THE COLLEGE OF NATURAL SCIENCES
Career Center

BIOCHEMISTRY & MOLECULAR BIOLOGY…NOW WHAT?

Morrill III, Room 215
www.cns.umass.edu/careers

What is Biochemistry? Biochemistry explores the chemical processes within and related to living organisms, and focuses on processes happening at a molecular level. It is a laboratory based science that uses chemical knowledge and techniques, to understand and solve biological problems. Biochemistry covers a range of scientific disciplines, including genetics, microbiology, forensics, plant science and medicine. It focuses on what's happening inside our cells, studying components like proteins, lipids and organelles. It also looks at how cells communicate with each other, for example during growth or fighting illness.

What do biochemists do? Biochemists seek to understand how the structure of a molecule relates to its function, allowing them to predict how molecules will interact. They provide new ideas and experiments to understand how life works, support our understanding of health and disease, and contribute innovative information to the technology revolution. Working on interdisciplinary teams with experts in other fields, such as physics, chemistry, healthcare, computer science, and engineering, biochemists use electron microscopes, lasers, and other laboratory technologies to carry out research, scientific experiments, and analysis. For example, they use computer modeling software to determine the three-dimensional structures of proteins and other molecules. Biochemists and biophysicists involved in biotechnology research use chemical enzymes to synthesize recombinant DNA.

Biochemists typically do the following:

- Plan and conduct complex projects in basic and applied research
- Manage laboratory teams and monitor the quality of their work
- Isolate, analyze, and synthesize proteins, enzymes, DNA, and other molecules
- Research the effects of substances such as drugs, hormones, and food on tissues and biological processes
- Prepare technical reports, research papers, and recommendations based on their research
- Present research findings to scientists, engineers, and other colleagues

What is Molecular Biology? Cell and Molecular Biology is an interdisciplinary field that bridges the fields of chemistry, structure and biology as it seeks to understand life and cellular processes at the molecular level, paying special attention to how molecules control a cell's activities and growth. With a focus on coordination of the activities that form the essential systems of a living cell, molecular biologists work to define the underlying mechanisms of human disease, to identify new therapeutic targets responsible for disease, and to lay a foundation for the development of novel therapies. This field is rapidly providing important new insights into the basis and treatment of numerous human diseases, including cancer, diabetes, cardiomyopathies, retinal degeneration, muscular dystrophy, cystic fibrosis, and mental retardation.

What does a molecular biologist do? Molecular biologists conduct research and academic activities. The research component involves the study of biological structures in well-equipped laboratories with advanced technology to help them explore complex molecular structures and their particular functions. The equipment may include microscopes, lab centrifuges, computers with specific software that allows them to analyze obtained data, and many more. The reason why research in molecular biology is so important is because the concepts discovered in this manner can be applied to mainstream biology, medicine, wildlife study and protection of endangered animals, food industry, pharmaceutical industry and environment protection.

A molecular biologist can also conduct academic work such as teaching, workshops, practical demonstrations in universities, at conferences, and in governmental agencies. This component requires the ability to explain the molecular concepts of biology in an easy-to-understand way for people who may need such knowledge in their field of study and work. At some point in their careers, doctors, environmental experts, biologists, bio-engineers and other professionals have been trained by a molecular biologist. Molecular biologists may also formulate and elaborate specific strategies or protocols in governmental agencies using their ability to understand biological processes at the molecular level.

What Can I Do With A Degree In Biochemistry and Molecular Biology (BMB)?

- Anesthesiologist
- Biochemist
- Biomedical Engineer
- Chemist
- Clinical Research Specialist
- College Professor
- Cytologist
- Dairy Technologist
- Geneticist
- Laboratory Supervisor
- Patent Attorney
- Perfumer
- Pharmaceutical Sales Rep.
- Pharmacist
- Physician
- Process Development Specialist
- Product Development Manager
- Quality Control Inspector
- Regulatory Affairs Specialist
- Science Teacher
- Toxicologist

Important Note: Bachelor's and master's degree holders qualify for some entry-level positions in biochemistry and molecular biology. However, biochemists and molecular biologists generally need a Ph.D. to work in independent research and development. After earning the PhD, many scientists in this field seek to fill a temporary postdoctoral research position (2-3 years) at a university

Who Could I Work For?

