**Biotechnology**

### What is Biotechnology?

Biotechnology, often referred to as “biotech,” is the application of biological research techniques to create new processes and products while using biological systems, living organisms, and/or derivatives of organisms. Although biotech processes have been used for thousands of years, scientists began to use components of microorganisms to solve human problems within spheres such as agriculture, medicine/healthcare, food processing and industry in the 1970s.

If you are considering a career in the biotechnology arena, there are two key questions to ask yourself: Do I like thinking about living things? And what sectors of the economy can I see myself operating in? Being able to answer these questions will guide you toward choosing the right career path within biotech.


### Departments in a Biotechnology Company

As you think about a career in biotechnology, it can be useful to identify the general areas where your aptitude and interests lie. The following reflect the various divisions within a biotechnology company.

- **Research and Development**: Discover promising drug candidates. Functions include discovery research, bioinformatics, and animal sciences.
- **Operations**: Make commercial quantities of a candidate drug available and assessing environmental impact and safety of a new product.
- **Clinical Research**: Take the new drug through the FDA approval process after emerging from the R&D department. Also manages all clinical drug trials and oversees all information related to the drug candidate.
- **Quality**: Responsible for quality control, assurance, and validation. Ensures that all products meet standards of quality in manufacturing process.
- **Finance and Administration**: Responsible for legal relationships to investors, creditors, and employees. Also maintain companywide computer systems/IT.
- **Business Development**: Responsible for identifying prospective new alliance partners and managing existing ones. Also includes marketing function (market research, targeting customers, promotion strategy) and sales function (meet customers in the field—often with specialist physicians).
- **Project Management**: Responsible for ensuring that work requiring collaboration of several departments goes smoothly and efficiently.
- **Commercial Strategy**: Responsible for leading worldwide product lifecycle management. Also works closely with management, marketing, sales, R&D, and corporate development.
- **Strategic Planning**: Responsible for identifying major milestones, investments, and decisions for successful profits of a product. Assesses commercial viability of a product in the target market.
Lab vs. No-Lab Job Functions in Biotechnology

Two fundamental career paths exist within the biotech field: laboratory research-oriented and non-laboratory research-oriented. Laboratory research-oriented positions are found in the Research and Development (R&D) department. Often called “discovery research,” this work involves discovering new processes, drugs, and technologies. Also, in biotech research, bioinformatics and animal science are tightly integrated. Non-laboratory research-oriented positions are found in all the other departments (besides R&D) within a biotech company. While a science and clinical background are often needed in these types of positions, other skill sets are also needed such as finance, administration, legal, IT, business development, sales, and marketing.

The commonality between lab and no-lab functions is that these careers require at least an undergraduate degree with a foundation in life science. However, many positions demand an advanced degree in science (such as a PhD in a life science).

Laboratory Research Careers

Discovery Research: Could include protein chemists, geneticists, biochemists, etc. There are jobs at all levels. You can get an entry-level job as a research associate and work for several years, though you will need an advanced degree for more senior jobs. Most supervisory and upper-level positions, however, require a PhD. You can definitely break into the industry after undergraduate studies. Entry-level research positions will get your feet wet and give you a chance to experience the culture of research first-hand before pursuing an advanced degree.

Animal Science Specialists: Grow cultures, make and purify DNA, and conduct early stages of testing when a drug’s safety is determined via animal testing.

Bioinformatics: Data analysts who combine the biological sciences with information technology who aid discovery researchers in identifying the most promising drug candidates. The three realms of activity in bioinformatics include: creating databases to store/manage large sets of data; develop algorithms and statistics to determine relationships among datasets; or use these tools to analyze and interpret biological data.

Non-Laboratory Research Careers

Engineering: Determine how to ensure there is enough material available for clinical testing and how to manufacture approved drugs. Includes four distinct paths: process/product development; manufacturing; environmental health and safety; and quality.

Medical and Clinical Setting: Involves clinical drug testing and analyzing data. Two distinct paths include clinical research (by physicians, nurses, or data management professions) and regulatory affairs (deal with all aspects of drug approval through the FDA).

Administrative and Support Functions: This area would include career paths in finance, human resources, safety managers, external relations, IT, legal, facilities management, and project management.

Sales and Marketing: Sales involves becoming a specialist in various medical niches, understanding the biological components of the product, and making contact in the field. The marketing function involves identifying target customers for the product and creating strategies to sell the new drugs and technologies. Additionally, new business development and alliance management is encompassed within this area.
Office of Personal & Career Development

Biotechnology

Online Resources

Biotechnology Information Directory of the Web Virtual Library www.vlib.org
A directory of over 1,500 links to companies, research institutes, universities, sources of information and other directories specific to biopharmaceutical product development and delivery of products and services.

BioMedNet www.links.bmn.com
Provides useful links to thousands of biological websites.

Bio.com www.bio.com
Resource for biotechnology news, analysis and Webcasts.

Biospace.com www.biospace.com
Hub site for bioscience-specific news, information and links on biotechnology and pharmaceutical developments.

