

MOLECULAR & INTEGRATIVE PHYSIOLOGY, PHD

for the degree of Doctor of Philosophy in Molecular & Integrative Physiology

The doctoral program uses a flexible approach to curriculum requirements. Students are required to take two core courses, three laboratory rotations (five weeks each), and electives. The students in consultation with a faculty advisory committee choose additional courses in chemistry, biochemistry, immunology, molecular biology, mathematics, and cell biology. Students are encouraged to begin research as soon as they identify an area of research interest. The department has a particularly strong focus in cell physiology, comparative physiology, computational biology, neurophysiology, and endocrinology. Courses and lab research are supplemented by a weekly seminar series. Toward the end of the second year, students must submit a report describing their initial research and pass an oral qualifying examination in order to continue in the PhD program. One year after their qualifying examinations, and no later than the end of their eighth semester in the program, students are expected to take their preliminary examinations in which they present their thesis topic and preliminary research to a faculty committee. Finally, a thesis, which is based on original work in one area of physiology and which demonstrates a thorough knowledge of underlying theories and experimental approaches, must be defended at the final examination. Most students complete their PhD training in four to five years.

Graduate Degree Program in Molecular & Integrative Physiology

- Molecular & Integrative Physiology, PhD (p. 1)

The PhD program in Molecular and Integrative Physiology (MIP) is designed to provide individualized training in preparation for research and teaching careers in molecular, cellular, and integrative physiology. The objective of the training is to produce scientists who are technically competent and broadly educated. Students interested in the MIP PhD program must apply directly to the School of Molecular and Cellular Biology (<http://mcb.illinois.edu/>). During the first semester, students perform three laboratory rotations, choosing from any laboratory in the School. Students select a laboratory for their thesis research in December and formally join the appropriate graduate program at that time.

Admission

Applicants interested in the Molecular & Integrative Physiology PhD program will need to apply directly to the School of Molecular and Cellular Biology (MCB) PhD program (<https://mcb.illinois.edu/graduate/gradprospect/>). The MCB PhD program is an umbrella program that requires admitted students to spend their first semester rotating among three different labs to explore their interests before joining one of our four departments.

MCB Admission requirements include a bachelor's degree in biological or physical sciences, a grade point average of a 3.0 or higher (A = 4.0),

prior research experience, and three letters of recommendation from individuals who can attest to the applicant's academic and research background. The Graduate Record Examination (GRE) is **not** required. Applicants interested in pursuing a PhD in Molecular & Integrative Physiology should have a strong background in biology, chemistry, and mathematics. In addition to these requirements, non-native English speaking applicants must attain a minimum Test of English as a Foreign Language (TOEFL) overall score of 96, with at least a score of 22 on the speaking section. MCB does **not** accept the International English Language Testing System (IELTS) to show English proficiency. Graduate College requirements also apply.

Graduate Teaching Experience

Experience in teaching is considered a vital part of the graduate program and is required as part of the academic work of all PhD candidates in this program. Minimum teaching requirement is 50% for one semester. However, it is strongly recommended that students gain experience equivalent to 50% for at least two semesters.

Financial Aid

Financial support is guaranteed for all students who remain in good academic standing.

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For additional details and requirements refer to the Department's Student Guide (<http://mcb.illinois.edu/departments/mip/gradstudentguide.html>) and the Graduate College Handbook (<http://www.grad.illinois.edu/gradhandbook/>).

Entering with approved M.S. degree

Code	Title	Hours
MCB 401 & MCB 402	Cellular Physiology and Sys & Integrative Physiology (College of Medicine M1 Physiology, both semesters, or equivalent, or proficiency exam.)	6
MCB 501	Advanced Biochemistry	4
MCB 502	Advanced Molecular and Cell Biology	4
MCB 509	Curr Topics Mol & Int Physiol	2
MCB 580	Res Ethics & Responsibilities	1
MCB 581 & MCB 582 & MCB 583	Laboratory Rotation I and Laboratory Rotation II and Laboratory Rotation III	9
Six credit hours taken from the department's Course Menu. See course list tab.		6
Required registration in MIP 590 each semester until passing the qualifying exam		0-8
Thesis Hours Required (0 min applied toward degree)		0
Total Hours		64

Other Requirements

Requirement	Description
Other requirements may overlap	
All graduate students in the Program are required to teach during their graduate training. The minimum teaching requirement is 50% for one semester.	
Successful completion of 96 hours of study (including the Core Courses with a grade A or B).	
Qualifying Exam Required	Yes
Preliminary Exam Required	Yes
Final Exam/Dissertation Defense Required	Yes
Dissertation Deposit Required	Yes
Minimum GPA:	2.75

