

# DEPARTMENT OF CELL BIOLOGY AND PHYSIOLOGY (GRAD)

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## Contact Information

**Department of Cell Biology and Physiology**

<http://www.med.unc.edu/cellbiophysio>

**Kathleen Caron, Chair**

Admission to the graduate program curriculum is via the unified Biological and Biomedical Sciences Program (BBSP) at UNC–Chapel Hill. A bachelor's degree (B.A. or B.S.) is required for admission. Applicants are expected to have a strong background in the biological sciences, chemistry, physics, and mathematics. Details of the application process are available at the BBSP Web site (<http://bbbsp.unc.edu>) and The Graduate School's admissions Web site. (<http://gradschool.unc.edu/admissions>) Briefly, the application should include transcripts, Graduate Record Examination (GRE) scores, three letters of recommendation, and a personal statement outlining career goals.

The mission of the Curriculum in Cell Biology and Physiology is to provide students with a rigorous, individually tailored educational experience to prepare them for research and teaching careers in the biomedical sciences. This graduate program will provide a forum for graduate students to learn current concepts in modern cell biology and physiology and to develop the skills necessary to formulate sophisticated strategies for analysis of contemporary problems in cell biology and physiology. Based on a solid foundation of coursework in cell biology and physiology, students will further complement their training by selecting courses in bioinformatics/statistics, genetics, pharmacology, immunology, and/or biochemistry that best support and enhance their specific area of research interest. Dissertation research enables students to apply these tools to a problem of intellectual and biomedical interest. Students receive strong training in the scientific process and apply their skills to probe the mechanistic basis of biological problems at molecular, cellular, and systems levels. A strong emphasis will be placed on career development, such as oral and written presentation skills, and mentoring students in a way that enables them to explore the diverse job opportunities available to them in the post-graduate biomedical workforce. Graduates will be well prepared to continue their research careers in a number of academic disciplines.

## Assistantships and Other Student Aid

Students are supported by a stipend of \$30,000 annually plus tuition, fees, and medical insurance.

The curriculum provides training for students whose research/teaching career objectives are faculty positions in medical school basic sciences departments. However, the flexibility of the program also provides for the training of students who seek careers in basic science as well as in clinical science departments of medical schools, in other professional schools such as dental schools, in liberal arts academic departments such as biology, or in state, federal, private, and industrial research laboratories. The program for the Ph.D. normally takes five to six years to complete. Persons interested in a combined M.D./Ph.D. program must be accepted into the School of Medicine and the departmental graduate

program, whereupon the combined studies are scheduled in accordance with individual requirements.

Ph.D. students take graduate-level courses in their first year as well as conduct laboratory rotations. Students who join the curriculum at the end of year one are examined for advancement to candidacy. Ph.D. candidacy is followed by a dissertation based on original research is conducted under the supervision of a faculty advisor. Additional information is available on the departmental Web site (<http://www.med.unc.edu/physiolo>).

## Professors

Eva Anton  
William Arendshorst  
Albert Baldwin  
Vicki Bautch  
James Bear  
Kerry Bloom  
Jay Brenman  
Patrick Brennwald  
Keith W.T. Burridge  
Kathleen Caron  
Richard Cheney  
Jean Cook  
M. Joseph Costello  
Frank Conlon  
Douglas M. Cyr  
Channing Der  
Mohanish P. Deshmukh  
James Faber  
Bob Goldstein  
Klaus Hahn  
Kenneth A. Jacobson  
Alan Jones  
Tom Kash  
Richard Loeser  
Chris Mack  
Paul Manis  
Greg Matera  
Carol Otey  
Leslie Parise  
Mark Peifer  
Ben Philpot  
Joan Taylor  
Jenny Ting  
Ellen R. Weiss  
Richard Weinberg  
Mark Zylka

## Associate Professors

Wolfgang Bergmeier  
Adrienne Cox  
Timothy Gershon  
Amy Gladfelter  
Stephanie Gupton  
Scott Hammond  
William Kim  
Scott Magness  
Ben Major  
Liza Makowski  
Larry Ostrowski

Scott Randell  
Stephen Rogers  
Garret Stuber  
Robert Tarran

## Assistant Professors

Edward Bahnson  
Michael Bressan  
Flavio Frohlich  
Kurt Gilliland  
Jimena Giudice  
Jiandong Liu  
Damaris Lorenzo  
Amy Maddox  
Zoe McElligott  
Saskia Neher  
Lori O'Brien  
Douglas Phanstiel  
Yuliya Pylayeva-Gupta  
Li Qian  
Spencer Smith  
Natasha Snider  
Juan Song  
Scott Williams

## Professors Emeriti

Robert G. Faust  
Paul B. Farel  
Noelle A. Granger  
Charles R. Hackenbrock  
O'Dell W. Henson Jr.  
Enid R. Kafer  
William E. Koch  
Jean M. Lauder  
Alan Light  
David L. McIlwain  
Edward R. Perl  
Peter Petrusz  
Lloyd R. Yonce

## CBIO

### CBIO 400. Introduction to Medical Simulation. 3 Credits.

This entry-level medical simulation course focuses on understanding the integration of simulation technology into clinical education, patient safety, and research applications to include the teamwork and communication skills related to these applications.

