Cellular and Integrative Physiology

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Degrees Offered

- Master of Science
- Doctor of Philosophy
- Joint Doctor of Medicine and Doctor of Philosophy

Physiology is a dynamic life science that focuses on the study of biological systems at many levels of complexity, ranging from genes and molecules to cells and organisms. Thus, training in physiology has the ultimate goal of linking molecular and cellular information to functional outcomes. Currently, groundbreaking research and discovery in the life sciences are more interdisciplinary than ever, and students studying within the realm of physiology can expect to work with a wide range of scientists. Our program provides a multidisciplinary approach to modern life sciences, drawing on faculty expertise from several departments and centers in the School of Medicine.

The program’s participating research faculty consists of scientists from the Center for Cardiovascular and Respiratory Sciences, NIOSH/CDC, Center for Neuroscience, and the Blanchette Rockefeller Neurosciences Institute. As a result, this multidimensional program includes activities in the following:

- Integrative and systems physiology
- Pathophysiology
- Pharmacology
- Translational research
- Small animal physiology, biomedical engineering
- Biophysics

It also integrates information from genetics, functional genomics, and proteomics into whole animal and human physiology.

This interactive and cross-disciplinary environment, together with an atmosphere filled with enthusiasm and passion for scientific discovery, makes our program a uniquely exciting place for doing research and the training of students. Specific topics of research emphasis include the following:

- Hemodynamics and Cardiovascular Control in Health and Disease
- Microcirculation and Cellular Biophysics
- Respiratory Function and Control in Health and Disease
- Neuroendocrine Control of Reproduction
- Neural Control of Sensory Physiology

The goal of the cellular and integrative physiology graduate program is to engage students in creating a new approach to the life sciences, with the aim of explaining how the higher-level properties of complex systems appear from the interactions amongst their parts. Students will leave our program better able to identify important unsolved scientific problems and with an appreciation of how to select problems for which quantitative and theoretical approaches will be most productive.

Qualifying Examination

After successful completion of their second academic year, students take a two-part qualifying examination. The exam consists of an oral examination covering the major areas of physiology followed by a written and oral research defense of the student’s research proposal. Upon successful completion of the qualifying examinations, the student is admitted to candidacy for the degree of doctor of philosophy. Our graduates obtain excellent postdoctoral research training opportunities in prestigious laboratories and develop productive and satisfying careers in academics, industry, and government. Graduates have become departmental chairs, industrial department heads, university vice presidents, and entrepreneurs.

Faculty

Graduate Program Director

- Dr. Robert W. Brock