

CELL AND MOLECULAR BIOLOGY, PHD: MICROBIOLOGY, VIROLOGY, AND PARASITOLOGY

Cell and Molecular Biology

The Cell and Molecular Biology Graduate Group (CAMB) (<https://www.med.upenn.edu/camb/>) is an interdisciplinary graduate program, providing rigorous training in modern cell and molecular biology. Within this integrated program are six discipline areas: Cancer Biology (CB) (<https://www.med.upenn.edu/camb/cb.html>); Cell Biology, Physiology, and Metabolism (CPM) (<https://www.med.upenn.edu/camb/cpm.html>); Developmental, Stem Cell, and Regenerative Biology (DSRB) (<https://www.med.upenn.edu/camb/dsrb.html>); Genetics and Epigenetics (G&E) (<https://www.med.upenn.edu/camb/ge.html>); Gene Therapy and Vaccines (GTV) (<https://www.med.upenn.edu/camb/gtv.html>); and Microbiology, Virology, and Parasitology (MVP) (<https://www.med.upenn.edu/camb/mvp.html>). Program faculty include 476 scientists from the Perelman School of Medicine, the Schools of Arts and Sciences, Engineering, Dental Medicine, Veterinary Medicine, the Children's Hospital of Philadelphia, and the Wistar Institute. The research efforts of these extraordinary scientists are diverse in their focus, experimental system, methodology, and represent the leading edge of basic and translational biomedical science.

Currently, 440 graduate students from colleges and universities around the nation and the world are enrolled in the program. Students select one discipline area based on their scientific interests yet have access to the full breadth of curricular and research opportunities provided by our 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.

Our mission is to provide an exceptional mentored training experience to every student, providing a foundation for successful careers as leaders in biomedical research. We welcome prospective students who are dedicated to the search for new knowledge.

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.html>

Required Courses

Code	Title	Course Units
Core Coursework		
BIOM 5550	Regulation of the Genome	1
BIOM 6000	Cell Biology	1
BIOM 6100	Foundations in Statistics ¹	1
CAMB 6050	CAMB First Year Seminar	1
Microbiology, Virology, and Parasitology Concentration		
CAMB 7000	Topics in Microbiology	1
CAMB 5100	Immunology for CAMB	1
2 CUs of CAMB 7060 MVP Core		2
Select one open electives between 4000-9999		1
Research		7
CAMB 6990	Lab Rotation	
CAMB 8990	Pre-Dissertation Lab Rot	
CAMB 9950	Dissertation	
Total Course Units		16

University PhD Benchmarks

In addition to Program requirements, the following milestones must be completed:

Code	Title	Course Units
Qualifying Evaluation		
Candidacy Examination		
Dissertation Defense/Oral Exam		
Dissertation Deposit		

For more information view the University's Academic Rules for PhD Programs (<http://catalog.upenn.edu/pennbook/academic-rules-phd/>).

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 2025 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

Spring

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

Summer

CAMB 8990 Pre-Dissertation Lab Rot

Year 2

Fall

CAMB 8990 Pre-Dissertation Lab Rot

BIOM 6100 Foundations in Statistics

1 Additional elective

Spring

CAMB 6950 Scientific Writing

CAMB 8990 Pre-Dissertation Lab Rot

Program elective

Additional elective

Year 3 and Beyond

CAMB 9950 Dissertation