Biochemistry, Cell and Molecular Biology

PROGRAM OVERVIEW The biochemistry, cell and molecular biology (BCMB) major prepares students for careers in one of the most exciting areas of science: the interface between biology, chemistry and physics. The development of techniques, like genetic engineering and microscale analysis, have brought an increasingly molecular focus to the traditional scientific disciplines of chemistry, biology and the health sciences. Biochemistry, cell and molecular biology are at this interdisciplinary crossroad. The BCMB program introduces students to the chemistry of living organisms and the experimental techniques that are used to probe the structures and functions of biologically important molecules.

The Bachelor of Science major is intended to meet the needs of students seeking careers in molecular life science industries (e.g. biotechnology, drug, food, agriculture and clinical industries), students preparing for health professional schools (medical, veterinary, dental, optometry), and students interested in graduate programs in molecular life sciences (e.g. biochemistry, cell and molecular biology, genetic engineering, medicinal chemistry). The major meets the guidelines of the American Society for Biochemistry and Molecular Biology.

The Bachelor of Arts major is intended to meet the needs of students interested in pursuing cross-disciplinary careers that merge a strong science background with a field of its application. These fields include bioinformatics, forensics, management, marketing, education, public relations, biophysics, biotechnology law and others upon approval of the BCMB Board of Directors.

Research is very important in the BCMB Program. Both B.A and B.S. students participate in research. Students begin research as soon as possible; some begin their first year or second year. Faculty and collaborating scientists provide a wide range of potential research projects in which students may engage. During their junior and senior years, students participating in the Advanced Molecular Life Sciences course are directly involved in collaborative research. Students write and orally present their research projects during their senior year as part of the Capstone experience. Students often present their research at professional scientific meetings and in scientific journals.

FACULTY The BCMB program incorporates courses and faculty from the Chemistry and Biology Departments with interests in molecular life science. The BCMB Board of Directors includes six faculty and two students. All faculty have doctoral degrees in their respective disciplines. Research opportunities for students include projects with these faculty as well as off-campus collaborations with regional industry and health-care systems.

ACADEMIC PREPARATION There are no prerequisite high school courses or requirements needed for enrollment in the BCMB program, but students should have a well-rounded academic high school curriculum.

REQUIREMENTS FOR MAJOR Both the B.A. and B.S. majors require students to demonstrate knowledge of course-based content and compile a portfolio. The B.A and B.S. differ in their content requirements.

DRAKE CURRICULUM The Drake Curriculum, required of all undergraduates, is designed to help students meet personal and professional goals as they acquire fundamental knowledge and abilities in ten Areas of Inquiry, including communication, critical thinking, artistic experience, historical consciousness, information and technology literacy, international and multicultural experiences, scientific and quantitative literacy, values and ethics and engaged citizenship. Students work closely with their academic advisers to craft a program of study in general education that prepares students for civic and professional leadership.

The Drake Curriculum also requires first-year seminars, which foster development of critical thinking and written and oral communication skills through a topical focus; and a Senior Capstone, in which students demonstrate the capacity to bring information, skills and ideas to bear on one project.

INTERNSHIPS & OPPORTUNITIES Through collaborations with regional faculty and industry, many internship sites are available both during the school year and over the summers; these often provide stipends for experienced students.

CAREER OPTIONS Graduates of the BCMB curriculum typically find employment or continue postgraduate studies in a variety of disciplines in or related to the sciences and medicine. According to the professional biochemistry and molecular biology association, Federation of American Societies of Experimental Biology, "Career prospects seem bright for someone trained in the molecular life sciences. Projections for the next 20 years indicate that there will be thousands of unfulfilled science and engineering jobs. A large fraction of that shortage will be in the fields of biochemistry and molecular biology. Further, while employment for BCMB professionals remains strong in these traditional areas, it is expected to increase more in cross-disciplinary areas like agriculture, environment and informatics."

The BCMB major is excellent preparation for health professional schools, including medical, veterinary, dental, and optometry schools. Basic science graduate programs open to BCMB majors include those

in biology, biochemistry, cell biology, molecular biology, molecular genetics, structural biology, chemistry, neurobiology, nutrition, and all of the basic science departments in medical schools, including departments of pharmacology and medicinal chemistry.

In addition to these careers, BCMB graduates will also find work in a variety of laboratories, management and business. Specific examples are drug discovery, formulations and drug delivery, forensics, food sciences, receptor biology, clinical research, regulatory compliance, bioprocess engineering, bioinformatics, medical diagnostics, quality control, science sales and marketing, intellectual property (and patent law), science education (high school, college), science manufacturing management, science business development and licensing, bioanalytical chemistry, and industrial safety.

STUDENT ORGANIZATIONS AND ACTIVITIES Undergraduate students may become student members of the American Chemical Society (ACS) or the American Society for Biochemists and Molecular Biologists (ASBMB).

HOW TO REACH US

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