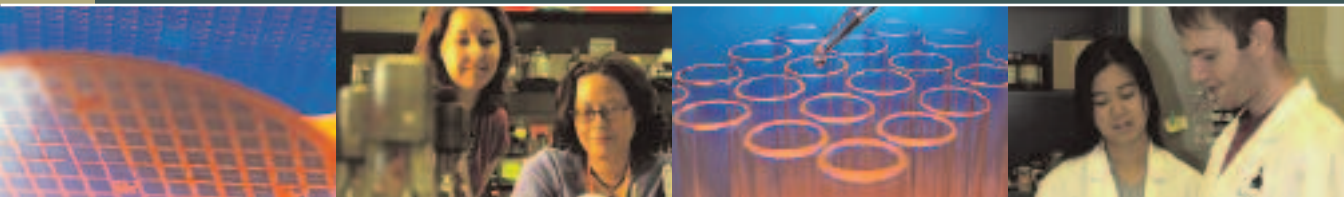
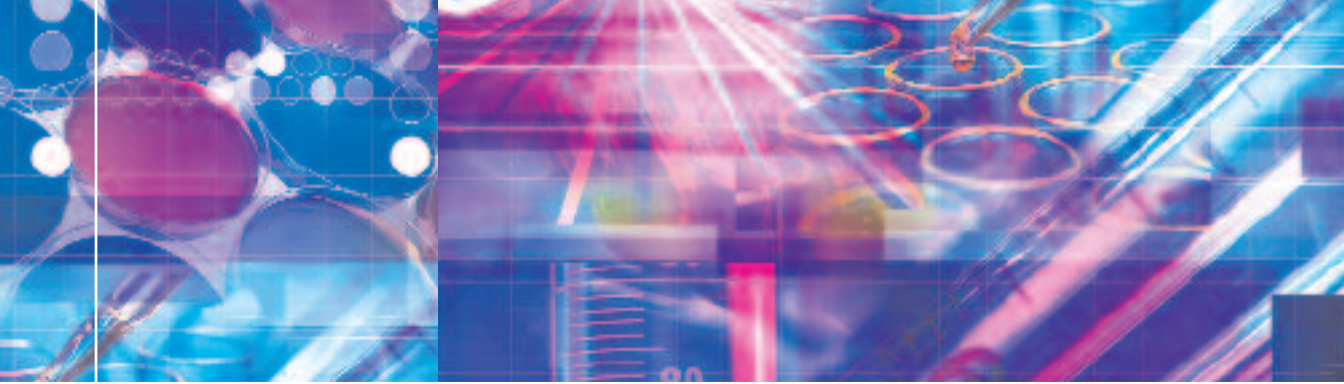


JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH



Department of
Biochemistry and
Molecular Biology

Protecting Health, Saving Lives—*Millions at a Time*



ON THE FOREFRONT OF BIOMEDICAL RESEARCH

The goal of the Department of Biochemistry and Molecular Biology is to increase current knowledge of the biochemical and molecular bases of normal and abnormal cellular processes and to train highly qualified scientists who, through research, teaching and service, will continue to provide new insights into the biochemical, biophysical and molecular aspects of biomedical issues that have an impact on public health. Critical biomedical issues in reproductive health are addressed in the Division of Reproductive Biology.



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“I chose Hopkins because of the **excellent research environment** and friendly atmosphere.” —JOYCE CHEUNG, VANCOUVER, BRITISH COLUMBIA

AN INSTITUTION

As the oldest and largest school of its kind, the Johns Hopkins Bloomberg School of Public Health is the place where many of the world's leading public health professionals work together to improve the public's health and save millions of lives. These leaders will be your teachers, your mentors, and eventually your colleagues as you learn and grow in a place that is helping to shape the future of public health.

The School welcomes students from across the nation and around the world—each contributing in a unique way to a dynamic learning environment.

Our location in the lively and inviting city of Baltimore provides easy access to the rich cultural, social, and recreational opportunities of the mid-Atlantic region. As students in the School of Public Health, you may also access the resources of the other divisions of The Johns Hopkins University, with locations around the Baltimore-Washington area and offering many academic disciplines.

DEGREE PROGRAMS

The Department offers a Master of Health Science (MHS) degree, a Master of Science (ScM) degree, and a doctoral (PhD) degree in biochemistry and molecular biology.

MASTER OF HEALTH SCIENCE

The MHS degree program requires one year of coursework culminating in a library-based thesis. The program is designed for students exploring career options, seeking to improve their chances for medical or other professional schools, or planning to pursue advanced graduate work or positions in industry.

MASTER OF SCIENCE

The ScM degree program requires two years of coursework, the completion of original research and the preparation of a research-based thesis. Typically, ScM students present their findings at national meetings and publish their results in peer-reviewed journals. Some continue on to advanced graduate study, while others obtain research positions in industry.

