

# Biomedical Science, PhD

## Molecular Physiology and Biophysics

The Doctor of Philosophy in biomedical science with a molecular physiology and biophysics subprogram offers opportunities for training and research. The degree requires a minimum of 72 s.h. of graduate credit. Students must maintain a cumulative grade-point average (GPA) of at least 3.00 to earn the degree.

Students enter the molecular physiology and biophysics subprogram through the Biomedical Science Program. The Biomedical Science Program is designed to provide students maximum flexibility during the first year of graduate studies to take a course of study compatible with several programs while completing research rotations. At the end of the first year, students choose a subprogram affiliation.

Students join an active group of faculty members and advanced students at a time of expanding interdisciplinary biomedical research at the University of Iowa. Faculty in the Department of Molecular Physiology and Biophysics have a strong research focus on the cellular, molecular, and physical mechanisms of physiological processes.

The PhD in biomedical science with a molecular physiology and biophysics subprogram requires the following coursework.

## Typical Curriculum

### First Year, Fall

Course #	Title	Hours
BMED:5207	Principles of Molecular and Cellular Biology	3
BMED:5208	Topics in Principles of Molecular and Cellular Biology	1
BMED:7777	Biomedical Science Seminar	1
BMED:7888	Biomedical Science Research	arr.
PCOL:5204	Basic Biostatistics and Experimental Design	1

Elective course(s)

### First Year, Spring

Course #	Title	Hours
BMED:7777	Biomedical Science Seminar	1
BMED:7888	Biomedical Science Research	arr.
MMED:6260	Methods for Molecular and Translational Medicine	1
PATH:5270/ IGPI:5270/ MMED:5270	Pathogenesis of Major Human Diseases	3

Elective course(s)

### Second Year, Fall

Course #	Title	Hours
BMED:5207	Principles of Molecular and Cellular Biology	3

BMED:7270	Scholarly Integrity/ Responsible Conduct of Research I	0
MPB:5153	Graduate Physiology	4
MPB:6302	Research Physiology and Biophysics	6

### Second Year, Spring

Course #	Title	Hours
BMED:7271	Scholarly Integrity/ Responsible Conduct of Research II	0
MMED:6226/ ACB:6226/ MPB:6226	Cell Cycle Control (elective)	1
MMED:6227/ ACB:6227/ MPB:6227	Cell Fate Decisions (elective)	1
MPB:6302	Research Physiology and Biophysics	2
PCOL:6225	Growth Factor Receptor Signaling	1

## Elective Coursework Options

Any elective preapproved by the director of graduate studies can be used to meet the elective requirement. A total of 9 s.h. of elective coursework is required.

The most common elective options are the following.

Course #	Title	Hours
GENE:6150	Genetic Analysis of Biological Systems	3
IGPI:5270/ MMED:5270/ PATH:5270	Pathogenesis of Major Human Diseases	3
MPB:6220/ ACB:6220/ MMED:6220	Mechanisms of Cellular Organization	3
NSCI:5653/ BIOL:5653/ PSY:5203	Fundamental Neurobiology I	3

## Additional Requirements

### Plan of Study

In consultation with the director of graduate studies, each newly admitted student formulates a plan of study to be completed before the comprehensive examination. This plan should include projected dates for completion of the comprehensive examination as well as provision for removal of deficiencies. Before completing the comprehensive exams, the normal course load is 15 s.h. each semester.

### Required Courses

It is the intention of the department to have a curriculum that allows coursework to be mostly completed within the first year, though in some instances additional coursework in subsequent years is required. The core curriculum represents a minimum of required classes; although with advice of the director of graduate studies and thesis advisor, some students may benefit from completing additional coursework.

Requests for waiver of required courses or change of course registration must be approved by the director of graduate

studies after consultation with the faculty and the chair of the department.

## Evaluation of Progress

Students must meet progress requirements of the Department of Molecular Physiology and Biophysics and the Graduate College. To meet departmental requirements, students must earn a grade of B or higher in MPB:5153 Graduate Physiology and BMED:5207 Principles of Molecular and Cellular Biology (B-minus or lower constitutes a non-passing grade), a grade of satisfactory (S) for BMED:7270 Scholarly Integrity/Responsible Conduct of Research I, and a GPA of at least 3.00 in all elective coursework (a grade below B, but above D-minus, is permissible for individual electives, so long as the GPA of all combined electives taken during the graduate program remains higher than 3.00).

All core curriculum courses receiving a letter grade must be satisfactorily completed prior to taking the comprehensive exam. According to Graduate College regulations, students cannot take a comprehensive exam in a semester in which they are on academic probation.

## Comprehensive Examination

Students admitted directly to the doctoral program are required to complete the comprehensive examination by June 30 of the second year in the program.

## Workshop

All postcomprehensive students are required to present a workshop on the progress of their thesis research once per year. Students should consult with the workshop coordinator to arrange presentation dates. Precomprehensive students also are encouraged to present workshops, though it is not required. Students have an option to present a full or half workshop (typically 45 or 20 minutes, respectively).

## Teaching

Experience in teaching is an important part of a student's academic training. To attain adequate teaching proficiency, students receive teaching assignments after successful completion of the comprehensive exam and in subsequent years as warranted. Individual assignments depend on the teaching needs of the department. Examples of teaching assignments include running review sessions in a graduate physiology course, formal lectures, participating in small group conferences, assisting in computer simulations, or bench mentoring of summer students. These teaching assignments are made by the director of graduate studies in consultation with appropriate course directors. Thesis advisors with specific suggestions concerning teaching assignments that would be particularly beneficial to the individual circumstances of a particular student are encouraged to share them with the director of graduate studies for consideration. However, final discretion for approval lies with the director of graduate studies who must preapprove all assignments.

## Research Publication

It is expected that thesis research will result in findings that are of sufficient quality and completeness to warrant publication in good quality peer-reviewed journals. At least one first-author peer-reviewed research paper should be accepted for publication prior to the PhD thesis defense. The published paper or a letter from an editor indicating acceptance should be provided to the director of graduate studies before scheduling a final exam date. In certain cases, a first-author research manuscript might be written, but not

yet accepted by a journal at the time a final PhD thesis exam is scheduled. In this case, the first-author requirement may be satisfied if trainees submit their manuscript to the preprint server for biology, bioRxiv.

## Thesis Defense and Presentation

Students complete a thesis defense with their committee. Once this test is completed they must schedule a public thesis presentation.

## Combined Programs

### PhD/MD

Students may work toward the Doctor of Medicine degree and a PhD in biomedical science (molecular physiology and biophysics subprogram) in a combined degree program offered by the Graduate College and the Carver College of Medicine. Applicants must be admitted to both programs before they may be admitted to the combined degree program. See the Medical Scientist Training Program (Carver College of Medicine) in the catalog.