- Government Agencies including:
  - Centers for Disease Control
  - Department of Agriculture
  - Department of Defense
  - Department of Health and Human Services
  - Drug Enforcement Agency
  - Environmental Protection Agency
  - Food and Drug Administration
  - National Cancer Institute
- Bio-Tech Companies
- Colleges and Universities
- Environmental Management Firms
- Energy Companies
- Forensic Labs
- Hospital
- Law Firms
- Chemical Engineering Firms
- Non-profit Organizations
- Perfumes and Cosmetic Companies
- Pharmaceutical Companies
- Agriculture
- Food institutes

Where Might I Do An Internship?

UMass Amherst Biochemistry and Molecular Biology Majors Have Done Internships at these sites:

Abbott Laboratories
Alexion Pharmaceuticals
American Friends Service Committee
Amgen Inc.
Amherst (Town of)
Baystate Medical Center
Boston Biochem

Broad Institute
CFRx
Children's Hospital Boston
Coastal America Foundation
Cubist Pharmaceuticals
Dana-Farber/Harvard Cancer Center
Eastman Chemical Company
EMD Millipore
GlycoSolutions Corp
Horace Mann Educated Financial Solutions
inviCRO, LLC
MASSPIRG
Pfizer
Riken
Sanofi Group (Pasteur & Genzyme)
Scripps Research Institute
Stanford University
U of Texas SW: Grad School for Biomed Science
UMass Amherst Emergency Medical Services
UMass Amherst Environmental Health & Safety
UMass Amherst Green Office Program
UMass Amherst Student Legal Services
UMass Medical School (Worcester)
US Army: Natick Soldier Center
UTC Aerospace Systems

Career Planning Resources & Websites

UMass Amherst Career Services Events Calendar	www.umass.edu/careers
FOCUS2 Career and Education Planning	www.umass.edu/careers/planning for sign-in button
What Can I Do With This Major?	www.whatcanidowiththismajor.com
Bureau of Labor Statistics Occupational Outlook Handbook	www.bls.gov/ooh/biochemists
O-Net: "Biochemists and BioPhysicists"	www.onetonline.org/link/summary/19-1021.00
O-Net: "Molecular Biologists"	www.onetonline.org/link/summary/19-1029.02
Massachusetts Career Information System	www.masscis.intocareers.org

(Click Mass Resident to login with "Amherst/01003"   Then click "Occupations" or "Assessments")

Amer Chem Society "Chemistry Careers"	www.acs.org/content/acs/en/careers
Organic Chemistry Resources Worldwide	www.organicworldwide.net
Science.gov Gateway to US Federal Science	www.science.gov
Mass Life Sciences Center	www.masslifesciences.com
Biotech Now	www.biotech-now.org

BMB Job Search Resources

UMass CareerConnect Database of Internships & Jobs	www.umass.edu/careers for sign-in button
Bio-Tech	
* Mass BioTechnology Council	www.massbio.org/careers/search_jobs
Biotech Career Center	www.biotechcareercenter.com
Tiny Tech Jobs (BioTech/NanoTech)	www.tinytechjobs.com
Mass Medical Device Industry Council	www.massmedic.com/resources/jobs/
Boston Scientific	www.bostonscientific.com/en-US/careers
More sites for BioTech Careers	www.biotechcareercenter.com

Chemistry

Chem Jobs	www.chemjobs.net/
Chemistry Jobs	www.chemistryjobs.com
Organic Chemistry Resources Worldwide	www.organicworldwide.net/jobs

General Biology And Science Jobs

* Life Sciences Recruiters for multiple companies	www.propelcareers.com
* American Soc for BMB Careers Blog	https://www.asbmb.org/Careers/Blog/

Bio Space	www.biospace.com/jobs/homepage/
Biology Jobs	www.BiologyJobs.com
Hire Bio	www.hirebio.com
American Society for Cell Biology	www.obboard.ascb.org/jobs
* More sites for Life Science Jobs	www.masslifesciences.com/resources
Forensic Science Jobs	www.webdata.aafs.org
General Science Jobs (widely defined)	www.jobs.sciencecareers.org/ & www.jobs.newscientist.com/
NatureJobs (widely defined)	www.nature.com/naturejobs/science/
Science Journal	www.sciencecareers.sciencemag.org
List of Science Job Sites	www.botw.org/top/Science/Employment

