Anatomy and Cell Biology

School of Medicine
Indianapolis

Chairperson
Professor David Burr*

Departmental E-mail
williams@anatomy.iupui.edu

Departmental URL
anatomy.iupui.edu

Graduate Faculty
(An asterisk [*] denotes membership in the University Graduate School faculty with the endorsement to direct doctoral dissertations.)

Professors

Associate Professors
Joseph P. Bidwell*, James J. Brokaw*, Kenneth E. Byrd*, Taihung Duong*, Eri Hashino (Otolaryngology), Roger C. Hoversland, Michael J. Kubek*, Nancy J. Mangini*, Margaret M. Moga, Dale W. Saxon, Robert D. Sweazey, Donald Wong*

Assistant Professors

Adjunct Professors
Bonnie Blazer-Yost* (Biology, Physiology, and Biophysics), Simon Conway* (Pediatrics), Alan Mikesky* (Physical Education), Michael Pritz* (Neurosurgery), David Suzuki* (Ophthalmology)

Adjunct Associate Professors
Robert Bacallao (Medicine), Anthony Firulli, Wei-Hua Lee* (Pediatrics), Jack Windsor* (Dentistry)

Adjunct Assistant Professors
Angela Bruzzaniti (Dentistry-Oral Biology), Melissa Kacena (Biomedical Engineering, Orthopaedic Surgery), Feng-Chun Yang (Pediatrics)

Graduate Advisor
James C. Williams*, Ph.D., Chair of Graduate Studies
Committee, 635 Barnhill Drive, MSS055Y, Indianapolis, IN 46202-5120, (317) 274-3423, jwillia3@iupui.edu

Degrees Offered
Master of Science and Doctor of Philosophy

Special Departmental Requirements
(See also general University Graduate School requirements.)

Admission Requirements
Bachelor’s degree, preferably with a background in general, cellular, and molecular biology; developmental biology; general and organic chemistry; physics; and calculus. Candidates should have a minimum grade point average of 3.0 (B) overall, and 3.0 in science courses. The Graduate Record Examination General Test or MCAT is required. It is preferable that graduate study be started in the fall semester. Application for admission to the Master of Science program requires sponsorship by a graduate faculty member. Completed applications should be received before January 15. A personal interview may be requested. Applicants will be notified of departmental action by April 15.

Master of Science Degree

Course Requirements
A total of 30 credit hours, including D861, and at least three of the following: D850, D851, D852, or G818.

Thesis
Normally required; an alternative project may, however, be approved by the student’s advisory committee.

Final Examination
Written. Oral defense of the thesis is also required.

Doctor of Philosophy Degree

Course Requirements
A total of 90 credit hours, including D861, and at least three of the following: D850, D851, D852, or G818. An approved course in statistics also is required. A minimum of 32 credit hours must be in courses other than research.
Minor
A minimum of 12 credit hours of course work other than research in a related program (e.g., biochemistry, biophysics, medical genetics, microbiology, neurobiology, pathology, pharmacology, physiology, toxicology, or life science). For a minor in life science, at least 6 credit hours must be taken in one department. The minor must be approved by the student’s advisory committee.

Other Requirements
Students are required to gain experience in teaching by assisting one semester in one of the departmental courses.

Grades
Overall B (3.0) average in course work and no less than a B in D850, D851, D852, or G818.

Qualifying Examination
Written and oral, designed to assess the student’s preparedness to carry out a research program.

Final Examination
Oral defense of dissertation. Further details of departmental policies will be made available to the student on request and at the time of enrollment.

Courses
The courses below are offered every year unless otherwise indicated. “Even” or “odd” refers to the calendar year in which the academic year ends (e.g., 1998-99 is an “odd” year).

General

D501 Functionally Oriented Human Gross Anatomy (5 cr.)
P: K101 Concepts of Biology I or K103 Concepts of Biology II, or K331 Embryology, or equivalent. Consent of instructor. Introduction to the concepts, terminology, and basic structure of the human body. Prosection of the body will use a regional approach. Emphasis on providing fundamental knowledge of the structure/function of major organ systems, peripheral nervous system, and vascular supply to the trunk, head and neck, limbs, and back.

D502 Basic Histology (4 cr.)
P: K103 or K324. Lecture and laboratory instruction on the microscopic structure of the basic tissues and organs of the body. Previous exposure to gross anatomy principles and dissection encouraged.

