

Molecular Biology and Biochemistry

Learning Goals

1. To be able to explain basic biochemical and molecular biological concepts and principles.
2. To appreciate the different levels of biological organization, from molecules to organisms.
3. To understand that molecular biology has a chemical, physical, informational, and mathematical basis.
4. To be able to explain the importance of the scientific method to understanding natural phenomena.
5. To effectively communicate scientific data and ideas to a liberal arts audience both orally and in writing.
6. To critically evaluate experimental data and primary papers, develop a hypothesis, and design experiments to address an interesting and novel problem.
7. To collaborate with other researchers.
8. To demonstrate advanced knowledge in a specialized field of biochemistry and molecular biology.
9. To demonstrate an awareness of ethical issues in the molecular life sciences.
10. To demonstrate the ability to think in an integrated manner and look at problems from different perspectives.

About the major

The program in molecular biology and biochemistry offers students an integrated approach to examining life at the macromolecular and cellular levels. The purpose of the program is to serve the students and faculty of Middlebury College by providing excellence in undergraduate education within a residential liberal arts setting. We value critical independent thought, a multidisciplinary approach, and effective oral and written communication. These values and education are achieved through relevant course work and laboratory projects in which students and faculty together explore (1) the fundamental concepts of molecular biology and biochemistry and their relationships with other biological, chemical, physical, and informational disciplines; (2) the study of proteins' and nucleic acids' roles in cell structure, replication, development, regulation, and transmission of genetic information; and (3) the actual use of experimental methods, analytical tools, and genetic manipulations to discover new knowledge about biological organisms at the molecular level. In the liberal arts tradition, the historical development of the field and its relevance to current interdisciplinary questions are emphasized. An important program goal is excellence of enquiry and endeavor, which often reach fruition in independent research projects.

“As an MBB major, I learned the importance of process, experimentation, and the pursuit of a theory and those are all skills that have served me well so far.”

—Ben Bogin '15
Director of Solutions and Professional Services, ThinkSmart LLC

Reasons you might choose this major

- You are fascinated by how life works at the molecular level.
- You seek to further understand critically important cellular processes—genetic expression and biochemical transformations—and want to approach them from a broad, interdisciplinary perspective.
- You are interested in contributing to scientific knowledge by participating in significant laboratory work and research alongside faculty members and students.
- You want a solid foundation that will serve as a basis for a career in the biotechnological or medical fields.
- You want an excellent foundation for further graduate work or professional school study.



Translating Learning into Professional Competencies

Throughout your time at Middlebury, you will develop and enhance the following core professional competencies, skills, and dispositions highly valued by employers that will prepare you for leadership and success in any given field:

Critical Thinking: Exercise sound reasoning to analyze issues, make decisions, and overcome problems.

Oral/Written Communications: Articulate thoughts and ideas clearly and effectively in written and oral forms.

Teamwork/Collaboration: Build collaborative relationships with colleagues and customers from diverse backgrounds.

Leadership: Leverage the strengths of others to achieve common goals, and use interpersonal skills to coach and develop others.

Professionalism/Work Ethic: Demonstrate personal accountability and effective work habits.

Global/Intercultural Fluency: Value, respect, and learn from diverse cultures, races, ages, genders, sexual orientations, and religions.

Digital Technology: Leverage existing digital technologies ethically and efficiently to solve problems, complete tasks, and accomplish goals.

Career Management: Identify and articulate one's skills, strengths, knowledge, and experiences relevant to career goals, and identify areas necessary for professional development.

Where molecular biology and biochemistry majors go

Applying your learning through internships . . .

Students pursue internships and research in a variety of fields, enabling them to apply their liberal arts learning in real-world settings. Internships, research, and self-directed projects enrich your academic experience and help prepare you for life after Middlebury. Students have interned or done research at the following:

Columbia University Medical Center

Grit Digital Health

Memorial Sloan Kettering Cancer Center

Adaptive Sensors Group at the National Centre for Sensor Research

Brigham and Women's Hospital/Harvard Medical School

Biomedical Research Institute of New Jersey

Middlebury Regional Emergency Medical Services

Bristol Internal Medicine

Gates Center for Regenerative Medicine

Krant/Global Healthy Living Foundation

Boston Children's Hospital, Department of Anesthesiology, Perioperative, and Pain Medicine Research

Stanford Genome Technology Center

Infectious Disease Research Institute (IDRI)

Bay Area Wilderness Training

The MidCoast Hunger Prevention Program

George Washington Institute for Neuroscience

Tradition Energy

Kenya Medical Research Institute

American Society for Microbiology

. . . leading to meaningful, dynamic, and engaging career paths.

See just some of the many interesting ways our graduates have applied their liberal arts learning to engage the world. If you want to see what other Middlebury alumni are doing now, log into Midd2Midd and search by major. [go/midd2midd](#)

National Center for Oncologic Investigation, *Researcher*

Memorial Sloan-Kettering Cancer Center, *Supervisor*

Lamplighter Brewing, *Copresident, Cofounder*

Brigham and Women's Hospital, *Physician, Obstetrics and Gynecology*

IMS Health, *Director, Health Economics and Outcomes Research*

University of California, Davis Medical Center, *Pediatric Gastroenterologist*

Sanofi Genzyme, *Manager, Commercial Leadership*

Edison Pharmaceuticals, *Scientist*

BioScience Laboratories, *Clinical Microbiologist*

Core Laboratories, *Regional Operations Manager-Petroleum Services*

Alexandria Animal Hospital, *Emergency and Critical Care Veterinarian*

National Institutes of Health, *Public Health Analyst*

NIH/Fogarty International Center, *Grants Management Specialist-Officer*

Harvard/Dana Farber Cancer Inst., *Associate Director, Geonomis Core Facility*

Vectio Technologies, *Cofounder and CEO*

Boehringer-Ingelheim, *Bioinformatics Scientist*

Colorado Association for School-Based Health Care, *Program Manager*

CRISPR Therapeutics, *Associate Director, ImmunoOncology*

Partners Healthcare System, *Molecular Geneticist, Chief Laboratory Director*

Infectious Disease Research Institute, *Senior Scientist*

Biogen Idec, *Scientist*