

CELL AND MOLECULAR BIOLOGY, PHD: CANCER BIOLOGY

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/>

Cancer Biology

The Program in Cancer Biology provides students focused training in a number of areas of cancer biology ranging from basic mechanisms to translational applications. Program faculty conduct research in DNA repair, epigenetics, metabolic pathways, the tumor microenvironment, cancer cell autonomous processes, cancer genetics and cancer immunology. Students take core molecular and cell biology courses, biostatistics course and elective courses in cancer biology and undertake three laboratory rotations of their choosing. Students have the opportunity to take grant writing courses, present in research-in-progress seminars, engage in networking opportunities, mentor undergraduates and high school students in Philadelphia as well as participate in outreach opportunities.

For more information: <https://www.med.upenn.edu/camb/cb.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
Cancer Biology Concentration		
CAMB 5120	Cancer Biology and Genetics (Taken twice)	1
Select two Cancer Biology courses		2
CAMB 5300	The Cell Cycle, Genome Integrity and Cancer	
CAMB 7010	Tumor Microenvironment	
CAMB 7040	Stress Responses and Metabolism in Cancer	
Select two CAMB electives between 4000-9999		2
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 5120	Cancer Biology and Genetics
CAMB 6050	CAMB First Year Seminar
CAMB 6990	Lab Rotation

Spring

BIOM 5550	Regulation of the Genome
CAMB 5120	Cancer Biology and Genetics
Elective	
CAMB 6990	Lab Rotation
CAMB 6990	Lab Rotation

Summer

CAMB 8990	Pre-Dissertation Lab Rot
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Year 2

Fall

BIOM 6100	Foundations in Statistics
CAMB 8990	Pre-Dissertation Lab Rot
CAMB 5300	The Cell Cycle, Genome Integrity and Cancer
	or CAMB 7049 Stress Responses and Metabolism in Cancer

Spring

CAMB 8990	Pre-Dissertation Lab Rot
CAMB 6320	Cell Control by Signal Transduction Pathways
	or CAMB 7011 Tumor Microenvironment
Elective	

Year 3 and Beyond

CAMB 9950	Dissertation
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