FierceBiotech www.FierceBiotech
The biotech industry’s daily monitor: daily bulletin on biotech industry news.

BioWorld Online www.bioworld.com
Worldwide biotechnology news and information resource.

Evelexa BioResources www.evelexa.com
Business and career-related information for those interested in biotech venture creation. Also the home of The Entrepreneur’s Guide to a Biotech Startup.

Bioinformatics sites www.bioinformatics.org
Organization for bioinformatics professionals.

A resource for public databases and bioinformatics tools and applications.

Oak Ridge Associated Universities www.orau.org/
Partner government agencies, national laboratories, and universities together on major scientific initiatives.

Targacept www.targacept.com/
A biopharmaceutical company located in Winston-Salem.

Clinical Research, Data Management, and Regulatory Affairs Recruiters

Advanced Clinical Services www.advancedclinical.com
Full-service, national staffing firm specializing in clinical research and data management for Phase I-IV trials, including contract, contract-to-hire and direct hire options.

ASG www.asg-inc.com
Consulting, outsourcing and contract technical assistance in clinical trials.

Biotech Resources www.biotechresources.net
Clinical and manufacturing recruiting.

Clinical Trial Jobs www.clinicaltrialjobs.com
Clinical research employment opportunities.

DrugDev123 www.drugdev123.com
Open positions in clinical research around the world.

JAS Associates www.jasrecruiters.com
Recruitment and placement of personnel working in clinical trials for pharmaceutical and biotech companies and contract research organizations.

MedExec Intl www.medexecintl.com
Pharmaceutical, medical device, biotechnology, diagnostic and biologics industry clients through placement in clinical research, medical affairs, regulatory affairs, quality and engineering departments.

Pharmaceutical Careers Inc. www.pharmaceuticalcareers.com
Career opportunities in clinical research.

Regsource www regsourc3jobs.com
Jobs particularly in regulatory affairs but also in many other areas of pharmaceutical and device development.

Life Sciences Disciplines and Bioinformatics Recruiters

BiologyJobs www.biologyjobs.com
Targeted resource for job seekers and employers interested in the life sciences.
Biotech Recruiters www.biotech-recruiters.com
Contingency and retained recruitment in drug discovery and biotechnology.

Evolution Recruitment Consultants www.evolutionconsultants.com
Areas of expertise include genomics, proteomics, bioinformatics and business development.

Futurebiojobs www.futurebiojobs.com
Jobs in genomics, bioinformatics, proteomics, BioMEMs and microfluidics.

Genomejobs www.genomejobs.com
Genomics, bioinformatics, biotechnology and biocomputing.

Harcourt and Associates www.harcourt.ca
Professional search firm specializing in biotech and technical placements.

Northstar Agents www.northstaragents.com
Executive search for bioinformatics and cheminformatics.

Research Careers www.researchcareers.com
Focus on pharmaceutical and biotech research industry employment.

New Scientist Jobs www.newscientistsjobs.com
Free science career site for job seekers listing industry, academic and government bioscience employment opportunities from the scientific publishers, Cell, BioMedNet and New Scientist.

Twin-Image Recruiting www.twin-images.com
Recruitment/placement of pharmaceutical research personnel for pharmaceutical, CRO and biotech companies.

Biotech Sales and Marketing Recruiters

Global Edge Recruiting Associates www.globaledgerecruiting.com
Pharmaceutical, biotech, medical device and medical sales industries.

Innovative Medical Recruiting www.innomedical.com
Specializes in biotech, medical and pharmaceutical sales and marketing professionals.

Medical Sales Associates www.msajobs.com
National recruiters for sales professionals in the pharmaceutical and medical sectors.

Seltek Consultants www.seltekconsultants.co.uk
Technical sales positions in the life sciences, biotechnology, molecular biology, chemistry, diagnostics, immunology and instrumentation industries.

Government Agencies

Centers for Disease Control and Prevention www.cdc.gov
Federal agency mandated to prevent and contain diseases through partnerships, monitoring and info access.

Food and Drug Administration (FDA) www.fda.gov
Federal agency mandated to supervise the food, pharmaceutical and biotechnology industries.

National Center for Health Statistics (NCHS) http://www.cdc.gov/nchs
Principal vital and health statistics agency for the U.S. government.

National Institutes of Health (NIH) www.nih.gov
Conducts research in its own laboratories and supports research by scientists in universities, medical schools, hospitals and research institutions in the United States and abroad.

California Institute for Regenerative Medicine (CIRM) www.cirm.ca.gov
State agency to make grants and provide loans for stem cell research and research facilities.

International Biotechnology Organizations

Australia: AusBiotech Ltd. www.ausbiotech.org
Canada: BIOTECanada www.biotech.ca
India: All India Biotech Association www.aibaonline.com
Ireland: The Irish BioIndustry Association (IBIA) www.ibiec.ie
South Africa: AfricaBio www.africabio.com
South Korea: Bioindustry Association of Korea www.bak.or.kr
United Kingdom: BioIndustry Association (BIA) www.bioindustry.org