



Welcome to GSK
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Cancer Biology PhD Program
Admissions

What can we help you find today?

Cancer Biology
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Research

Fall Semester

Alumni

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Rotation 1					Winter Break
Orientation	Lab 5 weeks	Experimental Biology 4 weeks	Mechanistic Biology 10 weeks		

Spring Semester

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
Rotation 2		Spring Break	Rotation 3		
Lab 5 weeks	Immunology 4 weeks	Cancer Biology 8 weeks		Lab (optional) 5–8 weeks	

Laboratory Rotations. All students enter our PhD program without a formal commitment to a particular laboratory. They have the opportunity to rotate in, or try out, three different laboratories in their first year. Each rotation lasts for 5 weeks. The first begins in July after students arrive on campus and is organized in advance in consultation with the dean. The second occurs in January, and the third in May. Students may complete all three rotations prior to joining a lab, or they can decide to join a lab in February after the second rotation. Our rotations are offset from classes so that students can concentrate on their research when they are in lab, and then they can focus on coursework when they are in class.

Coursework. Our students take formal classes *only* during their first year of graduate school. They take one “core” course all together. Through this course they learn how to read, understand, and discuss science, and they learn how to *do* cutting edge research. The course has 4 sections: Experimental Biology, Mechanistic Biology, Immunology, and Cancer Biology.

Experimental Biology teaches conceptual and practical aspects of five different research disciplines: *imaging, genetics, biochemistry, and genomics*.

Students also take additional short courses in programming and quantitative biology.

Each topic is considered for one week through a combination of workshops, research paper discussions, and lectures. Questions that are considered include:

- How is imaging performed at different length scales, and what can be learned through different techniques?
- How have imaging technologies pushed the boundaries of knowledge?
- How are genetic principles and applied technologies used to make new discoveries?
- What techniques allow for the experimental manipulation of DNA, RNA, and protein, and how do they work?
- How do the “kits” on my research bench actually work?
- How can I think quantitatively about different approaches and data sets?

Mechanistic Biology and Immunology teach what is understood about how cells are constructed and maintained, how groups of cells collaborate to achieve normal development, and how the immune system works. In this class a research paper is dissected every day with one of our GSK faculty members who is at the cutting edge of their research field.

Over 14 weeks the classes will consider:

- *Genome biology, gene expression, and proteins*
- *Cellular architecture: from the cytoskeleton to organelles*
- *Cell cycle control, cell division, and cell death*
- *Cell signaling*
- *Stem cells and pluripotency*
- *Tissue and organismal development*
- *Innate and adaptive immunity*

Cancer Biology teaches how to think about cancer as a disease and also as a biological problem. This course leverages the world-class research and clinical expertise at Memorial Sloan Kettering. The course

lasts for 10 weeks and considers both the biology of cancer and also clinical approaches to combatting this disease.

Week-long topics are considered, including:

- *Cancer as a disease*
- *Genetic and epigenetic mechanisms*
- *Computational biology and oncology*
- *Cancer signaling*
- *Cancer metabolism*
- *Metastasis*
- *Tumor modeling and heterogeneity*
- *Cancer types and microenvironments*
- *Therapeutic strategies*
- *Immunotherapeutic approaches*

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