Entering with approved B.S. degree

Code	Title	Hours
MCB 401 & MCB 402	Cellular Physiology and Sys & Integrative Physiology (College of Medicine M1 Physiology, both semesters, or equivalent, or proficiency exam.)	6
MCB 501	Advanced Biochemistry	4
MCB 502	Advanced Molecular and Cell Biology	4
MCB 509	Curr Topics Mol & Int Physiol	2
MCB 580	Res Ethics & Responsibilities	1
MCB 581 & MCB 582 & MCB 583	Laboratory Rotation I and Laboratory Rotation II and Laboratory Rotation III	9
Six credit hours taken from the department's Course Menu. See Course List tab.		6
Required registration in MIP 590 each semester until passing the qualifying exam		0-8
Thesis Hours Required (0 min/max applied toward degree)		0
Total Hours		96

Other Requirements

Requirement	Description
Other requirements may overlap	
All graduate students in the Program are required to teach during their graduate training. The minimum teaching requirement is 50% for one semester.	
Successful completion of 96 hours of study (including the Core Courses with a grade A or B).	
Qualifying Exam Required	Yes
Preliminary Exam Required	Yes
Final Exam/Dissertation Defense Required	Yes
Dissertation Deposit Required	Yes
Minimum GPA:	2.75

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Department Course Menu

Code	Title	Hours
Lecture Format		
MCB 400	Cancer Cell Biology	3
MCB 408	Immunology	3
MCB 410	Developmental Biology, Stem Cells and Regenerative Medicine	3
MCB 413	Endocrinology	3
MCB 419	Brain, Behavior & Info Process	3
MCB 431	Microbial Physiology	3
MCB 432	Computing in Molecular Biology	3
MCB 442	Comparative Immunobiology	4
MCB 461	Cell & Molecular Neuroscience	3
MCB 462	Integrative Neuroscience	3
MCB 571	Bioinformatics	4
MCB 480	Eukaryotic Cell Signaling	3
MCB 493	Special Topics Mol Cell Biol (Human Metabolic Disease)	1 to 4
ECE 480	Magnetic Resonance Imaging	3 or 4
ANSC 445	Statistical Methods	4
ANSC 542	Applied Bioinformatics	4
Journal-Club Format		
MCB 530	Reproductive Physiol Seminar	1
Laboratory Format		
BIOC 455	Technqs Biochem & Biotech	4
ECE 415	Biomedical Instrumentation Lab	2

These courses need to be approved to count:

MCB 493	Special Topics Mol Cell Biol
MCB 529	Special Topics in Cell and Developmental Biology
NEUR 520	Advanced Topics in Neuroscience
MIP Seminars in Physiology	

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A student awarded a doctorate in Molecular and Integrative Physiology should be able to:

1. Demonstrate mastery in inquiry and analysis. This is defined as a process of exploring a scientific question in physiology through collection and analysis of data that results in logical conclusions. It also encompasses the ability to break down a question into parts and design experiments to address it.
2. Construct and deliver oral presentations on topics in physiology that are well-prepared and purposeful, using clear, spoken language and polished delivery that is engaging to an audience. Presentation materials should be well-organized and appropriately reference information necessary for the listener to understand and learn from the presentation. Importantly, the presentations need to increase knowledge and foster understanding of the listener.

3. Compose written documents describing topics and research in physiology using correct English grammar that are clear, complete and well-referenced from credible and relevant sources of research literature. Writing must also be audience-appropriate and include the use of figures, tables, and equations as applicable to support the text.
4. Demonstrate critical thinking by critiquing literature, presentations and one's own data before drawing logical conclusions.
5. Practice integrative and applied learning. For our discipline, this is defined as making connections between classroom learning, seminars (on campus or at a scientific meeting), and one's own research. This includes synthesizing the knowledge one has gained and applying it to new situations and applying concepts from other areas of science to questions in physiology.

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Department of Molecular & Integrative Physiology

Head of Department: Claudio Grosman

Director of Graduate Studies: Catherine Christian-Hinman

Molecular & Integrative Physiology Department website (<https://mcb.illinois.edu/departments/mip/>)

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College of Liberal Arts & Sciences

College of Liberal Arts & Sciences website (<https://las.illinois.edu/>)

School of Molecular & Cellular Biology

School of Molecular & Cellular Biology website (<http://mcb.illinois.edu>)

Admissions

Overview of MCB Admissions Requirements (<https://mcb.illinois.edu/graduate/gradprospect/>)

Graduate College Admissions & Requirements (<https://grad.illinois.edu/admissions/apply/>)