Anatomy and Cell Biology

Chair
- John F. Engelhardt

Professional degree: master of clinical anatomy
Faculty: https://medicine.uiowa.edu/acb/people/primary-appointments
Website: https://medicine.uiowa.edu/acb/

The Department of Anatomy and Cell Biology performs three major functions. It teaches human anatomy to students preparing for careers in the health care professions; provides advanced courses, teaching experience, and research training to graduate students preparing for careers in academic research and related scientific fields; and conducts original research on the biological basis of cellular functions and human disease processes.

Preclinical Study

The department contributes to the preclinical education of health care professionals by providing major courses in gross anatomy, cell biology, histology, and neuroscience.

Graduate Study

The department offers the cell and developmental biology subprogram for the Ph.D. in Biomedical Science. It also participates in the Carver College of Medicine's Medical Scientist Training Program and the Graduate College's Molecular Medicine, Immunology, Genetics, and Neuroscience Programs. On occasion, students are directly admitted to a Department of Anatomy and Cell Biology laboratory by arrangement with the laboratory director.

Professional Study

The Department of Anatomy and Cell Biology offers a professional degree, the Master of Clinical Anatomy (M.C.A.).

Programs

Graduate Programs of Study

Majors
- Master of Science in Anatomy and Cell Biology
- Doctor of Philosophy in Anatomy and Cell Biology

Students interested in doctoral studies in cell and developmental biology should apply under the umbrella program in Biomedical Science (select cell and developmental biology subprogram). Direct applications to the M.S. and Ph.D. in anatomy and cell biology are not currently being considered. Students who entered a graduate anatomy and cell biology program prior to fall 2017 can refer to the 2015-16 General Catalog for previous degree requirements.

Professional Program of Study

Major
- Master of Clinical Anatomy

Facilities

The department occupies more than 35,000 square feet in the Bowen Science Building on the University of Iowa health sciences campus. The building houses modern teaching facilities and well-equipped research laboratories. The most modern instrumentation is available, including facilities and equipment for digital microscopic imaging, confocal microscopy, molecular biological techniques, tissue culture, and protein chemistry. Other specialized equipment (e.g., electron microscopes, mass spectrophotometers) is available in other facilities. Through collaborative programs with the Holden Comprehensive Cancer Center and the Abboud Cardiovascular Research Center, faculty and students also have access to outstanding research facilities throughout the University’s health sciences campus.

Courses

Anatomy and Cell Biology Courses

ACB:3110 Principles of Human Anatomy  3 s.h.
Gross and microscopic human anatomy; systemic approach to regional anatomy with emphasis on clinical relevance; optional tutorial sessions. Offered fall semesters. Requirements: pharmacy, pre-nursing, or associated medical sciences major.

ACB:3122 Independent Study in Anatomy and Cell Biology  arr.
Projects arranged with department faculty members.

Microscopy methods for research; all aspects of research, from sample preparation to imaging to data analysis; when to use a particular microscopy procedure; theory, operation, and application of scanning electron microscopy, scanning probe microscopy, laser scanning microscopy, X-ray microanalysis. Requirements: a physical science course. Same as CBE:4156, EES:4156.

ACB:5108 Human Anatomy  5 s.h.
Regional dissection, lectures, demonstrations; areas important to physical therapists, particularly the upper and lower extremities. Offered fall semesters. Requirements: physical therapy and rehabilitation science enrollment.

ACB:5203 Gross Human Anatomy for Graduate Students  5 s.h.
Regional dissection, lectures, demonstrations, tutorials, discussions, seminars; clinically relevant areas of anatomical radiology, surface anatomy with clinical correlations. Requirements: enrollment in master of clinical anatomy program.

ACB:5206 Graduate Research in Cell and Developmental Biology  arr.
Individual laboratory research training in anatomical sciences.

ACB:5210 General Histology Online  3 s.h.
Histology of all tissues of human body starting with basic tissues and working through systems of the body; linked in sequence to the human gross anatomy for graduate students course so students will be learning about related content at the same time in anatomy and histology; online course consisting of recorded lectures, online modules, and extensive use of Virtual Microscope. Requirements: enrollment in master of clinical anatomy program.
ACB:5218 Microscopy for Biomedical Research  
Basic microscopy methods for research including optics, preparation, and analysis of biomedical specimens; light, fluorescence, confocal, transmitting electron, scanning electron, atomic force microscopes, elemental analysis; immunohistochemistry and stereology techniques; individualized laboratory instruction. Prerequisites: BIOL:2723. Same as BIOL:5218, MICR:5218.

