MOLECULAR AND CELLULAR PHYSIOLOGY

Courses offered by the Department of Molecular and Cellular Physiology are listed under the subject code MCP on the Stanford Bulletin's ExploreCourses web site.

The Department of Molecular and Cellular Physiology is located in the Beckman Center for Molecular and Genetic Medicine.

A central goal of physiology in the post-genomic era is to understand how thousands of encoded proteins serve to bring about the highly coordinated behavior of cells and tissues. Research in the department approaches this goal at many levels of organization, ranging from single molecules and individual cells to multicellular systems and the whole organism. The faculty share common interests in the molecular mechanisms of cell signaling and behavior, with a special focus on structure/function analysis of ion channels and G-protein coupled receptors, and their roles at the cellular, organ, and whole-organism levels; the molecular basis of sensory transduction, synaptic transmission, plasticity and memory; the role of ion channels and calcium in controlling gene expression in neural and immune cells; and the regulation of vesicle trafficking and targeting, cell polarity, and cell-cell interactions in the nervous system and in epithelia. Research programs employ a wide range of approaches, including molecular and cell biology, biochemistry, genetics, biophysics, x-ray crystallography and solution NMR, electrophysiology, and in vitro and in vivo imaging with confocal and multi-photon microscopy.

Graduate Programs in Molecular and Cellular Physiology

The department offers required and elective courses for students in the School of Medicine and is also open to other qualified students with the consent of the instructor. Training of medical, graduate, and postdoctoral students is available. The program offers a course of study leading to the Ph.D. degree. No B.S. is offered, and an M.S. is offered only in the unusual circumstance where a student completes the course work, rotation, and the written section of the qualifying exam, but is unable to complete the requirements for the Ph.D.

Application and Admission

Applications are made through the Graduate Admissions (http://gradadmissions.stanford.edu) web site.

Applicants are assessed based on their undergraduate transcripts, test scores, research experience, statement of purpose and letters of recommendation that document exceptional potential, ability, or achievements.

Students admitted to the program are offered financial support covering tuition, a living stipend, and insurance coverage. Applicants are urged to apply for independent fellowships such as from the National Science Foundation. Fellowship applications are due in November of the year prior to matriculation in the graduate program, but MCP graduate students may continue to apply for outside fellowships after matriculation. Because of the small number of department-funded slots, students who have been awarded an outside fellowship have an improved chance of acceptance into the program.

Upon matriculation, each student is assisted in selecting courses and lab rotations in the first year and in choosing a lab for the dissertation research. Once a dissertation adviser has been selected, a dissertation committee is composed to include the dissertation adviser and two additional MCP/Non-MCP faculty, to guide the student during their dissertation research. The student must meet with the dissertation committee at least once a year.

Doctor of Philosophy in Molecular and Cellular Physiology

Candidates for Ph.D. degrees at Stanford must satisfactorily complete a program of study that includes 135 units of graduate course work and research.

Study toward the Ph.D. is expected to occupy five years, including summers. The MCP course requirements for the program are as follows:

- MCP 221 Advanced Cell Biology
- MCP 207 MCP Bootcamp

  MCP 208 MCP Journal Club and Professional Development Series
- MCP 256 How Cells Work: Energetics, Compartments, and Coupling in Cell Biology
- BIOS 200 Foundations in Experimental Biology
- MED 255 The Responsible Conduct of Research, if funded on NSF or NIH training grants
- Advanced graduate courses or mini-courses for a minimum of 6 units total. These courses do not need to be MCP courses but must be in relevant scientific topic and approved by the Director of Graduate Studies.
- Two of the following courses:
  - BIOC 241 Biological Macromolecules
  - GENE 205 Advanced Genetics
  - NBIO 206 The Nervous System
  - BIO 230 Molecular and Cellular Immunology

Students are also required to participate in the Molecular and Cellular Physiology Seminar Series and attend the department scientific meeting.

