

# PH.D. IN CANCER BIOLOGY

---

## Overview

The Sheila and David Fuente Graduate Program in Cancer Biology is a university-wide interdisciplinary training program that draws upon clinical and basic sciences from multiple departments and medical school divisions of the University of Miami.

The scientific focus is broadly cancer research with an emphasis on fundamental cellular processes, their deregulation in cancer, the identification of novel diagnostics and therapeutic targets. In addition to training in technical aspects, the curriculum places a strong emphasis on scientific reasoning as the most important and portable aspect of PhD training.

The cross-disciplinary training includes novel concepts and state-of-the-art techniques of molecular biology, biochemistry, genetics, genomics, proteomics, structural biology, cell biology, pharmacology, and molecular medicine. This training is integrated into the extensive clinical and translational research programs of the Sylvester Comprehensive Cancer Center (SCCC).

Research in Cancer Biology stands out by the scale and rate at which basic science translates into tangible changes in the treatment of patients. At the same time, information flows back rapidly from the clinic to direct the next frontier in basic science and innovation.

To make maximum use of this exciting research environment, scientists need training in the relevant clinical concepts to translate questions and research needs back into their own setting and engages in collaborative efforts. To facilitate this training, cancer biology graduate students receive guidance from both a research mentor and a physician mentor. The research mentor is the dissertation advisor, while the physician mentor provides a clinical perspective in cancer biology including issues of diagnosis, management, and treatment of cancer patients and clinical research

The Sheila and David Fuente Graduate Program in Cancer Biology is a university-wide interdisciplinary training program that draws upon clinical and basic sciences from multiple departments and medical school divisions of the University of Miami.

The scientific focus is broadly cancer research with an emphasis on fundamental cellular processes, their deregulation in cancer, the identification of novel diagnostics and therapeutic targets. In addition to training in technical aspects, the curriculum places a strong emphasis on scientific reasoning as the most important and portable aspect of PhD training.

The cross-disciplinary training includes novel concepts and state-of-the-art techniques of molecular biology, biochemistry, genetics, genomics, proteomics, structural biology, cell biology, pharmacology, and molecular medicine. This training is integrated into the extensive clinical and translational research programs of the Sylvester Comprehensive Cancer Center (SCCC).

Research in Cancer Biology stands out by the scale and rate at which basic science translates into tangible changes in the treatment of patients. At the same time, information flows back rapidly from the clinic to direct the next frontier in basic science and innovation.

To make maximum use of this exciting research environment, scientists need training in the relevant clinical concepts to translate questions and research needs back into their own setting and engages in collaborative efforts. To facilitate this training, cancer biology graduate students receive guidance from both a research mentor and a physician mentor. The research mentor is the dissertation advisor, while the physician mentor provides a clinical perspective in cancer biology including issues of diagnosis, management, and treatment of cancer patients and clinical research

## Admission Requirements

Applicants to biomedical programs should have a bachelor degree in a biological or related discipline (e.g., psychology, chemistry, engineering, physics). Although there are no prerequisite requirements, courses in general biology, cell/molecular biology, calculus, general physics, organic chemistry, physical chemistry, and biochemistry are encouraged. Applications are generally accepted from September to December for fall entry only. **Select applicants will be offered an interview.**

### COMPETITIVE CANDIDATES WILL HAVE THE FOLLOWING:

- Excellent academic record
- GRE is no longer required. Competitive GRE exam scores (top 50th percentile) can be submitted through BiomedCAS as additional information.
- Research experience in a laboratory setting
- Publications of abstract and / or papers
- Co-authorship in a peer-reviewed journal is recommended
- Strong letters of recommendation from research scientists who know the candidate well
- Motivation to pursue state-of-the-art biomedical research

### APPLICANTS MUST SUBMIT THE FOLLOWING:

- Online Application
- Application Fee

- Official Academic Transcripts
- English Proficiency Exam (non-native speakers)
- Statement of Purpose
- Resume / CV

Full application instructions can be found online (<http://biomed.med.miami.edu/apply/>).

