

Pharmacology and Toxicology (Ph.D.)

[View PDF of Pharmacology and Toxicology Admissions Checklist](#)

Prospective students should use this checklist to obtain specific admissions requirements on how to apply to Graduate School.

[View PDF version of the Pharmacology catalog description](#)

Degree Offered:	Ph.D.
Director:	Dr. Coral Lamartiniere
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Web site:	www.uab.edu/pharmtox

Faculty

Edward P. Acosta, Associate Professor (Clinical Pharmacology); Pharmacokinetics of and Pharmacodynamics of Antiviral and Antiretroviral Drugs in Adults and Children with HIV Disease

Stephen Barnes, Professor (Pharmacology and Toxicology, Biochemistry and Molecular Genetics); Pharmacokinetics of Dietary Phytoestrogens and Mechanism of Their Action on Cancer and Heart Disease; Molecular Biology of the Amino Acid Conjugation of Bile Acids in Mammals; HPLC-Mass Spectrometry

Jimmy Bartlett, Professor (Optometry, Pharmacology and Toxicology); Clinical Ocular Pharmacology; Diagnosis and Treatment of External Ocular Disease and Glaucoma; Clinical Trials of Investigational Anti-Inflammatory, Anti-Infective, and Anti-Glaucoma Drugs

Donald Buchsbaum, Professor (Pharmacology and Toxicology; and Radiation Biology); Experimental Therapeutics With Radiolabeled Monoclonal Antibodies and Immunotoxins; Radiation Biology

Robert B. Diasio, Professor and Chairman (Pharmacology and Toxicology; Medicine; and Director, Division of Clinical Pharmacology); Biochemical, Molecular, Chemical, and Clinical Pharmacology of Antineoplastic Agents; Pharmacogenetics

Xu Cao, Assistant Professor (Pathology, Pharmacology and Toxicology); the Mechanisms of Differentiation of Multipotential Stem Cells Into Functionally Distinct Cell Types, Particularly, the TGF-Beta/BMP Transcription Factors That Control Initiation of Cascade Networks of the Cell Lineage Split

Ada Elgavish, Associate Professor (Genetics, Pharmacology and Toxicology, Urology); Molecular Mechanisms of Epithelial Cell Membrane-Extracellular Matrix Interactions: Role In Cancer and Chemoprevention

Charles N. Falany, Professor (Pharmacology and Toxicology); Protein Chemistry and Molecular Biology of Drug Metabolizing Enzymes and Molecular Biology of Bile Acid-Conjugating Enzymes

Clinton J. Grubbs, Professor (Surgery, Pharmacology and Toxicology); Nutrition; Reproductive Pathoendocrinology; Development of Animal Cancer Models; Metabolism and Binding of Chemical Carcinogens

Donald L. Hill, Research Professor (Pharmacology and Toxicology); Metabolism and Site of Action of Antitumor Agents, Chemopreventive Agents, Carcinogens, and Xenobiotics

Gail V. W. Johnson, Professor (Psychiatry and Pharmacology and Toxicology); Professor (Psychiatry and Behavioral Neurobiology); Neuropharmacology and Biochemistry of Neurodegenerative Disorders, Including Alzheimer's Disease and Huntington's Disease; Signal Transduction; Metabolism and Function of Neuronal Cytoskeletal Proteins

Martin Johnson, Assistant Professor (Pharmacology and Toxicology); Biochemical, Molecular and Clinical Pharmacology of Antineoplastic Agents; Pharmacogenetics

Richard S. Jope, Professor (Psychiatry and Pharmacology and Toxicology); Neuropharmacology and Neurochemistry of Neurological Disorders, especially Alzheimer's Disease, and Psychiatric Diseases, especially manic-depression; Regulation of Signaling Systems, Gene Expression, and Apoptosis/Survival

Helen Kim, Research Associate Professor (Pharmacology and Toxicology); Protein Biochemistry, Cell Biology, and Cytoskeletal Proteins in Normal and Disease States; Mechanisms of Estrogenic Factors in Modulating Cognition and Brain Function

Mahmoud el Kouni, Associate Professor (Pharmacology and Toxicology); Biochemical and Molecular Pharmacology of Nucleotide Metabolism in Mammalian Systems and Parasites

David D. Ku, Professor (Pharmacology and Toxicology, Cardiovascular Disease); Cardiovascular and Coronary Pharmacology; Role of Thrombin, Endothelium, and Platelets in Coronary Vasospasm and Ischemic Heart Disease

