

Biological Chemistry

AN INTERDEPARTMENTAL MAJOR

Director: *Peterman (Biological Sciences)*

Biological Chemistry Advisory Committee: *Elmore (Chemistry), Hood-DeGrenier (Biological Sciences), Peterman (Biological Sciences), Vardar Ulu (Chemistry), Wolfson (Chemistry)*

Biological Chemistry is an interdisciplinary major offered by the Departments of Biological Sciences and Chemistry, allowing students to explore the chemistry of biological systems. Biological Chemistry includes fields we call biochemistry, cell and molecular biology, as well as other molecular aspects of the life sciences. It deals with the structure, function and regulation of cellular components and biologically active molecules, such as proteins, carbohydrates, lipids, and nucleic acids. Expertise in biological chemistry is central to breakthroughs in DNA technology, drug discovery and design, and molecular approaches to disease.

Goals for the Major

Fundamental knowledge of the principles of chemistry and biology in relation to biological chemistry, and the ability to specifically apply this knowledge to problems at the interface of these disciplines

Familiarity with the structure and function of biomolecules involved in biochemical pathways and regulation of cellular processes

Strong problem-solving abilities, and ability to adapt knowledge acquired in new situations to evaluate data, to competently approach new problems and to be independent learners

Strong quantitative skills and critical thinking abilities; skills in hypothesis generation and testing, data interpretation and analysis, and designing experiments

Good experimental skills in the laboratory, experience with the operation of complex instrumentation and computers, and the understanding of general lab protocols and safety issues

Ability to collaborate with other researchers, and awareness of ethical issues in biochemistry and molecular biology

Strong communication skills involving oral and writing competencies in scientific topics, and the ability to read and critically evaluate a scientific paper for content or techniques.

BIOC 240 Seminar in Biological Chemistry for Newly-Declared Majors

Staff

A seminar for newly declared majors, to be taken in the spring of their sophomore or junior year. Students will read and discuss papers related to the research of prominent scientists working in the fields of biological chemistry and molecular biology and attend seminars in which those researchers will present their work at Wellesley. Some seminars may be scheduled outside of the normal class meeting time. *Mandatory credit/noncredit.*

Prerequisite: Limited to sophomore or junior Biological Chemistry majors or by permission of instructor.

Distribution: Natural and Physical Science

Semester: Spring Unit: 0.5

BIOC 250 Research or Individual Study

Prerequisite: By permission of the instructor.

Distribution: None

Semester: Fall, Spring Unit: 1.0

BIOC 250H Research or Individual Study

Prerequisite: By permission of the instructor.

Distribution: None

Semester: Fall, Spring Unit: 0.5

BIOC 350 Research or Individual Study

Prerequisite: Open by permission to juniors and seniors.

Distribution: None

Semester: Fall, Spring Unit: 1.0

BIOC 360 Senior Thesis Research

Prerequisite: By permission of the Advisory Committee. See Academic Distinctions.

Distribution: None

Semester: Fall, Spring Unit: 1.0

BIOC 370 Senior Thesis

Prerequisite: 360 and permission of the Advisory Committee.

Distribution: None

Semester: Fall, Spring Unit: 1.0

As of 8/10/09

Requirements for the Major

In addition to two courses in biochemistry (CHEM 221 and 328), the major must include the following courses: CHEM (a) both 105 and 205, or 120; (b) 211; (c) 232; BISC (a) 110; (b) 219; (c) 220; (d) two 300-level courses from among the following: BISC 303/CS 303, [309], 310, 313, 316, 319, 320 or a seminar course if relevant to the major and approved by the director, excluding 350, 360, 370. At least one of these two 300-level courses must be a laboratory course; PHYS 104 or 107; MATH 116, 120 or equivalent. For students who enter the College in the fall of 2008 or later, BIOC 240 will be required for the major. For students who entered the College prior to the fall of 2008, BIOC 240 is strongly recommended.

Students should be sure to satisfy the prerequisites for the 300-level courses in biological sciences and chemistry. Students planning graduate work in biochemistry should consider taking additional courses in chemistry, such as analytical, inorganic, and the second semesters of organic and physical chemistry. Students planning graduate work in molecular or cell biology should consider taking additional advanced biological sciences courses in those areas. Independent research (350 and/or 360/370) is highly recommended, especially for those considering graduate study.

A recommended sequence of required courses would be:

Year I, CHEM 105 and math or physics; CHEM 205 and BISC 110

Year II, CHEM 211 and BISC 219; BISC 220 and math or physics

Year III, CHEM 221 and math; CHEM 328 and 232

Year IV, 300-level biological sciences courses and independent study

Please discuss your program with the director as soon as possible.

Honors

BIOC 250, 250H, 350, 360 and 370 research can be advised by any faculty member of the Departments of Biological Sciences or Chemistry. Advisors for honors work can be members of either department and students should enroll in BIOC 360/370 after approval by the Advisory Committee. The honors program will follow the guidelines of the appropriate department, but each honors candidate must be approved by the Biological Chemistry Advisory Committee.