MOLECULAR PHARMACOLOGY

Emeriti: (Professors) Robert H. Dreisbach, Avram Goldstein, Dora B. Goldstein, Tag E. Mansour
Associate Professor (Teaching): Ellen Porzig
Associate Professor: Phyllis Gardner (jointly with Medicine)
Consulting Professors: Gordon Ringold, Alejandro Zaffaroni

Division of Cellular and Genetic Pharmacology
Chair and Chief: Helen M. Blau
Professor: Helen M. Blau
Associate Professor: Garry P. Nolan

Division of Biological Chemistry
Chief: Daria Mochly-Rosen
Professors: Terrence Blaschke (jointly with Medicine), Oleg Jardetzky, Daria Mochly-Rosen, Richard A. Roth, James P. Whitlock, Jr.
Associate Professors: James E. Ferrell, Jr., Tobias Meyer
Assistant Professor: Karlene A. Cimprich

GRADUATE PROGRAMS

MASTER OF SCIENCE

Students in the Ph.D. program may apply for an M.S. degree, after having satisfactorily completed the course and laboratory requirements of the first two years. The degree also requires a written thesis based on literature or laboratory research. Postdoctoral research training is available to graduates having the Ph.D. or M.D. degree.

DOCTOR OF PHILOSOPHY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

The Department of Molecular Pharmacology offers interdisciplinary training to prepare students for independent careers in biomedical science. Research and training in the department focuses on the mechanisms by which hormones, drugs, and toxic compounds alter cell function, and on the development of new therapeutic technologies. At the heart of these issues lies the analysis of cell signaling and gene expression.

The program leading to the Ph.D. degree includes formal and informal study in pharmacology, genetics, biochemistry, and molecular cell biology. First-year students spend one quarter in each of three different laboratories, working closely with other graduate students, a professor, and postdoctoral fellows on various research projects. During the fourth quarter, the student chooses a faculty mentor with whom to undertake thesis research, based on available positions and the student's interest. During or before the eighth quarter of study, students must pass a qualifying exam which consists of an oral exam on general knowledge and a defense of a research proposal. Course requirements are fulfilled during the first two years of study; the later years of the four- to six-year program are devoted to full-time dissertation research. Close tutorial contact between students and faculty is stressed throughout the program.

Research opportunities also exist for medical students and a limited number of undergraduate students. The limited size of the labs in the department allows for close tutorial contact between students, postdoctoral fellows, and faculty.

The department presents two basic courses in medical pharmacology (201 and 202) and advanced courses open to qualified medical and other graduate students. Consult the *Time Schedule* for additional advanced courses.

COURSES

Course and lab instruction in the Department of Molecular Pharmacology conforms to the "Policy on the Use of Vertebrate Animals in Teaching Activities," the text of which is available at http://www.stanford.edu/dept/DoR/rph/8-2.html.

BASIC

201 and 202 provide a broad exposure to the principles of pharmacology and the properties of the major drug groups.

201. Pharmacology—Topics: receptors; pharmacokinetics; and autonomic, CNS, and cardiovascular pharmacology. Emphasis is on the mechanisms of drug action in humans. Prerequisite: biochemistry.
5 units, Aut (Staff)

202. Pharmacology—Continuation of 201. Topics: antimicrobial chemotherapy, cancer chemotherapy, endocrine and GI pharmacology, and toxicology.
5 units, Win (Staff)

ADVANCED

Open to all University students; instructor's consent required prior to registration. These courses require a good knowledge of physiology and biochemistry and sometimes of microbiology or genetics. Students should consult with the instructor about the adequacy of their preparation.

210. Cell Signaling—Provides a basic core of information on the molecular mechanisms through which cells receive and respond to external signals. Emphasis is on the principles of cell signaling and experimental strategies through which cell signaling pathways are being elucidated. Two didactic lectures, one research seminar, and one discussion section weekly. Prerequisites: a working knowledge of biochemistry and genetics.
4 units, Win (Ferrell, Meyer, Simon, Staff)

231. Molecular Biology of Gene Therapy—Cell mediated gene therapy as a novel form of drug delivery. Vectors, cell types, and relevant genetic and acquired diseases are discussed in a series of lectures, and in student and guest presentations. Prerequisites: biochemistry and molecular biology.
2-3 units (Nolan, Blau) alternate years, given 2002-03

240. Drug Discovery—The scientific principles and technologies involved in making the transition from a basic biological observation to the creation of a new drug, with emphasis on molecular and genetic issues.
4 units (Mochly-Rosen, Cimprich) alternate years, not given 2002-03

250. Fundamentals of Drug-Receptor Interactions and Drug Design—For the student of molecular biology and molecular pharmacology who wants to understand the principles of biological structure determination, scope, and the limits of the methods at our disposal, and of the structural information derived from them.
3 units (Jardetzky) alternate years, given 2002-03

251. Aging: Health and Disease—Open to graduate students and medical students. Interdisciplinary. The psychosocial aspects of aging: health policy considerations of geriatric medicine, changes in cognition and reproductive potential, effects of exercise and nutrition, cultural perspectives on aging and medical ethical issues including social and family support of aging patients. The cellular and molecular basis of aging: life span and animal models for aging, genetics of aging, aging syndromes, nuclear clocks, senescence and telomers, and non-disjunction in gametogenesis. Future approaches to novel treatments for the diseases of aging: Parkinsons, Alzheimers, cardiovascular illnesses, cancer, arthritis, and osteoporosis. Aging is evaluated as a normal developmental process, focusing on its effects on human reproductive, skeletal, hematopoetic, and nervous systems.
3 units (Staff) alternate years, not given 2002-03

270. Research Seminar—Weekly seminars on current research in pharmacology. Seminars are reviewed and discussed in a separate conference with a member of the faculty.
2 units, Aut, Win, Spr (Staff)

280. Tutorial Program—Primarily for graduate students in pharmacology. Guided readings in the literature of any area of pharmacology. A critical review paper may be required.
any quarter (Staff)

299. Directed Reading
any quarter (Staff)

399. Research
any quarter (Staff)

459. Frontiers in Interdisciplinary Biosciences—(Cross-listed in multiple departments in the schools of Humanities and Sciences, Engineering, and Medicine; students should enroll directly through their affiliated department if listed, otherwise enroll in ChE 459.) An introduction to cutting-edge research involving interdisciplinary approaches to bioscience and biotechnology; for specialists and non-specialists. Organized and sponsored by the Stanford BioX Program. Three seminars each quarter address a broad set of scientific and technical themes related to interdisciplinary approaches to important issues in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and throughout the world present the latest breakthroughs and endeavors that cut broadly across many core disciplines. Pre-seminars introduce basic concepts and provide background for non-experts. Registered students attend all pre-seminars in advance of the primary seminars, others welcome. Prerequisite: keen interest in all of science, engineering, and medicine with particular interest in life itself. Recommended: basic knowledge of mathematics, biology, chemistry, and physics.
1 unit, Aut, Win, Spr (Robertson)