

CELL AND MOLECULAR BIOLOGY: CELL BIOLOGY, PHYSIOLOGY, AND METABOLISM, PHD

Cell and Molecular Biology

The Cell and Molecular Biology Graduate Group (CAMB) is an interdisciplinary graduate program, providing rigorous training in modern cell and molecular biology, preparing students for leadership careers in biomedical research. Within this integrated program are six discipline areas: Cancer Biology (<https://upenn-curr.courseleaf.com/graduate/programs/cell-molecular-biology-cancer-biology-phd/>); Cell Biology, Physiology, and Metabolism (<https://upenn-curr.courseleaf.com/graduate/programs/cell-molecular-biology-cell-biology-physiology-metabolism-phd/>); Developmental, Stem Cell and Regenerative Biology (<https://upenn-curr.courseleaf.com/graduate/programs/cell-molecular-biology-developmental-stem-cell-regenerative-biology-phd/>); Gene Therapy and Vaccines (<https://upenn-curr.courseleaf.com/graduate/programs/cell-molecular-biology-gene-therapy-vaccines-phd/>); Genetics and Epigenetics (<https://upenn-curr.courseleaf.com/graduate/programs/cell-molecular-biology-genetics-epigenetics-phd/>); and Microbiology, Virology and Parasitology (<https://upenn-curr.courseleaf.com/graduate/programs/cell-molecular-biology-microbiology-virology-parasitology-phd/>). Program faculty include more than 300 scientists representing 35 departments from the Perelman School of Medicine, the Schools of Arts and Sciences, Dental Medicine, and Veterinary Medicine, Children's Hospital of Philadelphia, the Wistar Institute and Fox Chase Cancer Center. The research efforts of these scientists are diverse in their focus, experimental system, methodology, and represent the leading edge of basic and translational biomedical science.

Students from colleges and universities around the nation and the world are enrolled in the program, selecting one discipline area based on their scientific interests, yet have access to the full breadth of curricular and research opportunities provided by this large and diverse program. Our students participate in core courses in cell and molecular biology, specialized coursework in one or more discipline areas, and original hypothesis-driven thesis research. Upon completion of the PhD, they pursue successful research careers at top academic institutions, in the biotech and pharmaceutical industries, and in other biomedicine-related career paths.

For more information: <http://www.med.upenn.edu/camb/>

Cell Biology, Physiology, and Metabolism

Modern cell biology is a dynamic discipline that integrates multiple fields, including molecular biology, biochemistry, biophysics, microbiology, physiology, developmental biology, cytology and genetics. Cell biologists investigate the basic structural and functional units of life: cells that compose all living organisms. Once reliant primarily on microscopic methods, cell biologists now take advantage of cutting edge methods in ultrastructure, biochemistry, genetics and molecular biology, and utilize a diverse range of model organisms. Program faculty conduct research in cellular metabolism; cell motility, the cytoskeleton, and muscle physiology; intracellular trafficking and organelle function; membrane transport; and signal transduction and cell cycle regulation.

For more information: <https://www.med.upenn.edu/camb/cpm.shtml>
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View the University's Academic Rules for PhD Programs (<http://catalog.upenn.edu/pennbook/academic-rules-phd/>).

Required Courses

Code	Title	Course Units
Coursework		
BIOM 5550	Regulation of the Genome	
BIOM 6000	Cell Biology	
CAMB 5320	Human Physiology	
BIOM 6100	Foundations in Statistics ¹	
CAMB 6050	CAMB First Year Seminar	
CAMB 6910	Advanced Topics in Cell Biology & Physiology	
CAMB 6920	Advanced Topics in Cell Biology and Physiology II: Cell Signaling and Metabolism	
Select two electives		
Research		
CAMB 6990	Lab Rotation	
CAMB 8990	Pre-Dissertation Lab Rot	
CAMB 9950	Dissertation	

¹ Or other statistics course with approval of the Graduate Group.

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2023 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.

Sample Plan of Study

Code	Title	Course Units
Year 1		
<i>Fall</i>		
BIOM 6000	Cell Biology	
CAMB 6050	CAMB First Year Seminar	
CAMB 6990	Lab Rotation	
<i>Spring</i>		
BIOM 5550	Regulation of the Genome	
BIOM 6100	Foundations in Statistics	
CAMB 6920	Advanced Topics in Cell Biology and Physiology II: Cell Signaling and Metabolism	
CAMB 6990	Lab Rotation	
CAMB 6990	Lab Rotation	
<i>Summer</i>		
CAMB 8990	Pre-Dissertation Lab Rot	
Year 2		
<i>Fall</i>		

CAMB 5320 Human Physiology

CAMB 8990 Pre-Dissertation Lab Rot

Electives

Spring

CAMB 6910 Advanced Topics in Cell Biology & Physiology

CAMB 8990 Pre-Dissertation Lab Rot

Elective

Year 3 and Beyond

CAMB 9950 Dissertation