



Careers in Applied Biological Sciences

A degree in **Applied Biological Sciences** provides many possible careers paths.

The science of *Biology* has evolved from the days of Darwin studying the Galapagos' finches.

*Modern-day Biology involves understanding the world, including:
plant and animal populations, medicine, energy, and the environment,
at the biochemical, genetic, and molecular level.*

Applied Biological Sciences - ABS graduates will be rigorously trained in the basic biological sciences, with a strong background in chemistry, mathematics, and physics. Students will then focus in one of several areas of specialization. These areas include biomedical engineering, including materials science; applied and industrial microbiology; and molecular biology.

The interdisciplinary specialization afforded by this program will uniquely position students for careers (or further graduate study) in medicine, pharmaceutical sciences, biomedical engineering and technology, biotechnology, bioprocessing, bioenergy, and patent law. ABS graduates will also be well-positioned to fill the demand for highly-trained middle and high school science teachers.

American Chemical
Society (ACS.org)



American Society of
Microbiology (ASM.org)



Biochemistry involves the study of the structure, composition, and chemical reactions of substances in living systems. Biochemistry emerged as a separate discipline when scientists combined biology with organic, inorganic, or physical chemistry and began to study such topics as how living things obtain energy from food, the chemical basis of heredity, and what fundamental changes occur in disease. Biochemistry includes the sciences of molecular biology; immunochemistry; neurochemistry; and bioinorganic, bioorganic, and biophysical chemistry.

Biotechnology involves the application of biological organisms, systems, or processes by various industries to learning about the science of life and the improvement of the value of materials and organisms such as pharmaceuticals, crops, and livestock. It is a relatively new and exciting field that integrates knowledge from several traditional sciences: biochemistry, chemistry, microbiology, and chemical engineering.

Materials Science is an applied science concerned with the relationship between the structure and properties of materials. Those who work in the field study how different combinations of molecules and materials result in different properties. They use this knowledge to synthesize new materials with special properties. Materials scientists are generally employed by industry or in laboratories where the focus is on developing product-related technologies.

Microbiology Microbiologists study microbes--bacteria, viruses, mycoplasma, fungi, algae and protozoa--some of which cause diseases, but many of which contribute to the balance of nature or are otherwise beneficial.

Microbiological research includes infectious diseases, recombinant DNA technology, alternative methods of energy production and waste recycling, new sources of food, new drug development, and the etiology of sexually transmitted diseases, among other areas. Microbiology is also concerned with environmental problems and industrial processes.

Microbiology boasts some of the most illustrious names in the annals of science--Pasteur, Koch, Fleming, Leeuwenhoek, Lister, Jenner and Salk--and some of the greatest achievements for mankind. Within the 20th century, a third of all Nobel Prizes in Physiology or Medicine have been bestowed upon microbiologists.

Biomedical Engineering The biomedical engineer serves as an interface between traditional engineering disciplines and living systems and may work in either direction, applying the patterns of living organisms to engineering design or engineering new approaches to human health. ABS training can prepare a student for research and development careers in biomedical industry where they can advance the frontiers of biomedical science and engineering with attention to generating new ideas for commercialization.



Careers in Applied Biological Sciences



From ASBMB 2004 – UNLOCKING LIFE'S SECRETS
Career Opportunities in Biochemistry and Molecular Biology

College Graduates with a bachelor degree in biochemistry or molecular biology can go to medical, dental, veterinary, law or business school, use it as a stepping stone to careers in biotechnology, toxicology, biomedical engineering, clinical chemistry, plant pathology, animal science or other fields.

Employers requiring BMB talents include:

- Government agencies: National Institutes of Health; U.S. Food and Drug Administration; Environmental Protection Agency; U.S. Department of Agriculture; and state agencies for analysis of food, drugs, air, water, wastes, or animal tissue.
- Drug companies: for basic research on causes of disease and drug development programs.
- FBI, state governments and private forensics laboratories: DNA fingerprinting, etc.
- Biotechnology companies: interests in environment, energy, human health, agriculture and animal health.

College and University Employment

Ph.D. scientists combine teaching (classroom & laboratory instruction) and research.

Industry and Government Employment

Industry and government laboratories hire Ph.D. scientists to lead teams for basic research, or to work in research and development programs. Administrative positions afford Ph.D. scientists the opportunity to lead programs concerned with the safety of new devices, food, drugs and pesticides or other chemicals; or to influence which projects the National Institutes of Health, the National Science Foundation, and the Department of Agriculture will support.

CAREERS IN THE BIOTECHNOLOGY INDUSTRY

Biotechnology includes development of medical devices, pharmaceutical, biopharmaceutical, and agricultural products using biochemistry and the other molecular life sciences, including chemistry, biology, applied physics, engineering, and applied mathematics/computational sciences.

Biotechnology is applied predominantly to medical therapeutics, but also includes agricultural biotechnology, genomics, proteomics, human diagnostics, medical devices, scientific equipment/supplies, environmental protection and veterinary medicine

ASBMB suggests things to do with a degree in Biochemistry or Molecular Biology — including:

Health Professions

Medicine (Physician)
Pharmacy
Dentistry
Medical Research
Veterinary Medicine

Allied Health Professions

Nursing
Physician's Assistant
Physical Therapy
Pathology
Radiology
Occupational Therapy
Speech Therapy
Medical Technology
Public Health
Genetic Counselor

Education

Biology Teacher
Professor

Math/Engineering

Nanotechnologist
Biomedical Engineer
Epidemiologist
Bioinformatics

Communications

Science Writer/Editor
Grant Writer
Science Reporter

Legal

Forensic Science
Environmental Law
Patent Law

Environmental Science

Bioremediation
Toxicologist
Conservation Biologist

Industry

Drug Testing/Quality Control
Pharmaceutical Research
Sales & Marketing