Coral A. Lamartiniere, Professor (Pharmacology and Toxicology); Environmental Toxicology; Molecular Endocrinology; Cause and Prevention of Mammary and Prostate Cancers

Xiaohua Li, Assistant Professor (Psychiatry, and Pharmacology and Toxicology); Neuropsychopharmacology and Clinical Psychopharmacology of Psychiatric Disorders; Role of Neurotrophic Factors and Regulation in Bipolar and Depressive Disorders

Elias Meezan, Professor (Pharmacology and Toxicology); Biochemical Pharmacology of Glycoconjugates in Health and Disease, Particularly Diabetes Mellitus

Dennis J. Pillion, Professor (Pharmacology and Toxicology); Endocrine Pharmacology; Administration of Insulin in Eye Drops and Nose Drops; Diagnosis and Treatment of Diabetes Mellitus

Denise R. Shaw, Research Associate Professor (Medicine, Pharmacology and Toxicology); Immunohematology and Immunotherapy

Jeffrey B. Smith, Professor (Pharmacology and Toxicology); Ubiquitin proteasome system (UPS) in apoptosis; Escape apoptosis by cancer cells; down-regulation of protein kinase C by UPS; Orphan receptor triggered by the carcinogenic metal cadmium

Hui Wang, Research Assistant Professor (Pharmacology and Toxicology); Molecular Therapeutics; Pharmacokinetics and Pharmacodynamics; Genetic-Based Therapy; Clinical Pharmacology and Clinical Trials; Cancer Prevention

Jun Wang, Research Instructor (Pharmacology and Toxicology); Cause and Prevention of Breast and Prostate Cancers; Molecular Endocrinology

Ruiwen Zhang, Associate Professor (Pharmacology and Toxicology); Antisense Therapy; Toxicology; Carcinogenesis; Anticancer Agents; Anti-AIDS Therapeutics; Cancer Prevention

Adjunct Faculty

John C. Besse, Associate Professor Emeritus (Pharmacology and Toxicology); Modulation of Vascular Smooth-Muscle Contractile Responses by Steroids

William P. McCann, Professor Emeritus (Pharmacology and Toxicology); Renal Physiology; Pharmacokinetics

Richard May, Adjunct Assistant Professor (Pharmacology and Toxicology); translational research for drug development (primarily for biotech and pharmaceutical companies) involving immune function assays, ELISAs, bone marrow progenitor cell assays, and assay development

William B. Parker, Adjunct Associate Professor (Pharmacology and Toxicology); Biochemical and Molecular Mechanism of Action of Anticancer and Antiviral Nucleoside Analogs

Program Information

The objectives of the program leading to the Ph.D. degree in Pharmacology and Toxicology are to prepare students for careers as research scientists in academia, government, or industry. Training and research programs include biochemical, endocrine, neuro-, cardiovascular, behavioral, and molecular pharmacology; environmental and molecular toxicology; chemical carcinogenesis and chemoprevention; and drug discovery, design, and toxicity

Admission to graduate study in Pharmacology and Toxicology requires a bachelor's degree in an appropriate science, such as chemistry or biology. Students should have completed courses in general and organic chemistry; mathematics through calculus; and general biology. Courses in biochemistry, physiology, and toxicology are also recommended. The Pharmacology and Toxicology graduate program committee reviews all applications for admission. Acceptance for graduate study in pharmacology is based on Graduate School admission criteria, and a personal interview with the graduate program committee if possible.

Completion of the requirements of the Ph.D. program normally requires four to five years for students entering with B.S. degrees. The general course of study will include introductory courses in pharmacology and toxicology, biochemistry, and physiology, as well as advanced courses selected in accordance with the student's area of specialization and with the guidance of the advisor and graduate study committee.

Additional Information

Deadline for Entry Term(s):	Fall only
Deadline for All Application Materials to be in the Graduate School Office:	June
Number of Evaluation Forms Required:	Three
Entrance Tests	GRE (TOEFL and TWE also required for international applicants whose native language is not English.)
Comments	GRE General Test is required; in addition, subject test is recommended.
Graduate Catalog Description	http://main.uab.edu/show.asp?durki=24923

For detailed information, contact Dr. Coral Lamartiniere, Graduate Program Director, UAB Department of Pharmacology and Toxicology, Volker Hall, Room 124, 1670 University Boulevard, Birmingham, AL 35294-0019.

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Web www.uab.edu/pharmtox/pharm.htm

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Pharmacology (PHR)

701. **Graduate Pharmacology I.** Introduction to graduate pharmacology. Dose-response relationships, drug absorption, disposition and metabolism, drug receptors, agonists and antagonists, enzyme receptor binding kinetics, pharmacokinetics, biostatistics. 3 hours.