## Curriculum Requirements

Code	Title	Credit Hours
<b>Journal Club</b>		<b>2</b>
PIB 700	Journal Club <sup>1</sup>	
<b>Biomedical Sciences</b>		
PIB 701	Introduction to Biomedical Sciences	5
PIB 702	Scientific Reasoning	3
PIB 705	Biostatistics for the Biosciences	3
PIB 706	Informatics for the Biosciences	2-4
PIB 731	Laboratory Research	3-5
PIB 780	Research Ethics	1
PIB 782	Professional Development: Skills for Success I	1
PIB 783	Professional Development: Skills for Success II	1
PIB 830	Doctoral Dissertation	1
<b>Core Courses</b>		
Student Seminar		4
CAB 701	CAB Student Seminar <sup>2</sup>	
Clinical Research		3
CAB 705	Translational to Clinical Research <sup>3</sup>	
CAB 710	Cancer Biochemistry and Molecular Biology	3
CAB 713 is a required courses CAB 712, CAB 714, CAB 715 & CAB 716 can be done as electives:		2
CAB 712	Special Topics in Cancer Research - Viral Oncology and Tumor Immunology Module	
CAB 713	Special Topics in Cancer Research - Molecular Cancer Therapeutics Module	
CAB 714	Integrated Cancer Epidemiology and Prevention and Biobehavioral Oncology	
CAB 715	Special Topics in Cancer Research - Breast and Genitourinary Cancers Module	
CAB 716	Special Topics in Cancer Research: Design and Management of Cancer Clinical Trials	
CAB 720	Dialogues with Cancer Clinicians	1
CAB 750	Logic and Reasoning in Translational Cancer Research: Bench to Bedside Part 1	3
<b>Dissertation (Includes 1 credit from PIB 830)</b>		
Choose 23 credits from the following:		23
CAB 830	Dissertation Research - Pre Candidacy	
CAB 840	Doctoral Dissertation- Post Candidacy	
CAB 850	Research in Residence	
<b>Total Credit Hours</b>		<b>61</b>

<sup>1</sup> Students in this degree program take PIB 700 two times, at 1 credit each for a total of 2 credits

<sup>2</sup> Students in this degree program take CAB 701 four times, at 1 credit each for a total of 4 credits.

<sup>3</sup> Students in this degree program take CAB 705 three times, at 1 credit each for a total of 3 credits.

## Suggested Plan of Study

<b>Year One</b>		<b>Credit Hours</b>
<b>Fall</b>		
PIB 701	Introduction to Biomedical Sciences	5
PIB 702	Scientific Reasoning	3
PIB 731	Laboratory Research	2
PIB 700	Journal Club	1
PIB 780	Research Ethics	1
PIB 782	Professional Development: Skills for Success I	1
<b>Credit Hours</b>		<b>13</b>
<b>Spring</b>		
PIB 700	Journal Club	1
PIB 705	Biostatistics for the Biosciences	3
PIB 731	Laboratory Research	1
PIB 783	Professional Development: Skills for Success II	1
CAB 710	Cancer Biochemistry and Molecular Biology	3
<b>Credit Hours</b>		<b>9</b>
<b>Summer</b>		
PIB 830	Doctoral Dissertation	1
<b>Credit Hours</b>		<b>1</b>
<b>Year Two</b>		
<b>Fall</b>		
CAB 701	CAB Student Seminar	1
CAB 705	Translational to Clinical Research	0
CAB 830	Dissertation Research - Pre Candidacy	2
CAB 716	Special Topics in Cancer Research: Design and Management of Cancer Clinical Trials	1
<b>Credit Hours</b>		<b>4</b>
<b>Spring</b>		
PIB 706	Informatics for the Biosciences (Students take either PIB 706 or an elective that meets the Bioinformatics requirement)	2-4
CAB 701	CAB Student Seminar	1
CAB 705	Translational to Clinical Research	1
CAB 713 is a required course. CAB 712, CAB 714, CAB 715 & CAB 716 can be done as electives:		2
CAB 712	Special Topics in Cancer Research - Viral Oncology and Tumor Immunology Module (Offered Alternate Years Spring 2023, 2025, 2027)	
CAB 713	Special Topics in Cancer Research - Molecular Cancer Therapeutics Module (Offered Alternate Years Spring 2023, 2025, 2027)	
CAB 714	Integrated Cancer Epidemiology and Prevention and Biobehavioral Oncology (Offered Alternate Years Spring 2024, 2026, 2028)	
CAB 715	Special Topics in Cancer Research - Breast and Genitourinary Cancers Module (Offered Alternate Years Spring 2024, 2026, 2028)	
CAB 830	Dissertation Research - Pre Candidacy	2
<b>Credit Hours</b>		<b>8</b>
<b>Summer</b>		
CAB 840	Doctoral Dissertation- Post Candidacy	2
<b>Credit Hours</b>		<b>2</b>
<b>Year Three</b>		
<b>Fall</b>		
CAB 701	CAB Student Seminar	1
CAB 705	Translational to Clinical Research	0

