MOLECULAR MEDICINE, PHD

Degree: Doctor of Philosophy (PhD)
Field of Study: Molecular Medicine

Program Overview

Admission into the Molecular Medicine PhD program is obtained through application directly to the program. Graduate students complete didactic coursework, independent research, and other doctoral requirements to earn the PhD. First-year students complete two to four laboratory rotations among the laboratories of training faculty and are exposed to trainer research projects during the Frontiers of Molecular Medicine seminars. The first year begins mid-July. Students from all years present their research and received feedback in the Student Seminar Series.

During subsequent years, students will devote the majority of their time to thesis research while attending advanced graduate courses, and seminars. Advanced elective courses may be chosen from any department or program on campus with the approval of the graduate program director and the student's thesis committee over the first two years. Students must take a total of 36 semester hours of courses and pre-candidacy thesis research, including 24 graded credit hours, and maintain a B average.

The qualifying exam will be comprised of preparing and defending a grant application in the NIH format. The topic of the grant is the area of the student's thesis research. At least one aim of this proposal will consist of a specific translational or clinical aim.

All efforts should be made to complete the PhD within five years from the date of matriculation. All students are expected to submit two or more first-authored primary research publications in peer-reviewed scientific journals. At least one manuscript must be accepted for publication prior to the thesis defense.

Research Rotations

The research rotations allow the student to sample areas of research and become familiar with faculty members and their laboratories. The main purpose of these rotations is to aid the student in selecting a laboratory for the thesis work. Students will begin their rotations in July. At least two rotations are highly recommended prior to choosing the thesis advisor.

Choosing a Thesis Advisor

During or after the second semester of the first year, students select an advisor for their dissertation research. The emphasis of the PhD work is on research, culminating in the completion of an original, independent research thesis.

PRISM Program (Physicians Researchers Innovating in Science and Medicine)

NIH recognizes the need for physician on-ramps into research training, including the option for obtaining a PhD during residency / fellowship. The Molecular Medicine PhD Program offers a track for Cleveland Clinic physician trainees in GME accredited programs, who wish to pursue a PhD in laboratory-based research in the Molecular Medicine PhD Program, a program completely housed and administered at the Cleveland Clinic. If you are a Cleveland Clinic physician trainee and have questions about this opportunity, please email molmedphd@ccf.org.

PhD Policies

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

Program Requirements

Code	Title	Hours
Required Courses		
MMED 402	Tools for Research	2
MMED 410	Introduction to Human Physiology and Disease	4
MMED 415	Cell Biology	2
MMED 412	Metabolism	2
MMED 413	Nucleic Acids, Gene Expression, and Gene Regulation	2
MMED 414	Mammalian Genetics	2
MMED 416	Host Defense: Infection and Immunity	2
MMED 501	Principles of Clinical and Translational Research	4
MMED 521	Molecular aspects of the diagnosis, pathology, and treatment of selected human diseases	3
MMED 612	Clinical Experience	2
Total Hours		**25**

Coursework

Students begin in July by taking MMED 402 Tools for Research and MMED 410 Introduction to Human Physiology and Disease. The student will follow a progressive curriculum including Cell Biology; Metabolism and Pharmacology; Nucleic Acids, Gene Expression and Gene Regulation; Mammalian Genetics; and Infection and Immunity. In the second summer, students take Principles of Clinical and Translational Research. During year 2, students are required to take MMED 521 Molecular aspects of the diagnosis, pathology, and treatment of selected human diseases, focusing on molecular mechanisms of human disease, and an independent study mentored MMED 612 Clinical Experience.

Sample Plan of Study

First Year		
Fall		**Hours**
MMED 400	Research Rotations [1]	0
MMED 402	Tools for Research	2
MMED 410	Introduction to Human Physiology and Disease [1]	4
MMED 415	Cell Biology	2
MMED 504	Student Seminar Series	1
	Hours	**9**
Spring		
MMED 400	Research Rotations	0
MMED 412	Metabolism	2
MMED 413	Nucleic Acids, Gene Expression, and Gene Regulation	2
MMED 414	Mammalian Genetics	2
MMED 416	Host Defense: Infection and Immunity	2
MMED 504	Student Seminar Series	1
	Hours	**9**

Second Year		
Fall		
MMED 501	Principles of Clinical and Translational Research	4
MMED 521	Molecular aspects of the diagnosis, pathology, and treatment of selected human diseases	3
MMED 601	Dissertation Research [1]	2
	Hours	**9**
Spring		
MMED 612	Clinical Experience	2
Advanced Electives (approved by program director) [2]		varies
MMED 601	Dissertation Research [3]	7
	Hours	**9**
Third Year		
Fall		
MMED 701	Dissertation Ph.D.	1 - 9
Advanced Electives (if necessary) [2]		
	Hours	**1-9**
Spring		
MMED 701	Dissertation Ph.D.	1 - 9
Advanced Electives (if necessary) [2]		
	Hours	**1-9**
	Total Hours	**38-54**

1 Starts in July.

2 Credits vary.

3 Credits may vary to yield 9 credits per semester.

Third Year and beyond: Complete elective coursework so total graded courses equal at least 24 credits; Research credits switch from MMED 601 Dissertation Research to MMED 701 Dissertation Ph.D. once passed into candidacy. Minimum of 1 credit of MMED 701 Dissertation Ph.D. is required each regular semester thereafter for a total of 18 credits to graduate.