

# BIOMEDICAL SCIENCES - CELLULAR AND MOLECULAR BIOLOGY - PH.D.

College of Arts and Sciences  
School of Biomedical Sciences  
www.kent.edu/biomedical

## About This Program

The Biomedical Sciences - Cellular and Molecular Biology Ph.D. program provides advanced training in biomedical research, with a focus on cellular and molecular biology. With access to state-of-the-art facilities and experienced faculty, you will gain the knowledge and expertise needed to tackle complex biomedical questions and make a meaningful impact in the field. Read more...

## Contact Information

- Director: **John Johnson** | BMS@kent.edu | 330-672-3849
- Connect with an Admissions Counselor: U.S. Student | International Student

## Program Delivery

- **Delivery:**
  - In person
- **Location:**
  - Kent Campus

For more information about graduate admissions, visit the graduate admission website. For more information on international admissions, visit the international admission website.

## Admission Requirements

- Bachelor's degree or higher from an accredited college or university
- Minimum 2.750 GPA on a 4.000-point scale
- Academic preparation adequate to complete graduate coursework in cell and molecular biology (recommended courses in chemistry, cell biology, genetics and biochemistry)
- Official transcript(s)
- Curriculum vitae/résumé
- Goal statement (applicants should describe their research experience and goals in pursuing an advanced degree)
- Three letters of recommendation
- English language proficiency - all international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning one of the following:
  - Minimum 600 TOEFL PBT score
  - Minimum 100 TOEFL IBT score
  - Minimum 85 MELAB score
  - Minimum 7.0 IELTS score
  - Minimum 68 PTE score
  - Minimum 120 Duolingo English score

## Application Deadlines

- **Fall Semester**
  - Application deadline: December 1

Applications submitted after this deadline will be considered on a space-available basis.

## Program Requirements

### Major Requirements

Code	Title	Credit Hours
<b>Major Requirements</b>		
BMS 70120	LABORATORY TECHNIQUES IN BIOMEDICAL SCIENCES (taken twice)	4
BMS 71000	RESPONSIBLE CONDUCT OF RESEARCH	1
BMS 71001	INTRODUCTION TO BIOMEDICAL SCIENCES	1
BMS 78637	BIOANTHROPOLOGICAL DATA ANALYSIS I	3-5
or BSCI 70104	BIOLOGICAL STATISTICS	
or PSYC 71651	QUANTITATIVE STATISTICAL ANALYSIS I	
Electives <sup>1</sup>		12-14
<i>Culminating Requirement</i>		
BMS 80199	DISSERTATION I <sup>2</sup>	30
<b>Concentrations</b>		
Choose from the following:		7
	Cellular Biology and Structure	
	Molecular Biology and Genetics	
<b>Minimum Total Credit Hours for Post-Baccalaureate Students:</b>		<b>90</b>
<b>Minimum Total Credit Hours for Post-Master's Students:</b>		<b>60</b>

<sup>1</sup> Elective courses and research must be approved by the student's guidance committee.

<sup>2</sup> Upon completion of course requirements and candidacy exam, doctoral students must register for BMS 80199 for two semesters for a total of 30 credit hours. Thereafter, it is expected that a doctoral candidate will continuously register for BMS 80299 each semester until all requirements for the degree have been met. As soon after completion of candidacy examination as possible, the dissertation committee will be established, consisting of the guidance committee and an outside discipline member – a graduate faculty member from another department at Kent State University or another program of the School of Biomedical Sciences. Students will submit to this committee their prospectus for the dissertation. The format of the prospectus will parallel that utilized for NIH grant proposals (without biographical, budget and facilities information). The dissertation committee may elect to examine the candidate on the proposal and may accept it as submitted or reject it with specific reasons and recommendations for reformulation.

## Cellular Biology and Structure Concentration Requirements

Code	Title	Credit Hours
<b>Concentration Requirements</b>		
BSCI 70142	BIOENERGETICS	3
BSCI 70143	EUKARYOTIC CELL BIOLOGY	3

BSCI 70144	SELECTED READINGS IN EUKARYOTIC CELL BIOLOGY	1
<b>Minimum Total Credit Hours:</b>		<b>7</b>

## Molecular Biology and Genetics Concentration Requirements

Code	Title	Credit Hours
<b>Concentration Requirements</b>		
BSCI 70143	EUKARYOTIC CELL BIOLOGY	3
or BSCI 70158	MOLECULAR BIOLOGY	
or CHEM 70254	BIOMEMBRANES	
BSCI 70144	SELECTED READINGS IN EUKARYOTIC CELL BIOLOGY	1
Elective		3
<b>Minimum Total Credit Hours:</b>		<b>7</b>

## Graduation Requirements

Post-baccalaureate students must complete a minimum of 60 credit hours, and post-master's students a minimum of 30 credit hours, of coursework prior to dissertation.

## Program Learning Outcomes

Graduates of this program will be able to:

1. Publish their research in peer-reviewed journals.
2. Demonstrate the ability to teach undergraduate students.
3. Seek employment in fields that reflect their area of training.

## Full Description

The Ph.D. degree in Biomedical Sciences–Cellular and Molecular Biology prepares creative research scientists for careers in teaching, research and biotechnology. Graduates possess an in-depth comprehension of experimental design at the cellular and molecular levels of biological organization, as well as competency in current techniques in the discipline. Major research emphases include signal transduction, biochemistry and pathobiology, gene regulation, cell systems biology, cell and tissue ultrastructure, membrane structure and function, molecular aspects of neurobiology and endocrinology, genetics and metabolism of microorganisms, virology and immunology and enzymology with an emphasis on protein dynamics and folding, as well as cytochrome P-450s.

The Ph.D. degree is offered in consortium with Cleveland Clinic and Northeast Ohio Medical University (NEOMED). Program faculty are drawn from several departments at Kent State and the other two institutions. Additional participant faculty are located at area clinical facilities and hospitals. This multi-departmental and inter-institutional structure gives doctoral candidates access to the talents of a broadly diverse research faculty as well as significant research facilities and resources.

The Biomedical Sciences–Cellular and Molecular Biology major comprises the following concentrations:

- Cellular Biology and Structure
- Molecular Biology and Genetics