DEPARTMENT OF CELL BIOLOGY AND PHYSIOLOGY (GRAD)

Contact Information
Department of Cell Biology and Physiology
http://www.med.unc.edu/cellbiophysio

KATHLEEN CARON, Chair

Admission to the departmental graduate program 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://bbsp.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.

Research Facilities
Our research space in the Medical Biomolecular Research Building, Neuroscience Research Building, Taylor Hall, and Glaxo Building provides neighboring space that enhances interlaboratory interactions and gives the opportunity to organize investigator space along research themes or technical needs. It is adjacent to three synergistic Centers (Neuroscience, Cardiovascular, and GI), which facilitate interdisciplinary research. Our research space also includes shared equipment space for cold/warm room storage and for large pieces of shared equipment (i.e., autoclaves, freezers, centrifuges). This shared space fosters a spirit of community in the department and also benefits each laboratory financially and in space efficiency.

In addition to individually assigned research laboratories and shared research space, the department sponsors a research support recharge facility, the Histology Research Core Facility. This facility provides expertise and consultation on histological and immunohistochemical methods. It offers a variety of services insuring that histological techniques are always available for investigators and their research project needs.

Assistantships and Other Student Aid
Students are supported by a stipend of $29,500 annually plus tuition, fees, and medical insurance.

The primary purpose of the graduate program is to train students to become biomedical scientists. The program 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.

Some of the department's areas of specialization are cell biology, physiology, developmental biology, neurobiology, reproductive biology, membrane biology, molecular biology, cell signaling, and parasitology. Ph.D. students take graduate-level courses in their first year as well as conduct laboratory rotations. Students who join the departmental graduate program 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, Molecular Analysis of Neuronal Migration and Layer Formation in Cerebral Cortex
William Arendshorst, Hormone/Paracrine/Autocrine Regulation of the Renal Microcirculation, Calcium Signaling in Vascular Smooth Muscles Cells, Pathophysiology of Hypertension
James Bear, Cell Motility, Actin Cytoskeleton, Coronins, Live-Cell Microscopy
Jay Brennan, Genetic Models and Signaling Relevant to Metabolic Disease and Type 2 Diabetes
Patrick Brennwald, Cell Polarity, Tumor Suppressor, Vesicle Transport, Exocytosis, Rho GTPases
Keith W.T. Burridge, Cell Migration, Cell-Matrix and Cell-Cell Adhesion, Rho Family GTPases, Leukocyte Transendothelial Migration
Kathleen Caron, Genetically Engineered Animal Models in Study of Human Disease
Richard Cheney, Intercellular Junctions between Fibers in Normal and Cataractous Lenses Using Light
M. Joseph Costello, Membrane Biophysics, Intercellular Junctions, Active Transport, Membrane Fusion, Electron Microscopy
Douglas M. Cyr, Cystic Fibrosis, Organelle Biogenesis, Protein Folding, Molecular Chaperones, Ubiquitin-Proteasome Pathway
Mohanish P. Deshmukh, Neuronal Apoptosis, Molecular Mechanism of Programmed Cell Death, Regulation of Caspase Activation
James Faber, Physiologic and Genetic Regulation of Collaterogenesis during Development and in Ischemic Disease; Vascular Growth and Remodeling
Kenneth A. Jacobson, Membrane Biology and Biophysics, Cell Migration, Video Image Analysis
Carol Otey, Cell Motility in Embryonic Development, Wound-Healing and Cancer Metastasis
Ben Philpot, Angelman Syndrome, Rett Syndrome, Autism Spectrum Disorders, Neurodevelopmental Disorders, Experience-Dependent Synaptic Plasticity, Restoration of Plasticity in Neurological Disorders
Lola Reid, Growth and Differentiation of Stem Cells
Aldo Rustioni (15), Glutamate Receptors Expression and Regulation, Axonal Regeneration and the Cytoskeleton, Somatosensory Mechanisms
Ellen R. Weiss (9), Regulatory Domains of G-Protein Coupled Receptors, Molecular Biology of Cellular Signaling Pathways

Associate Professors
Stephanie Gupton, Coordination of Actin Dynamics and Membrane Trafficking during Development and Cancer Metastasis, Live Cell Imaging, Cell Adhesion
Scott Hammond, Biochemical Mechanism for RNA Interference
Ben Major, Proteomic Analysis of Signal Transduction and Cell Biology, Oxidative Stress, Functional Genomics, Mass Spectrometry
Scott Randell, Airway Epithelial Biology-Stem Cells, Host Defense, and Response to Injury
Robert Tarran, Signal Transduction and the Regulation of Ion Transport in Airway Epithelia
Mark Zylka, Molecules and Mechanisms for Pain, Angelman Syndrome Therapies

Assistant Professors
Michael Bressan, Cardiovascular Development, Morphogenesis, Organogenesis
Andrew Dudley, Tumor Microenvironment, Tumor Angiogenesis, Vascular Stem Cells
Kurt Gilliland (16), Intercellular Junctions, Human Cataract, Electron/Confocal Microscopy
Spencer Smith, Neuroscience and Neuroengineering
Natasha Snider, Biochemical Basis of Intermediate Filament-Associated Diseases; Liver Disease Mechanisms and Drug Targets

Research Professor
Richard Weinberg, Quantitative Immunocytochemistry, Organization of Excitatory Synapses, Calcium Signaling in Dendritic Spines

Research Associate Professors
Edward Kernick, Human Anatomy, Neuroanatomy, Central Nervous System
Shoji Osawa, Regulation of Signal Transduction Pathways by G Proteins
Julia Shackelford

Research Assistant Professors
James Alb
Andrea Azcarate-Peril
Elizabeth Benson
Alain Burette
Martina Gentzch
Gerald W. Gordon
Maryna Kapustina
Jennifer Lucitti
Scott Parnell
Erika Wittchen
Hua Zhang

Instructors
Linda Levitch
Marianne Meeker
Virginia Shea

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

Subjects in this department include Cell and Development Biology (CBIO) and Physiology (PHYI).

CBIO

Advanced Undergraduate and Graduate-level Courses

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, MCRO 643, PHCO 643, PHYI 643.

CBIO 644. Cell Structure, Function, and Growth Control II. 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: MCRO 644, PHCO 644, BIOC 644, PHYI 644.

PHYI

Advanced Undergraduate and Graduate-level Courses

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, MCRO 643, PHCO 643.
PHYI 644. Cell Structure, Function, and Growth Control II. 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 644, MCRO 644, PHCO 644, BIOC 644.

Graduate-level Courses
PHYI 993. Master's Research and Thesis. 3 Credits.
PHYI 994. Doctoral Research and Dissertation. 3 Credits.