

MAJOR IN BIOCHEMISTRY

As the name suggests, biochemistry links biology and chemistry. Biochemistry is most simply defined as the chemistry of living systems. It is the science that tries to explain how “lifeless” molecules work together to make “living” organisms. The methods of chemistry and molecular biology are used to study the structure and behavior of the complex molecules found in biological materials and the ways these molecules interact to form cells, tissues, and whole organisms. Biochemistry provides the basis for advances in human and veterinary medicine, agriculture, and biotechnology. Biochemists may participate in interdisciplinary research and development projects alongside chemical engineers, biologists, microbiologists, agronomists, physicians, and other professionals. They investigate the molecular mechanisms of such diseases as AIDS, diabetes, cancer, heart disease and stroke, and develop solutions to environmental problems through biotechnology.

The Biochemistry major provides a student with a strong, well-balanced background in the biological, physical, and mathematical sciences. As a Biochemistry major, studies include macromolecular structure and function; cellular biochemistry; metabolism; gene expression, DNA and protein structure, DNA replication and repair; cell organization, communication, growth, aging, and death. Students are also required to take courses in physics, organic chemistry, and statistical measurements and methods used in research. Independent study and internships (typically during the junior and senior years, but could start in the freshman year) provide opportunities for experiential learning and working closely with the faculty, sometimes leading to authorship of original publications.

Learning Outcomes

Students will be able to:

- Describe the basic concepts of chemistry, biology, biochemistry, molecular biology, and cellular biology
- Critically analyze, and present the methods, results, and conclusions of scientific papers in the current biochemical literature, and orally present technical material in a clear and comprehensible form
- Use a variety of laboratory instruments and techniques, interpret experimental results, and design new experiments
- Demonstrate the ability to perform original research in biochemistry and molecular biology

Potential Occupations

Possible career opportunities include, but are not limited to: process research technician, production/quality assurance lab technician, biomedical/pharmaceutical researcher or salesperson, molecular biologist, biophysicist, cytologist, toxicologist, crime scene investigator, industrial hygienist, dairy technologist, environmental analyst, hygienist, chemist, wastewater treatment chemist, food and drug inspector, museum technician, teacher, writer, fisheries biologist, research analyst, and medical or clinical lab technologist. Many biochemistry majors go on to earn higher degrees in graduate school or health care related professional schools, leading to careers in medicine, veterinary medicine, pharmacy, or law.

Concentrations

- ASBMB Concentration (<http://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biochemistry-molecular-biology/>

[biochemistry-major-asbmb-concentration/](http://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biochemistry-molecular-biology/biochemistry-major-asbmb-concentration/)) American Society for Biochemistry and Molecular Biology) (<http://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biochemistry-molecular-biology/biochemistry-major-asbmb-concentration/>)

- Data Science Concentration (<http://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biochemistry-molecular-biology/biochemistry-major-data-science-concentration/>)
- Health and Medical Sciences Concentration (<http://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biochemistry-molecular-biology/biochemistry-major-health-medical-sciences-concentration/>)
- Pre-Pharmacy Concentration (<http://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biochemistry-molecular-biology/biochemistry-major-prepharmacy-concentration/>)