

CELLULAR AND MOLECULAR PHYSIOLOGY, PHD

Physiology is an integrative science, bringing together diverse disciplines in an effort to understand the functioning of living organisms. It seeks to identify the mechanisms by which an organism maintains the processes we regard as characteristic of life. Physiological investigations of these mechanisms range from the molecular level to studies of intact animals and human subjects. More and more, departments of physiology are using the latest tools of cellular and molecular biology to study these problems. Our own department is particularly interested in seeking answers to questions in certain broad categories:

- What are the functions of cell membranes, and how are these functions controlled?
- How are messages sent from the outside to the interior of a cell, from one cell to another?
- How do groups of different cells coordinate their separate activities to develop and function as an integrated tissue organ?
- How is a process as complicated as the development of the mammalian embryo regulated and integrated?

The Department of Physiology accepts students for graduate study leading to the degree of Doctor of Philosophy. Applicants must satisfy the requirements of the department before admission. Candidates for the degree of Master of Arts in Physiology are not accepted.

Postdoctoral Training

Students who have already been awarded the Ph.D. or M.D. degree may be accepted for postdoctoral research work with members of the faculty.

Admission Requirements

At the time of entry into the program, you must have completed a bachelor's or higher degree. Ordinarily this degree will be in biology, physics, chemistry, mathematics, or engineering, or some combination of these, but exceptions will be made. Scientific research experience is not required but is now common among applicants to our program. Such experience is to your advantage and is widely available to undergraduates willing to take the initiative. If you are planning ahead, consider searching out an experience of this kind.

Regardless of the degree major, the following are entrance requirements: Physics: one year college level course is required; two years of study are recommended. Chemistry: two years are required, and three recommended, of college level courses with laboratory, including inorganic, organic, and physical chemistry. Biology: two years of college level courses, with laboratory. Mathematics: through differential and integral calculus.

Examinations: Students are required to take the Aptitude (general) section of the Graduate Record Exam. The Advanced (subject) test is not required, but is encouraged and viewed favorably by the Admissions Committee. Foreign applicants must take the Test of English as a Foreign Language Exam (TOEFL).

In addition to the above, official transcripts or certified records from all university (undergraduate and graduate) study and three letters of recommendation from at least two faculty members who are acquainted with the applicants academic work are required to complete the application for admission. While these requirements will apply for the

large majority of applicants, exceptions will be made for unusually well-qualified candidates.

Applications are due by January 10th for September admission. This is the main application deadline, and we encourage all applicants to meet this date. Most or all students will be selected from those meeting this deadline. A full application should be completed online. ETS Institutional code: 5316 for GRE/TOEFL scores.

Program Requirements

In general, students must complete successfully the following basic science courses, given by the School of Medicine:

First Year

Courses

- Biochemical and Biophysical Principles
- Macromolecular Structure and Analysis
- Current Physiology
- Molecular Biology and Genomics
- Genetics, Bioinformatics
- Pathways and Regulation
- Cell Structure and Dynamics
- Physiology
- Research
- Primary Source Readings and Analysis

Rotations

- Three laboratory rotations of ten weeks each (on average)

Second Year

In the second academic year, the only required course is Research. In addition, students have the opportunity to begin taking elective courses. Students must complete four credits of elective courses other than "Research". These additional courses are selected in accordance with the student's particular needs. However, we strongly encourage one or more of the following electives:

- Bio-organic Mechanisms (Second Quarter)
- Immunology and Microbiology (Second Quarter)
- Neuroscience (Third Quarter)
- Organ Histology (Fourth Quarter)

Examinations

Aside from regular course examinations, candidates are required to take and pass the following:

Doctor of Philosophy Board Oral Examination: Given by a committee appointed by the University, this examination will test the candidate's knowledge of physiology and related sciences, critical sense, and ability to formulate an original, interesting, and appropriate research problem.

Final Examination and Defense of Thesis: This examination will be given by faculty inside and outside the department, appointed by the director of the graduate program of the department. Following this exam, students will be invited to present their thesis work at an open seminar.