CELL AND MOLECULAR BIOLOGY: DEVELOPMENTAL, STEM CELL, AND REGENERATIVE BIOLOGY, 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 (http://catalog.upenn.edu/graduate/programs/cell-molecular-biology-cancer-biology-phd); Cell Biology, Physiology, and Metabolism (http://catalog.upenn.edu/graduate/programs/cell-molecular-biology-cell-biology-physiology-metabolism-phd); Developmental, Stem Cell and Regenerative Biology (p. 1); Gene Therapy and Vaccines (http://catalog.upenn.edu/graduate/programs/cell-molecular-biology-gene-therapy-vaccines-phd); Genetics and Epigenetics (http://catalog.upenn.edu/graduate/programs/cell-molecular-biology-genetics-epigenetics-phd); and Microbiology, Virology and Parasitology (http://catalog.upenn.edu/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/

Developmental, Stem Cell, and Regenerative Biology

Students within Developmental, Stem Cell, and Regenerative Biology address key questions in developmental biology, stem cell/niche interactions, and regenerative biology. The central focus that unites these areas is the compelling drive to understand how tissues are first formed, how they are maintained, and how they can be repaired. Students participate in interdisciplinary training in gametogenesis; embryonic and fetal development; nervous system development and its wiring; the genesis of tissues and organ systems as well as their homeostasis, metabolism and repair; with goal of understanding the basic biology of these processes, as well as their role in disease. Complementing these areas is work on natural and induced Embryonic Stem Cells to understand disease processes in vitro in order to develop cell replacement strategies for therapy. In conducting their research students utilize all tools of the modern genomic era and a wide variety of experimental model systems.

For more information: https://www.med.upenn.edu/camb/dsrb.shtml

View the University's Academic Requirements for PhD Degrees (http://catalog.upenn.edu/pennbook/academic-rules-phd).

Required Courses

Code	Title	Course Units
Coursework		
BIOM 555	Regulation of the Genome	
BIOM 600	Cell Biology	
BIOM 611	Statistics in Experimental Design and Analysis [1]	
CAMB 511	Principles of Development	
CAMB 605	CAMB First Year Seminar	
CAMB 695	Scientific Writing	
CAMB 597	Neural Development, Regeneration and Repair	
or CAMB 697	Biology of Stem Cells	
Select three electives		
Research		
CAMB 699	Lab Rotation	
CAMB 899	Pre-dissertation Research	
CAMB 995	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 2018 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		
Fall		
BIOM 600	Cell Biology	
CAMB 605	CAMB First Year Seminar	
CAMB 699	Lab Rotation	
Spring		
BIOM 555	Regulation of the Genome	
BIOM 611	Statistics in Experimental Design and Analysis	
CAMB 511	Principles of Development	
CAMB 699	Lab Rotation	
CAMB 699	Lab Rotation	
Summer		
CAMB 899	Pre-dissertation Research	
Year 2		
Fall		

	CAMB 597	Neural Development, Regeneration and Repair
	or CAMB 697	Biology of Stem Cells
	CAMB 899	Pre-dissertation Research
	Elective	
Spring		
	CAMB 695	Scientific Writing
	CAMB 899	Pre-dissertation Research
	Elective	
	Elective	
Year 3 and Beyond		
	CAMB 995	Dissertation