

CELL AND MOLECULAR BIOLOGY: MICROBIOLOGY, VIROLOGY, AND PARASITOLOGY, 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/>

Microbiology, Virology, and Parasitology

The Program in Microbiology, Virology, and Parasitology provides students an opportunity to undertake concentrated study in the molecular and cellular biology of viral and bacterial pathogenesis and parasitology. Program faculty conduct research in a broad range of disciplines, including Bacteriology, Emerging Infectious Diseases, Immune Response, Microbial Genomics and Evolution, Parasitology, Tumor Virology, Virology, and Host Microbiome. Viruses, parasites, prions, and bacteria are a major cause of human morbidity and mortality. Disease resulting from HIV, malaria, and tuberculosis are becoming more prevalent. The threat of emerging infectious diseases, such as Zika and West Nile viruses, and bioterrorism also calls for increased research in the area of microbiology. Students study human pathogens, as well as

their interplay with host resident microbial populations, learning much about normal cell biology, molecular biology, and immunology, as well as developing strategies for the prevention and treatment of infectious diseases.

For more information: <https://www.med.upenn.edu/camb/mvp.shtml> (<https://www.med.upenn.edu/camb/mvp.shtml/>)

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	
BIOM 6100	Foundations in Statistics ¹	
CAMB 6050	CAMB First Year Seminar	
CAMB 7060	MVP Core	
CAMB 5100	Immunology for CAMB or IMUN 5060 Immune Mechanisms	
Select two program electives		
Select two electives		
Research		
CAMB 6990	Lab Rotation	
CAMB 8990	Pre-Dissertation Lab Rot	
CAMB 9950	Dissertation	

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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 7060	MVP Core	
CAMB 6990	Lab Rotation	
<i>Spring</i>		
BIOM 5550	Regulation of the Genome	
CAMB 5100	Immunology for CAMB or IMUN 5060 Immune Mechanisms	
CAMB 7060	MVP Core	
CAMB 6990	Lab Rotation	
CAMB 6990	Lab Rotation	
<i>Summer</i>		

CAMB 8990	Pre-Dissertation Lab Rot	
Year 2		
<i>Fall</i>		
CAMB 8990	Pre-Dissertation Lab Rot	
BIOM 6100	Foundations in Statistics	1
1 Additional elective		
<i>Spring</i>		
CAMB 6950	Scientific Writing	
CAMB 8990	Pre-Dissertation Lab Rot	
Program elective		
Additional elective		
Year 3 and Beyond		
CAMB 9950	Dissertation	