CAB 716	Special Topics in Cancer Research: Design and Management of Cancer Clinical Trials (CAB 716 is an elective course)	
CAB 750	Logic and Reasoning in Translational Cancer Research: Bench to Bedside Part 1 (Offered Alternate Years Fall 2022, 2024, 2026)	3
CAB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>6</b>
<b>Spring</b>		
CAB 701	CAB Student Seminar	1
CAB 705	Translational to Clinical Research	1
CAB 720	Dialogues with Cancer Clinicians (Offered Alternate Years Spring 2024, 2026, 2028)	1
CAB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>5</b>
<b>Summer</b>		
CAB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>2</b>
<b>Year Four</b>		
<b>Fall</b>		
CAB 705	Translational to Clinical Research	0
CAB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>2</b>
<b>Spring</b>		
CAB 705	Translational to Clinical Research	1
CAB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>3</b>
<b>Summer</b>		
CAB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>2</b>
<b>Year Five</b>		
<b>Fall</b>		
CAB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>2</b>
<b>Spring</b>		
CAB 840	Doctoral Dissertation- Post Candidacy	2
	<b>Credit Hours</b>	<b>2</b>
<b>Summer</b>		
CAB 850	Research in Residence	1
	<b>Credit Hours</b>	<b>1</b>
	<b>Total Credit Hours</b>	<b>62</b>

Students are encouraged to take pertinent elective courses under guidance of their Dissertation Committee and research mentor. Electives must be approved by CAB graduate program director.

- Required course credits: 36 cr. [700 level courses (required or elective)]
- Dissertation research: 24 cr.

## Mission

The Graduate Program in Cancer Biology offers graduate training leading to a Ph.D. in Cancer Biology. It is the mission of the program to provide our students with 1) an understanding of the central concepts in cancer biology and basic biomedical science coupled with an understanding of clinical aspects of cancer including prevention, diagnosis, prognosis and therapeutic interventions and 2) the ability to formulate, conduct, analyze and communicate original research within the broad field of cancer biology including fundamental cellular processes and their derangement in cancer etiology / progression; identification and mechanisms of novel cancer therapeutics and preventative agents; and identification of novel therapeutic targets, diagnostic and prognostic markers.

## Student Learning Outcomes

- At the end of the program, students will demonstrate an overall knowledge and understanding of the core concepts in cancer biology, including the essential skills to conduct cancer biology research.
- Upon completion of the program, all students will demonstrate critical thinking skills, the capacity to develop hypotheses, the ability to evaluate their hypotheses through appropriate experimental design and analysis paying attention to responsible conduct of research as appropriate.
- Students will demonstrate the ability to write effective scientific reports and to present scientific results orally.