**Grading status:** Letter grade.

### CBIO 423. Developmental Toxicology and Teratology. 3 Credits.

Emphasizes topics of current research interest relative to the genesis of environmentally caused and genetically based birth defects. One two-hour session per week (evening).

**Grading status:** Letter grade

**Same as:** TOXC 423.

### CBIO 607. Gross Anatomy. 2-4 Credits.

Permission of the instructor. Primarily for graduate students. Enrollment by availability of space and material.

**Grading status:** Letter grade.

### CBIO 627. Regional Anatomy. 3 Credits.

Permission of the instructor. For students of oral surgery, surgical residents, and graduate students.

**Grading status:** Letter grade.

### CBIO 643. Cell Structure, Function, and Growth Control I. 3 Credits.

Comprehensive introduction to cell structure, function, and transformation.

**Requisites:** Prerequisite, undergraduate cell biology or biochemistry or permission of the instructor.

**Grading status:** Letter grade

**Same as:** BIOC 643, PHCO 643, PHYI 643.

## CBPH

### CBPH 705. Communicating Scientific Results. 1 Credit.

Practice in oral and written communication evaluated by peers and faculty. Includes delivery of coached presentations on topics in physiology and preparation of writing assignments typically encountered in scientific life.

**Repeat rules:** May be repeated for credit.

### CBPH 706. Communicating Scientific Results. 1 Credit.

Practice in oral and written communication evaluated by peers and faculty. Includes delivery of coached presentations on topics in physiology and preparation of writing assignments typically encountered in scientific life.

**Repeat rules:** May be repeated for credit.

### CBPH 741. Introduction to Human Anatomy. 3 Credits.

A general course for persons preparing for careers as dental hygienists. Two lectures and two laboratory hours a week.

### CBPH 791. Gross Anatomy for Physical Therapists. 4 Credits.

Fundamental principles and concepts of human gross anatomy for physical therapists taught by lectures and cadaver dissection. Emphasis on functional anatomy. Three lecture hours and six laboratory hours a week.

**Requisites:** Prerequisites, BIOL 474 and 474L; Permission of the instructor for students lacking the prerequisites.

### CBPH 793. Functional Neuroanatomy. 3 Credits.

Study of basic structure of the brain and spinal cord, including both lecture and laboratory. Primarily for physical therapy students. Four hours a week.

**Requisites:** Prerequisites, CBIO 607 and CBPH 791; permission of the instructor for students lacking the prerequisites.

### CBPH 850. Modern Concepts in Cell Biology I. 4 Credits.

Permission of the instructor. Graduate students only. Discussion based course that covers key elements of cell, molecular, and developmental biology, and genetics. Students present and discuss breakthrough primary research papers under the direction of faculty members across the department. Minimal instructor lecturing is included.

### CBPH 851. Modern Concepts in Cell Biology II. 4 Credits.

Literature based discussion course on experimental approaches in Cell Biology. Emphasis is on small group discussion and dissection of primary literature including methods, scientific logic, and critical thinking. Each session typically includes both a discussion of key background by a faculty member and student led discussions of selected papers from the primary literature.

**CBPH 852. Experimental Physiology of Human Health and Disease. 4 Credits.**

Students will learn the principles of cell, organ, and systems physiology and pathophysiology required to identify and understand important areas of current biomedical research. This course will focus on non-human model systems (cultured cells, mice, drosophila, etc.). In addition to lectures, this course will include journal-club discussion of assigned papers.

**CBPH 853. Experimental Physiology of Human Health and Disease. 4 Credits.**

Permission of the instructor. Molecular and cellular basis of organ system function; integration of systems to maintain the normal state. Understanding of normal physiology is amplified by examples from human disease and mouse models. Principles of cell, organ, and integrative physiology and how these principles apply to translational research.

**CBPH 855. Career and Research Enhancement Seminar (CaRES). 1 Credit.**

Permission of the director of graduate studies.

**CBPH 856. Career and Research Enhancement Seminar (CaRES). 1 Credit.**

Permission of the director of graduate studies.

**CBPH 910. Research. 2-15 Credits.**

Credit to be arranged in individual cases.

**CBPH 915. Research Laboratory Apprenticeship. 2 Credits.**

Enrollment in the cell biology and anatomy graduate program required. A course for first- and second-year graduate students in cell biology and anatomy, consisting of a research project of limited scope pursued under the supervision of a faculty member.

**Repeat rules:** May be repeated for credit.

**CBPH 993. Master's Research and Thesis. 3 Credits.****CBPH 994. Doctoral Research and Dissertation. 3 Credits.**

## PHYI

**PHYI 643. Cell Structure, Function, and Growth Control I. 3 Credits.**

Comprehensive introduction to cell structure, function, and transformation.

**Requisites:** Prerequisite, undergraduate cell biology or biochemistry or permission of the instructor.

**Grading status:** Letter grade

**Same as:** CBIO 643, BIOC 643, PHCO 643.