702. **Graduate Pharmacology II.** Neuropharmacology. Drug modulation of neurotransmission; drugs used in diseases of the nervous system; sympathetic agonists and antagonists; cholinergic agents; CNS pharmacology. 3 hours.

703. **Graduate Pharmacology III.** Cardiovascular, renal and GI pharmacology. Drug modulation of the cardiovascular system, GI tract and renal system. Anti-inflammatory and anti-allergic agents. 5 hours.

704. **Graduate Pharmacology IV.** Endocrine pharmacology and chemotherapy of disease. Hormones; antimicrobial agents; antiparasitic drugs; cancer chemotherapy; antiviral and antifungal agents. 5 hours.

705. **Graduate Pharmacology V.** Molecular pharmacology. Current topics, including interaction between a particular drug and its target with emphasis on current literature; mechanisms of drug action.

*720. **Lab Rotation in Pharmacology.** Introduction to laboratory methods, experimental design and execution. Sequential rotations (one per term) mentored and based on student's research. 5-8 hours.

723. **Medical Pharmacology.** Comprehensive treatment of pharmacology and therapeutics including principles of pharmacology, neuropharmacology, cardiovascular, renal and gastrointestinal pharmacology and chemotherapeutics. 6 hours.

725. **Modern Drug Design and Development.** This course covers various topics regarding modern drug research and development, including molecular targeting, lead compounds screening, genomics, biotechnology, pharmacological and toxicological evaluation, and regulatory issues.

730. **Research Assessment in Pharmacological Problems.** Original research proposal is written based on current library research and assistance of faculty member. Hypothesis formulation and experimental design. 2 hours.

744. Proteomics-Mass Spectrometry. The goal of the course is to provide graduate students with the necessary skills to design experiments and evaluate the literature in the area of small and large scale analysis of the proteome in biological systems. This involves selection of the biological fraction for study, separation of the proteins therein, and qualitative and quantitative analysis of the individual proteins by mass spectrometry.

750. Advanced Principles of Pharmacology I. Basic Principles: Dose-response relationships, drug absorption, disposition and metabolism, enzyme-receptor binding kinetics, pharmacokinetics, drug receptors, agonists and antagonists, mechanisms of drug action, interaction between a particular drug and its target. Pharmacogenetics. Biostatistics. Neuropharmacology: Drug modulation of neurotransmission; drugs used in diseases of the nervous system; sympathetic agonists and antagonists; cholinergic agents, 4 hours.

751. Advanced Principles of Pharmacology II. Endocrine, CNS, cardiovascular, renal and GI pharmacology. Drug modulation of the cardiovascular system, GI tract and renal system. Chemotherapy of disease; Anti-inflammatory and anti-allergic agents, Hormones; antimicrobial agents; antiparasitic drugs; cancer chemotherapy; antiviral and antifungal agents, 4 hours

760. Pharmacogenetics and Drug Metabolism. This course is designed to provide the student with a more thorough understanding of the role of genetic variation in enzymes involved in the metabolism of important therapeutic drugs on the response to drug therapy. Genetic variation in drug metabolism is the major cause of individual variability in drug efficacy and toxicity. The course will focus on how genetic variability in major enzyme families such as the cytochromes P450 and UDP-glucuronyltransferases, and will utilize a combination of lectures, reports and seminars.

*790. **Advanced Pharmacology Seminar.** Recent advances in pharmacology and toxicology and departmental research in progress. 1 hour.

*798. **Doctoral Nondissertation Research.** 1-12 hours.

*799. **Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-12 hours.

Toxicology (TOX)

711. Principles of Toxicology. Foundation for understanding the basis of toxicology. Designed for doctoral students pursuing a career in toxicology; also appropriate for doctoral students studying pharmacology, veterinary medicine, pathology, forensic science, neuroscience, environmental health sciences, etc.

713. Advanced Topics in Toxicology. Foundation for understanding the basis of toxicology. Designed for doctoral students pursuing a career in toxicology. Exposes students to the most recent advances in contemporary toxicology.

720. Laboratory Rotation in Toxicology. Introduction to laboratory methods, experimental design and execution. 1-12 hours.

795. Advanced Toxicology Seminar. To facilitate the critical review of recent refereed publications in the field of toxicology. This will expose students to advanced knowledge and diversified subjects. All students enrolled in the UAB campus-wide toxicology program are required to participate. 1 hour.

798. Doctoral Nondissertation Research in Toxicology. 1-12 hours.

Last modified 09/04/07