regulation of effectors in cells, mutational analysis for probing receptor-effector interactions, mechanisms of G-protein activation, regulation of nonselective cation channels.

Jeff Staudinger. Asst. Prof., Pharmacology and Toxicology, Ph.D., Texas, Southwestern Medical Center. Regulatory mechanisms in toxicology, identification of novel xenobiotic-inducible genes using gene-arrays and genetically altered mice, characterization of signal transduction pathways that interface with transcription factors mediating drug metabolism and drug transport.

Research Facilities

The department's state-of-the-art facilities offer a wide range of modern research instrumentation and numerous research support services. Major instruments include tissue culture rooms, monoclonal antibody facilities, an *in vivo* imaging system, luminometers, ultracentrifuges, flow cytometers, scintillation counters, high-pressure liquid chromatography systems, fluorometers and spectrophotometers, light and fluorescence microscopes, and extensive data analysis and graphics programs. Individual lab groups have more specialized equipment, such as electrophoresis and electrotransfer apparatus, PCR for DNA amplification, in vivo voltammetry stations, protein purification systems, and sophisticated instrumentation and computers for studies of operant conditioning and motor behavior.

Specialized research support facilities also contribute to the high quality of the programs. These include a laser confocal and electron microscopy laboratory, a DNA micro-array lab, a high throughput drug screening facility, a structural biology center, protein and DNA sequencing, MALDI-TOF and mass spectrometry instruments for proteomics, a molecular graphics laboratory with extensive data bases for protein structures, an NMR facility, a Biacore plasmon resonance instrument, and an instrument design laboratory.

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The $13-million Anschutz Library next to Malott Hall houses KU's extensive holdings in biology, chemistry, pharmacy, physics, and geology. The entire library collection can be accessed via online catalog. The science library is fully equipped for online computer searching of commercial data bases in the biomedical sciences.

Housing

A wide variety of housing is available both on and near the campus. For students with families, the university maintains Stouffer Place, a 292-unit apartment complex. One-, two-, and three-bedroom apartments are available for very reasonable rates. Off-campus apartments with monthly rents from $350 to $650 are also available.

The University

The University of Kansas is a major educational and research institution with 29,000 students and 2,100 faculty members. The university includes the main campus in Lawrence; the Medical Center in Kansas City, Kansas; the KU Edwards Campus in Overland Park; a clinical campus of the School of Medicine in Wichita; and educational and research facilities throughout the state. KU has 14 major academic divisions: the College of Liberal Arts and Sciences, the Graduate School, and the Schools of Allied Health, Architecture and Urban Design, Business, Education, Engineering, Fine Arts, Journalism and Mass Communications, Law, Medicine, Nursing, Pharmacy, and Social Welfare. Visit KU's Web site, *www.ku.edu*, or the Graduate School's Web site, *www.graduate.ku.edu*.

Research is an integral part of the university's educational process. KU has more than 40 special research facilities, in addition to those in individual departments and schools. KU receives more than $258 million a year for research in science, technology, the social sciences, and humanities. The National Science Foundation classifies KU as a major university receiving substantial research support. The Carnegie Foundation classifies KU as a research-extensive doctoral institution, a classification given to the top research universities.

The University of Kansas prohibits discrimination on the basis of race, color, religion, sex, national origin, age, ancestry, disability, veteran status, sexual orientation, marital status, and parental status.

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