ACB:5224 Graduate Seminar in Cell and Developmental Biology  
Current research, literature. Requirements: cell and developmental biology graduate standing.

ACB:6000 Human Anatomy for Advanced Practice  
Integrated study of interrelationships between anatomic structure and physiological function in health and disease at various points in the lifespan; mechanisms governing and supporting cellular, organ, and system function; internal milieu; relationship of study to clinical assessment of functional integrity of individual organ systems utilizing pertinent objective and subjective data; implications of pathophysiology for anesthesia and implications of anesthesia for pathophysiology; foundation for clinical practicums and courses in nurse anesthesia. Requirements: completion of an undergraduate human anatomy and physiology course and admission to anesthesia nursing program. Same as NURS:6000.

ACB:6200 Special Topics in Genetics  
Current research in a selected field of genetics; different topic each year. Companion to a genetics seminar series. Same as GENE:6200.

ACB:6220 Mechanisms of Cellular Organization  
Current understanding of basic cell biological processes; key experiments that led to guiding insights; mechanisms that cells use for compartmentalization and how those mechanisms are regulated; biogenesis of major organelles (e.g., mitochondria, peroxisomes, nucleus, secretory/endorcytic membrane system); functions of cytoskeleton in cell motility, organelle motility, and cell division. Prerequisites: BIOC:3130. Same as MMED:6220, MPB:6220.

ACB:6225 Growth Factor Receptor Signaling  
Mechanisms of signaling by growth factors; cytokines and related molecules that regulate cell proliferation, development, differentiation, and survival; emphasis on molecular mechanisms of signaling, relevance of these signaling processes to various human diseases. Same as MMED:6225, MPB:6225.

ACB:6226 Cell Cycle Control  
Cell cycle regulation, DNA damage-dependent cell cycle regulation, redox-dependent cell cycle regulation, cellular senescence. Same as MMED:6226, MPB:6226.

ACB:6227 Cell Fate Decisions  
Cellular fate decisions including signal integration, terminal differentiation in development, mechanisms of embryonic stem cell gene regulation/cellular reprogramming, cell death paradigms, and cell death in development and cancer. Same as MMED:6227, MPB:6227.

ACB:6237 Critical Thinking in Biochemistry and Molecular Biology  
How nucleic acids, proteins, lipids, and carbohydrates interact to influence the function of cells and tissues; how molecules drive signaling pathways and cellular processes essential for biological functions; based on research publications.

ACB:6238 Critical Thinking in Genetics  
Current topics in molecular and classical genetics; emphasis on genetic underpinnings of disease; based on primary research publications.

ACB:6239 Critical Thinking in Cell Biology  
Understanding subcellular organization and intercellular communication; emphasis on critical thinking and primary research publications.

ACB:6248 Critical Thinking in Development  
Current topics in molecular basis of vertebrate development; based on primary research publications.

ACB:6249 Critical Thinking in Cellular Physiology  
Control of physiological systems at the cellular level; emphasis on regulation by molecular signaling pathways; literature-based.

ACB:6250 Clinical Thinking in Scientific Writing and Presentations  
Scientific grant writing, particularly specific aims development, and oral presentations. Requirements: second-year standing in cell and developmental biology graduate program.

ACB:6252 Functional Neuroanatomy  
Basic principles of neuroanatomy and neurophysiology; emphasis on human central nervous system; laboratory emphasis on anatomical study of spinal cord and brain. Offered spring semesters. Requirements: physical therapy and rehabilitation science enrollment or graduate standing. Same as PTRS:6253.

ACB:6265 Neuroscience Seminar  

ACB:7001 Teaching and Learning in the Anatomical Sciences  
Strategies involved in anatomical sciences education; these include interactive lecturing, dissection, peer teaching/learning, plastination, virtual microscopy, simulation, and case presentation, as well as assessment techniques; online course delivered through recorded lectures and online modules. Requirements: enrollment in master of clinical anatomy program.

