

# PHARMACOLOGY, PHD

**Degree:** Doctor of Philosophy (PhD)

**Field of Study:** Pharmacology

## Program Overview

Students seeking a PhD degree in Pharmacology are admitted into the Department of Pharmacology through the administrative structure of Biomedical Sciences Training Program which provides an introduction to many related training areas within the biomedical field during the first year. PhD applicants may indicate Pharmacology as their "primary program of interest" (PPI) during the application process. Alternatively, admission may be through the Medical Scientist Training Program (MSTP).

The PhD program is divided into three phases. The first phase allows students to follow an integrated first-year sequence of course work that involves a core curriculum in cell and molecular biology. In addition, the first year includes three research rotations that allow the students to sample areas of research and become familiar with faculty members and their laboratories. Selection of a specific training program and thesis advisor is made before the end of the first year. The second phase involves a two-part core course in the fundamentals of pharmacology, oral presentations, and laboratory experience, which is concluded with a comprehensive written exam designed to challenge students to apply key concepts in new contexts. Successful completion of this phase leads to admission to PhD candidacy.

After advancing to PhD candidacy, students focus on their research interests in coordination with their mentor, through regular meetings with their thesis committee, and annual departmental events that showcase their accomplishments. Students are encouraged to participate in additional training activities to enhance their career and professional development.

Upon completion of coursework requirements (54 credit hours, see below) and having completed a complete body of research demonstrating a multifaceted immersion in research endeavors, the training culminates with a scholarly thesis presentation and defense, leading to the award of the PhD degree.

## Admissions

Students are admitted to this PhD program through the Biomedical Sciences Training Program (BSTP) or the Medical Scientist Training Program (MSTP).

### Biomedical Sciences Training Program (BSTP)

The BSTP offers a common entry point to most of the School of Medicine's biomedical PhD programs. BSTP students can choose among research mentors in many different PhD programs in the School of Medicine.

### Medical Scientist Training Program (MSTP)

Students in the MSTP earn the dual MD/PhD degree. MSTP students also have the choice of mentors in many different PhD programs. The admission requirements of those programs can be viewed on their pages in the Bulletin. Program requirements for the dual can be found on the Medical Scientist Training Program, PhD/Medicine, MD program page.

## PhD Policies

For PhD policies and procedures, please review the School of Graduate Studies section of the General Bulletin.

## Program Requirements

The first year consists of the Core curriculum in Cell Biology and Molecular Biology (IBMS 453, IBMS 455), research rotations, scientific ethics, part one of the Pharmacology core course, and an advanced course (18 credit hours total). During Year two, part two of the Pharmacology core course, a second advanced course, two seminar presentation courses, and independent study complete the course requirements. In all, 24 credit hours of graded coursework and 12 credit hours of P/N coursework are completed. Then 18 credit hours of dissertation research fulfill the program of study.

Code	Title	Hours
IBMS 453	Cell Biology I	3
IBMS 455	Molecular Biology I	3
PHRM 401	Principles of Pharmacology I: The Molecular Basis of Therapeutics	3
PHRM 402	Principles of Pharmacology II: The Physiological Basis of Therapeutics	3
PHRM 511	Frontiers in Pharmacology	2
Two advanced electives (from the Advanced Track offerings)		6
Prelim I Comprehensive Examination		
IBMS 450	Fundamental Biostatistics to Enhance Research Rigor & Reproducibility	1
IBMS 456A	Since You Were Born: Nobel Prize Biomedical Research in the Last 21 Years- Section A	1
IBMS 500	On Being a Professional Scientist: The Responsible Conduct of Research	1
PHRM 601	Independent Study and Research	11
PHRM 526	Grant Writing Tutorial	2
PHRM 701	Dissertation Ph.D.	18
<b>Total Hours</b>		<b>54</b>

## Biomedical Sciences Training Program (BSTP) Requirements

### Coursework

Students take integrated courses in Cell and Molecular Biology (IBMS 453, IBMS 455). They also complete a course in biostatistics (IBMS 450) and a literature based reading course (IBMS 456A). These four courses, offered in the fall semester, emphasize the molecular approaches that form the basis of modern biology. We also seek students with strong quantitative training who may have majored in physics or math, and offer alternative courses for these students to acquire foundations in biology. Qualified students also may take more specialized elective courses. All students take IBMS 500 On Being a Professional Scientist: The Responsible Conduct of Research.

### Research Rotations

The research rotations allow students to explore research areas and become familiar with faculty members and their laboratories. The main purpose of these rotations is to aid students in selecting a laboratory for their thesis work. Students are encouraged to begin their rotations in July. Doing so gives them the opportunity to complete rotations during

the summer before classes begin at the end of August. Students must complete at least three rotations.

## Choosing a Thesis Advisor

During the first year, students select an advisor for their dissertation research. Each student also joins the PhD program with which their advisor is affiliated. Once students choose a PhD program, the requirements of that program are followed to obtain the PhD. The emphasis of the PhD work is on research, culminating in the completion of an original, independent research thesis and publishing the results in the scientific literature. PhD programs also focus on educating students to work as professional scientists.

## Sample Plan of Study

### First Year

Fall		Hours
IBMS 453	Cell Biology I	3
IBMS 455	Molecular Biology I	3
Research Rotation 2,3 <sup>a</sup>		
IBMS 450	Fundamental Biostatistics to Enhance Research Rigor & Reproducibility	1
IBMS 456A	Since You Were Born: Nobel Prize Biomedical Research in the Last 21 Years- Section A	1
PHRM 601	Independent Study and Research	1
Selection of Thesis Advisor		
<b>Hours</b>		<b>9</b>

### Spring

PHRM 401	Principles of Pharmacology I: The Molecular Basis of Therapeutics	3
PHRM 511	Frontiers in Pharmacology	0
IBMS 500	On Being a Professional Scientist: The Responsible Conduct of Research	1
PHRM 601	Independent Study and Research	2
Elective		3
<b>Hours</b>		<b>9</b>

### Second Year

Fall		Hours
PHRM 402	Principles of Pharmacology II: The Physiological Basis of Therapeutics	3
PHRM 511	Frontiers in Pharmacology	1
PHRM 526	Grant Writing Tutorial	2
Elective		3
<b>Hours</b>		<b>9</b>

### Spring

PHRM 511	Frontiers in Pharmacology	1
PHRM 601	Independent Study and Research	7
PHRM 701	Dissertation Ph.D.	1
Apply for candidacy		
<b>Hours</b>		<b>9</b>

### Third Year

Fall		Hours
PHRM 701	Dissertation Ph.D.	3
<b>Hours</b>		<b>3</b>

### Spring

PHRM 701	Dissertation Ph.D.	3
<b>Hours</b>		<b>3</b>

### Fourth Year

Fall		Hours
PHRM 701	Dissertation Ph.D.	3
<b>Hours</b>		<b>3</b>

### Spring

PHRM 701	Dissertation Ph.D.	3
<b>Hours</b>		<b>3</b>

### Fifth Year

Fall		Hours
PHRM 701	Dissertation Ph.D.	3
<b>Hours</b>		<b>3</b>

### Spring

PHRM 701	Dissertation Ph.D.	3
IBMS 501	Responsible Conduct of Research for Advanced Trainees <sup>b</sup>	0
<b>Hours</b>		<b>3</b>
<b>Total Hours</b>		<b>54</b>

a Rotation 1 takes place during Summer prior to First Year Fall Semester.

b The SOM requires that PhD students who are 4 years beyond their initial RCR training in IBMS 500, register for IBMS 501.