D526 Methods in Cell and Neurobiology (4 cr.)
Didactic and laboratory instruction in contemporary methods used in modern cell biology and neurobiology research. Methods range from cellular to molecular. Each method is taught by a faculty member with expertise and experience in that area.

D527 Graduate Neuroanatomy (3 cr.)
P: Any undergraduate biology or anatomy course, or approval of the course director. A neuroanatomy/neurobiology course that introduces the student to terminology, pathways, organization, and concepts of the human nervous system. It is designed for those seeking a doctoral or terminal Master of Science degree in a department other than anatomy, or for students in interdisciplinary programs such as psychology, medical and biological engineering, and the medical neurobiology program.

D533 Neural Substrate for Sensory-Motor Control (3 cr.)
This is an advanced graduate course that will build upon the neuroanatomic foundation established in ANAT D527. The goal is to give functional meaning to the neural systems involved with acquiring behaviorally relevant information and transforming this information into signals that guide behavior. The emphasis will be on neuronal signal processing.

D850 Gross Anatomy (8 cr.)
A survey course of human anatomy including a complete dissection.

D851 Histology (4 cr.)
A complete survey of the microscopic structure of the tissues and organs of the body.

D852 Neuroscience and Clinical Neurology (5 cr.)
P: Gross anatomy or instructor approval. A multidisciplinary course integrating basic neuroscience with clinical neurology in understanding the human nervous system and neurological disorders. Includes the neurologic exam in presentations of neurologic patients, neuroradiologic imaging, and histologic atlas cross-sections in studying internal organization and vasculature of the brain and spinal cord.

D853 Human Developmental Anatomy (4 cr.)

D856 Advanced Histology (1-5 cr.)
In-depth consideration of selected topics on the microscopic anatomy of cells, tissues, and organs.

D860 Research (1-10 cr.)

D861 Seminar (1 cr.)
Required yearly for all graduate students in residence. Literature and research reports and discussions by faculty, students, and invited distinguished visitors.

D862 Anatomical Techniques (2 cr.)
Introduction to techniques in anatomical research and in preparation of teaching materials.

D863 Peripheral Nervous System (2-3 cr.)
Anatomical and functional consideration of sensory, motor, and autonomic portions of the peripheral nervous system, with emphasis on neurotransmission and its regulation, physiology of receptors, neuromuscular junction, peripheral axons and their central regulation, myelination, and axonal transport.

D864 Advanced Gross Anatomy (cr. arr.)
P: D850. Functional, clinical, and developmental gross morphology of specific regions of the human body; special topics may vary.

D865 Developmental Neuroanatomy (3 cr.)
Basic principles and problems relating to prenatal and postnatal development and aging of the central nervous system.
both experimental and theoretical approaches that led to our current knowledge of the nervous system.

Graduate

G595 Current Topics in Cell Structure and Function (3 cr.) P: D851 or F705 or B817 or consent of instructor. An advanced course in cell biology designed to evaluate contemporary issues in cell structure and function. Background lectures are complemented by discussion of primary research articles. Emphasis is on developing a critical approach to the cell biology literature by evaluating the effectiveness and limitations of various experimental strategies.

G801 Experimental Approaches to Cell Structure and Function (3 cr.) The overall objective of this graduate course in cell biology is to present, in an experimental context, information integrating cell structure with cell function. The focus is on topics in which new information on cell structure has enhanced or reformulated our understanding of cell function.

G812 Fundamental Concepts in Aging (3 cr.) P: None. A survey course covering various processes and diseases of aging. The course includes sections on demography and epidemiology; physiology, molecular biology, and pharmacology of aging; specific clinical disease entities commonly associated with aging; neurodegeneration, memory, and cognition; depression; the pathophysiology of pain, nutrition, physical function, ethics, and psychosocial issues.

G818 Integrative Cell Biology (3 cr.) This course provides broad understanding of ways in which cells are organized and integrated into tissues. Emphasis is on the function of cells in neural/neuroendocrine system, cardiopulmonary, renal, and immune systems in the cytomechanics. Modern approaches to the study of tissue function by analysis of cellular regulation will be emphasized.

G819 Basic Bone Biology (2 cr.) P: One semester of introductory biology. An introduction to basic bone biology, including bone morphology, composition, and physiology; cell biology of bone cells; measurement techniques; adaption to the mechanical and metabolic environments; regulatory factors and mineral homeostasis; and growth and development.

1 See also “Anatomy” in the Medical Sciences bulletin, Bloomington.