

# MOLECULAR PHARMACOLOGY

*Emeriti: (Professors)* Robert H. Dreisbach, Avram Goldstein, Dora B. Goldstein, Tag E. Mansour, James P. Whitlock

*Chair:* James E. Ferrell, Jr.

*Professors:* James E. Ferrell, Jr., Oleg Jardetzky, Tobias Meyer, Daria Mochly-Rosen, Richard A. Roth

*Assistant Professors:* James K. Chen, Karlene A. Cimprich, Thomas J. Wandless

*Consulting Professors:* Gordon Ringold, Alejandro Zaffaroni

*Web Site:* <http://molepharm.stanford.edu>

Courses given in Molecular Pharmacology have the subject code MPHA. For a complete list of subject codes, see Appendix.

## 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. The main focus of the program is on cell signaling, chemical biology, and systems biology.

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 undergraduates. The limited size of the labs in the department allows for close tutorial contact between students, postdoctoral fellows, and faculty.

The department participates in the four quarter Health and Human Disease sequence which provides medical students with a comprehensive, systems-based education in physiology, pathology, microbiology, and pharmacology.

## 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>.

**MPHA 199. Undergraduate Research**—Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut, Win, Spr, Sum (Staff)*

## ADVANCED

Open to all University students; instructor's consent required prior to registration. Students should consult with the instructor about the adequacy of their preparation.

**MPHA 210. Signal Transduction Pathways and Networks**—The molecular mechanisms through which cells receive and respond to external signals. Emphasis is on principles of cell signaling, the systems-level properties of signal transduction modules, and experimental strategies through which cell signaling pathways are being studied. Prerequisite: working knowledge of biochemistry and genetics.

*4 units, Win (Ferrell, J, Meyer, T)*

**MPHA 220. Chemistry of Biological Processes**—(Same as BIOC 220.) The principles of organic and physical chemistry as applied to biomolecules. Goal is a working knowledge of chemical principles that underlie biological processes, and chemical tools used to study and manipulate biological systems. Prerequisites: organic chemistry and biochemistry, or consent of instructor.

*4 units, Aut (Wandless, T; Herschlag, D; Chen, J; Bogoy, M)*

**MPHA 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 emphasizing molecular and genetic issues. Prerequisite: biochemistry, chemistry, or bioengineering.

*4 units, Spr (Mochly-Rosen, D)*

**MPHA 260. Quantitative Chemical Biology**—Current topics including protein and small molecule engineering, cell signaling sensors and modulators, molecular imaging, chemical genetics, combinatorial chemistry, in vitro evolution, and signaling network modeling. Prerequisites: undergraduate organic chemistry, and biochemistry or cell biology.

*4 units, alternate years, not given this year*

**MPHA 270. Research Seminar**—Weekly seminars by outside speakers on current research in pharmacology. Seminars are reviewed and discussed in a separate conference with a member of the faculty.

*1-2 units, Spr (Staff)*

**MPHA 299. Directed Reading in Molecular Pharmacology**—Prerequisite: consent of instructor.

*1-18 units, Aut, Win, Spr, Sum (Staff)*

**MPHA 399. Graduate Research**—Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut, Win, Spr, Sum (Staff)*