Government Agencies

National Institutes of Health	www.jobs.nih.gov/vacancies/scientific/
Health and Human Services Jobs	www.hhs.gov/careers/where/index.html
USDA Agricultural Research Service	www.ars.usda.gov/careers/careers.htm

Internships and Research Opportunities

* Finding Independent Lab Research On Campus	www.umass.edu/biochem/undergraduate/lab
* Office of Undergraduate Research and Studies (OURS)	www.umass.edu/ours
* Mass Life Sciences Internship Program	www.masslifesciences.com/programs
* STEM Internships in Federal Government	www.science.gov/internships/index.html
* Bio-Med Research Opps for Pre-Meds (BIG List)	www.people.rit.edu/gtfsbi/Symp/premed
* Summer Medical Research Programs	www.aamc.org/members/great/61052
* Summer STEM Research Opportunities	www.pathwaystoscience.org/programs
Broad Institute Summer Research Prgrm in Genomics	www.broadinstitute.org/diversity
New England Research Fellowships	www.cancer.org/myacs/

Pharmaceuticals

International Society of Pharmaceutical Engineers	www.ispeboston.org
UMass Amherst ISPE chapter!	www.ecs.umass.edu/ispe
American Assoc of Pharma Scientists Jobs Board	www.jobs.aaps.org
GET YOUR $40 AAPS STUDENT MEMBERSHIP!	
Current jobs	www.biopharmguy.com
Sample entry level job descriptions, and a list of New England pharma companies.	www.biopharmguy.com
Jobs in Healthcare, Pharma and Science	www.medzilla.com/
Drug Information Association	www.diaglobal.org/resources/career-center
HireRX	http://www.hirerx.com

General Job Search Engines

One-Stop Career Centers (search by zip code)	www.careeronestop.org/jobsearch/findjobs
GlassDoor	www.glassdoor.com/index.htm
Indeed	www.indeed.com
SimplyHired	www.simplyhired.com

BMB Professional Organizations

American Association for the Advancement of Science	www.aaas.org
American Association of Pharmaceutical Scientists	www.aaps.org

American Chemical Society	www.acs.org
American Physiological Society	www.the-aps.org
American Society for Biochem and Molecular Bio	www.asbmb.org
American Society for Cell Biology	www.ascb.org
American Society for Virology	www.virology.net/jobs/
Association of American Medical Colleges	www.aamc.org
Association of Biomolecular Resource Facilities	www.abrf.org
Biochemistry Society	www.biochemistry.org
Biophysical Society	www.biophysics.org
Biotechnology Industry Organization	www.bio.org
Cell Death Society	www.celldeath-apoptosis.org
Chem Industry	www.chemindustry.com/index
Intl Society for Molecular Electronics and Biocomputing	www.mebc.elte.hu/mebc
Massachusetts Biotechnology Council	www.massbio.org
Microscopy Society of America Listserver	www.microscopy.com
Society for Industrial Microbiology	www.simhq.org
Society for In Vitro Biology	www.sivb.org
Society for Molecular Imaging	www.molecularimaging.org
UC Santa Barbara Library (Huge Biochem List)	www.guides.library.ucsb.edu/content

Important Transferable Qualities To Include On Your Resume

Analytical skills. Biochemists must be able to conduct scientific experiments and analyses with accuracy and precision.

Critical-thinking skills. Biochemists draw conclusions from experimental results through soundreasoning and judgment.

Interpersonal skills. Biochemists typically work on research teams and need to be able to work well with others toward a common goal. Many also serve as team leaders and must be able to motivate and direct other team members.

Math skills. Biochemists regularly use complex equations and formulas in their work, and they need a broad understanding of mathematics, including calculus and statistics.

Perseverance. Scientific research involves substantial trial and error, and biochemists must not become discouraged in their work.

Problem-solving skills. Biochemists use scientific experiments and analysis to find solutions to complex scientific problems.

Speaking skills. Biochemists frequently give presentations and must be able to explain their research to others.

Writing skills. Biochemists write memos, reports, and research papers that explain their findings.