CAREER CONNECTION

A Bird's-Eye View of Biotech Jobs

[By Surajit Sen Sharma]

The term "biotech," short for "biotechnology," refers to the application and manipulation of biological resources to develop products and processes that fulfill industrial and other human objectives. While popular imagination tends to latch onto controversial fields of biotechnological research like DNA typing, cloning, and stem cell research, the fact is that biotechnology has commonplace applications ranging from bread production to wastewater recycling that influence our daily lives. The consequence of this wide reach of biotechnology is that the number of biotech jobs continues to grow faster than the numbers of jobs in other sectors.

The Divisions of Biotech

A great number of industries are directly influenced by biotechnology, and it would be difficult to mention all of them in a short article. However, to provide a broader perspective, jobs in biotechnology can be grouped into three functional categories:

1. **Research and development:** Considered by some to be the most prestigious division of biotech, research and development (R&D) creates the frontiers of biotechnology and sets the paradigms that influence both humanity and the biotech job market. The three major divisions of biotechnological R&D are research for discoveries, veterinary sciences, and bioinformatics. Jobs in this sector are usually reserved for life scientists.

2. **Clinical research and safety:** Once a functional process or product is developed by R&D, the necessity to establish trials to determine the impact of the product or process on public health and safety emerges. Biotechnologists working in this field ensure the safety of biotechnological products and processes.

3. **Compliance:** Issues of compliance with respect to biotechnological products and processes-in terms of both quality and standards and rules established by the state-create openings for biotechnologists.

Openings for biotechnologists are also available in the following specific areas and functional fields:

Medicine and Pharmaceuticals

In this broad field, the following functional areas need biotechnologists:

- genetics, including medical genetics, genetic counseling, and genetic nursing
- organ transplantation, reproduction, and regenerative medicine
- public health and safety, which includes projects ranging from vaccine development to wastewater treatment by bacterial colonies
- gene testing and genetic therapy

Agriculture

Under the broad heading of agriculture, the following functional areas rely on the application of biotechnology and consequently are the areas where biotech jobs are to be found:

- development of genetically modified variations of plants and seeds
- development of biological pesticides and nutrition
- identification and protection of endangered species, including artificial breeding
- verification and authentication of costly food products

Bioinformatics

Under this broad heading come:

- computational biology
- supercomputing
- statistical and actuarial functions
- data analysis, data transfer, database creation, and other data-related functions

Law

With the rise in the use of biotechnology, openings for biotechnologists have also opened up in the legal field. Openings are principally located in the following functional areas:

- patent specialties and litigation
- academia
- ethical, social, and legal issues
- forensic sciences, including gene testing for identification purposes

Guided Missile Development and Space Technology

Biotechnologists are required in organizations engaged in manufacturing guided missiles and space vehicles. Functional areas include:

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- creation of closed artificial environments
- creation of life-supporting equipment and systems
- research into the effects of space on biological systems
- cybernetics

Engineering

There are many opportunities for biotechnologists in the field of engineering. Biotechnologists working in this area may be involved in:

- designing bioprocessing containers and equipment
- creating new energy sources such as biofuels
- biomedical engineering

Education

Obviously a need for biotechnologists who can teach will always exist. Types of opportunities available in biotechnological education reflect the needs of universities and traditional academic structure.

Besides the above fields, there are myriad other divisions of applied biotechnology, including life-science research, anthropology, history, military, bio-science communication, and chemical manufacturing.

Biotech Job Designations

Biotech job designations are as varied as the fields in which biotechnology finds application. Though designations can reflect the imagination of the employer, some standard, industry-recognized designations that are related to biotechnology or the application of biotechnical knowledge are veterinary assistant, veterinarian, technician, technologist, chemist, pharmacologist, laboratory technician, chemical technician, engineer, computer system analyst, health service worker, physician, biological scientist, biotechnologist, and agricultural technician. One's designation depends on the organization, industry, and sector in which he or she works, and job designations can be superficially misleading.

ON THE NET

Biotechnology Occupational Trends
www.cdr.state.tx.us/researchers/emerging/Downloads/Biotech_Occup_Trends.pdf

Careers in Genetics and the Biosciences
www.ornl.gov/sci/techresources/Human_Genome/education/careers.shtml