PHD IN BIOCHEMISTRY AND MOLECULAR BIOLOGY

Required courses in the first year include the following: Molecular Biology and Genomics, Macromolecular Structure and Analysis, Biochemical and Biophysical Principles, Genetics, Cell Structure and Dynamics, Organic Mechanisms in Biology Pathways and Regulation, Computational Biology and Bioinformatics, and Mechanisms for Preservation of Genome Integrity. In addition, students must take two of the following electives: Reproductive Biology for Biomedical Scientists, Structure Determination, Developmental Biology, Mechanisms in Bioorganic Chemistry, Neurobiology, Epigenetics, Transcription Mechanisms, Virology, Post-Transcriptional Events in Gene Regulation, Structure and Chemistry of Lipid Bilayers, The Nucleus, Fundamentals of Membrane Physiology, or Introductory Molecular Immunology.



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“In the Department of Biochemistry and Molecular Biology, I found the **advantages of a small department** coupled with the resources of one of the world’s leading research institutions.” —ROB NEWMAN, CUMBERLAND, MARYLAND

First-year students also participate in a Current Research Literature course that is directed by Department faculty. At the end of their first year, students choose their thesis advisers.

In their second year, students pursue courses in their specialty areas. In addition, all students are required to take Research Ethics or Research Ethics and Integrity, and Public Health Perspectives in Research (this course may be taken in the third year). The PhD program is organized into the following specializations, with corresponding research issues:

- *Biochemical Nutrition*: Cellular growth control
- *Bioorganic Chemistry*: Organic and enzymatic synthesis of nucleic acids, antisense oligonucleotides, nucleic acid analogues
- *Biophysics*: Biopolymer structure and interaction; fluorescence spectroscopy of protein conformation and function, and of protein-protein interactions
- *Structural Biology*: X-ray crystallography, protein and nucleic acid structure, RNA splicing
- *Cellular and Molecular Biology*: Molecular carcinogenesis; regulation of chromosomal DNA replication; signal transduction mechanisms; DNA repair; immunological detection and quantitation of DNA and DNA damage using computer-assisted microphotometry; biosynthesis; trafficking and function of glycoproteins; nuclear transport; cell adhesion and interactions; protein turnover during erythroid differentiation; glycobiology; mechanisms of heat shock protein function; control of eukaryotic gene expression during differentiation and alterations in gene expression during neoplastic transformation; control of plant gene expression; mechanisms of DNA methylation; detection and mechanism of DNA rearrangement; eukaryotic genome structure and sequencing; eukaryotic growth control; bacteriophage and bacterial genetics; mechanisms of bacterial transformation; transfection and recombination
- *Enzymology*: Mechanisms of DNA replication, recombination and repair; kinetics of enzyme action; peptide chemistry and protein structure; enzyme mechanisms; mechanisms of molecular chaperone action and targeting; structure, function and synthesis of membrane molecules; specificity and targeting in ubiquitin-mediated proteolysis
- *Reproductive Biology*: Human male sex differentiation and development; gene function during development; hormonal and neural regulation of seasonal reproductive behavior; regulation of the structure, function and aging of Leydig cells in the mammalian testis; molecular mechanisms of androgen action in target tissues; function and control of prostate growth in relation to normal physiology; benign prostatic hyperplasia and cancer; hormonal and molecular regulation of mammalian spermatogenesis; interactions between Sertoli and germ cells in the mammalian testis; oocyte maturation; sperm-egg interaction during fertilization; development of methods for



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“I am in the Department of Biochemistry and Molecular Biology, but I’ve also taken classes in epidemiology, biostatistics, and international health. Being able to interact with people with **vastly different viewpoints** is what I treasure most about my Hopkins education.” —SARA VOLK, MENTOR, OHIO

contraception and prevention of sexually transmitted diseases; effects of environmental toxicants on the reproductive tract

In addition to coursework, first-year PhD students participate in five different laboratory rotations, each lasting seven weeks. At the end of each rotation period, students present brief oral reports on their work. This laboratory rotation program provides students with a working knowledge of the Department’s research programs and a rational basis for choosing a thesis adviser. The average course of study for a PhD in Biochemistry and Molecular Biology is five years.

QUALIFICATIONS FOR ADMISSION

The teaching and research program in the Department of Biochemistry and Molecular Biology is planned for individuals with a bachelor’s degree in chemistry, biochemistry or biology, preferably with experience in physical chemistry, physics and mathematics. All candidates should have had some research experience, although

this requirement is waived for applicants from smaller colleges. Applicants typically seek preparation for a career in research and teaching. Applicants are requested to indicate their research experience and career goals and to name the person(s) with whom their research experience has been gained.

Applications for the master’s degree should be submitted by June 1. Completed applications for the PhD program, including GRE scores, are accepted up to January 10. Candidates for admission to the PhD program will be identified and invited to the Department for an interview at the Department’s expense.

For more information about our programs, visit our website at bmb.jhsph.edu.

FINANCIAL SUPPORT

All PhD students receive full financial support, which covers tuition, fees, medical insurance and a stipend for living expenses. Graduate students are not required to serve as teaching assistants, although opportunities to teach are available if a student so desires.

VISIT WITH US

We encourage you to visit with us, talk with faculty and students, and explore all our student services before you choose your school for graduate study. Visitor Days include information about admissions, individual departments, student diversity, and student services. Campus tours are also included. If you are not able to visit with us, take our virtual tour online at www.jhsph.edu/admissions, or call 410-955-3543.