ACB:7002 Seminar in Anatomical Sciences  
Opportunity to discuss peer-reviewed anatomical, clinical, and education research articles as they relate to issues of teaching in the anatomical sciences; student- and/or faculty-led presentations prompt further discussion of various in-depth studies that focus on bringing current information into the classroom. Requirements: enrollment in master of clinical anatomy program.

ACB:7010 Anatomy Through Imaging  
Exploration of anatomy through basic imaging techniques; online modules and in-class activities; focus on identification of normal structures through application of anatomical concepts. Requirements: enrollment in master of clinical anatomy program.

ACB:7020 Human Embryology Online  
Major events of embryologic development in humans; more of a morphologic focus than a molecular focus, but includes important molecular concepts of development; students come to understand the backstory of adult human anatomy and how various birth defects occur. Offered spring semesters. Prerequisites: ACB:5203 or ACB:8101 or ACB:5108. Requirements: enrollment in master of clinical anatomy program.
ACB:7227 Anatomic Study for Teaching  2-3 s.h.
Experience completing a detailed dissection of a region of
the human body; opportunity to create models depicting
anatomical concepts. Requirements: enrollment in master of
clinical anatomy program.

ACB:7400 Practicum in College Teaching for Master of
Clinical Anatomy  1-4 s.h.
Supervised college teaching experience; teaching in
collaboration with faculty, observation and critiques of
teaching, participation in course planning and evaluation
procedures; ethical and multicultural considerations.
Recommendations: enrollment in master of clinical anatomy
program.

ACB:8101 Medical Gross Human Anatomy  5 s.h.
Complete dissection of the body with regional emphasis
stressing relationships to the living system; clinically relevant
areas of radiologic imaging, surface anatomy, embryology,
and clinical correlations; anatomical knowledge through
lectures, small group work, independent activities. Offered fall
semesters. Requirements: M.D. or M.P.A.S. enrollment.

ACB:8120 Human Gross Anatomy for Dental
Students  6 s.h.
Exploration of gross anatomy of human body including thorax,
abdomen, upper limb; extensive focus on head, neck, and
neuroanatomy; regional and systemic approaches; course
sequence and assessment blended with general histology for
dental students; cadaveric dissections closely follow lecture
sequence; emphasis on correlations to dental practice. Offered
spring semesters. Requirements: D.D.S. enrollment.

ACB:8121 General Histology for Dental Students  4 s.h.
Microscopic study of cells, fundamental tissues, organ
systems; emphasis on tooth-related structures. Offered spring
semesters. Requirements: D.D.S. enrollment or anatomy and
cell biology graduate standing.

ACB:8401 Advanced Human Anatomy  arr.
Regional dissection of the body with emphasis on systems
relevant to student's specialty interests; discussion, reading,
clinically relevant imaging, embryology. Offered spring
semesters. Requirements: fourth-year M.D. enrollment or
graduate standing.

ACB:8402 Teaching Elective in Regional
Anatomy  2-4 s.h.
Expand knowledge and experience in medical education;
investigate educational pedagogy in a laboratory setting
coupled with self-directed learning of anatomical content
relevant to professional development; prepare, design,
and implement four teaching interactions with M1/D1/PA1
students; design a classroom exercise (e.g., interactive
lecture, learning activity, computer-based study module) that
helps bridge the basic science content with clinical procedure.
Requirements: M.D. standing and enrollment in teaching
distinction track.

ACB:8403 Advanced Human Anatomy for Master of
Clinical Anatomy  arr.
Regional dissection of the body with emphasis on systems
relevant to student's specialty interests; discussion, reading,
clinically relevant imaging, and embryology. Requirements:
enrollment in master of clinical anatomy program.

ACB:8404 Teaching Elective in Regional Anatomy for
Master of Clinical Anatomy  2 s.h.
Expansion of knowledge and experience in medical education;
investigation of educational pedagogy in a laboratory setting
coupled with self-directed learning of anatomical content
relevant to professional development; preparation, design,
and implementation of four teaching interactions with first-year medical, dental, and physician assistant students; design
of a classroom exercise (e.g., interactive lecture, learning
activity, computer-based study module) that helps bridge
basic science content with clinical procedure. Requirements:
enrollment in master of clinical anatomy program.

ACB:8498 Special Study On Campus  arr.
Anatomy research on campus; individually arranged.
Requirements: M.D. enrollment.