Why Biochemistry at Brandeis?

The Brandeis biochemistry major is designed to equip students with a rigorous understanding of the chemical and molecular events underlying all biological processes. Particular emphasis is placed on basic principles and observations in biochemistry and molecular biology, as well as biophysical chemistry. The biochemistry major provides an excellent foundation for careers in medicine, biotechnology, or research in all branches of the biological sciences.

Curriculum Overview

Students have the option of completing a bachelor of arts, a bachelor of science, or a four-year combined BS/MS program.

The BA requires the following:
- One semester of Introductory Biochemistry
- One year of General Chemistry plus labs
- One year of Organic Chemistry plus labs
- One year of Biology plus labs
- One year of Physics taught with calculus plus labs (a year of calculus is required prior to taking this requirement)
- One year of Physical Biochemistry
- One elective

The BS requires the following:
- All of the above plus one year of Advanced Biochemistry

The BS/MS program is designed for students entering Brandeis with advance standing (e.g., AP credit) in one or more core courses. In addition to the above requirements, BS/MS students must complete one additional elective, three semesters of research, a summer research residency, and a research thesis.

Most students can complete the requirements for a BS in biochemistry by taking two science courses each semester. A typical schedule might consist of General Chemistry and Calculus in the freshman year; Biology and Organic Chemistry in the sophomore year; Physics, Introductory Biochemistry, and an elective in the junior year; and Physical Biochemistry and Advanced Biochemistry in the senior year.

Electives consist of upper-level courses in the biochemistry, biology, chemistry, and neuroscience programs.
Research Opportunities

Undergraduates have many opportunities to engage in state-of-the-art research in biochemistry and biophysics at Brandeis. Students often find part-time employment in faculty research labs, occasionally publishing joint papers. Many students also engage in summer laboratory research.

Independent research courses are another popular mechanism for going beyond the curriculum and getting involved in laboratory research.

Completing a senior honors thesis in biochemistry provides an opportunity to spend an entire year working on a self-directed research topic under the guidance of a faculty member.

Career and Education Options

Students completing a BA, BS, or BS/MS in biochemistry from Brandeis pursue a wide variety of career paths. Many go on to either graduate or medical school, while others immediately enter the work force in the biotechnology sector. Over half of all biochemistry majors have another major, typically biology, chemistry, economics, mathematics, or physics. Double-majors often choose career paths that combine their majors, such as biophysics or biotechnology business ventures. Others pursue professional training in science policy or law.

Faculty

Following is a list of department faculty members and their areas of specialization:

- Jeff Gelles, chair
  Mechanisms of mechanoenzymes, stochastic processes in single enzyme molecules, light microscopy as a tool to study enzyme mechanisms

- Ulrich Genick
  Structural investigation of signaling in the phytochrome system, time-resolved X-ray crystallography

- Nikolaus Grigorieff
  High-resolution electron cryomicroscopy of membrane proteins and channels

- Lizbeth Hedstrom
  Enzyme structure-function studies, protein engineering, design of enzyme inhibitors

- Dorothee Kern, chair, biophysics and structural biology
  Dynamics of enzymes, magnetic resonance methods

- John Lowenstein
  Role of phospholipids in hormone action, regulation of lipogenesis, regulation and function of the purine nucleotide cycle, regulation and function of adenosine production in the heart, techniques of cloning and high-level expression of proteins

- Christopher Miller, graduate program chair
  Structure and function of ion channel proteins, membrane transport and mechanisms of electrical excitation

- Melissa Moore, undergraduate advising head
  Pre-mRNA splicing, mRNA metabolism

- Daniel Oprian
  Structure-function studies of visual pigments and other cell surface receptors

- Gregory Petsko, director, Rosenstiel Center
  X-ray crystallographic analysis of protein structure and enzyme mechanisms

- Dagmar Ringe, Rosenstiel Center
  Structures of enzymes and enzyme-substrate complexes, X-ray crystallography