Courses taken to meet program requirements must be taken for a letter grade and students must earn a minimum grade of at least a 'B' in every individual required course. Students must also maintain a minimum GPA of 3.0 by University policy. Failure to maintain the required grades and grade point average is taken as evidence of unsatisfactory progress in the program.

Students should complete their required courses within the first two years of study. Exceptions may be made in cases where it was impossible to schedule courses because they were not offered within a student's first two years. Students may petition the MCP graduate committee for variances in the specific courses required, and such petitions may be granted in special circumstances, in cases where a student's progress is otherwise exemplary.

Qualifying Examination

All students in the program must pass a qualifying examination to advance to candidacy for the Ph.D. It is expected that students take the qualifying examination by the end of the Autumn Quarter in the second year of study. Failure to take the qualifying exam by the end of Autumn Quarter of the second year of study is taken as evidence of unsatisfactory progress in the program. In any case where a student thinks they need additional time to schedule and take their exam, a request must be submitted in writing to the Director of Graduate Studies (DGS) by November 15 of Autumn Quarter. The DGS may opt to grant additional time in compelling circumstances that do not indicate poor progress, or may refer the matter to the graduate committee for further action.

Students are given two chances to unconditionally pass the qualifying examination. Failure to achieve an unconditional pass of the qualifying examination by the end of the Spring Quarter of the second year is grounds for dismissal from the program.

Students form a qualifying examination committee consisting of at least 3 faculty members (members of the academic council, including the dissertation advisor), at least one of whom must be a member of MCP. This committee should be formed by the end of Spring Quarter of the first year of study. The composition of this committee should be approved by the Director of Graduate Studies. Students should also check with the department's student services office to make sure to file all required paperwork by the end of Spring Quarter. The University maintains certain deadlines for filing for candidacy, and it is the student's responsibility to be aware of these deadlines.

Dissertation and University Oral Examination

The results of independent, original work by the students are presented in a dissertation. The oral examination is largely a defense of the dissertation.

Advisers and Advisory Committees

A graduate advisory committee, currently professors Feng, Kobilka, Maduke and Madison, advises students during the period before the formation of their qualifying committees.

Financial Aid

Students may be funded by their advisers' research grants, by training grants, by department funds, or by extramural funds. Students are encouraged to obtain funding from outside sources such as NIH and NSF.

Graduate Advising Expectations

The Department of Molecular and Cellular Physiology is committed to providing academic advising in support of graduate student scholarly and professional development. When most effective, this advising relationship entails collaborative and sustained engagement by both the adviser and the advisee. As a best practice, advising expectations should be periodically discussed and reviewed to ensure mutual understanding. Both the adviser and the advisee are expected to maintain professionalism and integrity.

Faculty advisers guide students in key areas such as selecting courses, designing and conducting research, developing of teaching pedagogy, navigating policies and degree requirements, and exploring academic opportunities and professional pathways.

Graduate students are active contributors to the advising relationship, proactively seeking academic and professional guidance and taking responsibility for informing themselves of policies and degree requirements for their graduate program.

For a statement of University policy on graduate advising, see the "Graduate Advising (http://exploredegrees.stanford.edu/graduatedegrees/#advisingandcredentialstext)" section of this bulletin.

Chair: Miriam B. Goodman

Professors: Axel T. Brunger, K. Christopher Garcia, Miriam B. Goodman, Brian K. Kobilka, Richard S. Lewis, Georgios Skiniotis, Thomas C. Sudhof

Associate Professors: V. Daniel Madison, Merritt C. Maduke

Assistant Professors: Liang Feng, Lucy E. O'Brien

Joint Professors: Steve Chu, William Weis

Courtesy Professors: John Huguenard, Anthony J. Ricci, Ron Dror

Courtesy Assistant Professor: Gregory Scherrer

Emeritus Faculty: W. James Nelson, Stephen J. Smith, Richard W. Tsien