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Major Biotechnology Employers in California

More than 400 biotechnology companies are located in California. The largest of the biotech companies engage in manufacturing as well as research and development activities. Since this is such a new science and technology, established companies are working hard to develop new products to add to their product lines. There are also many smaller companies in the state with a limited staff working to develop products which they hope will prove to be marketable.

Major Areas of Biotechnology

- **Pharmaceuticals**
- **Bioinformatics**
- **Instrumentation and supplies**
- **Universities and colleges**
- **Research institutes**
- **Government research facilities**
- **Agriculture and food**
- **Human genome project**

Most biotechnology jobs will be found in the three areas of the state with the largest concentrations of biotechnology companies: the San Francisco Bay area, Los Angeles, Orange and Ventura Counties and San Diego. Additional jobs are in the Sacramento/Davis area and in smaller concentrations throughout the state. Most biotechnology companies tend to cluster near the larger metropolitan areas where a good supply of talented scientific staff is available.

This edition of *California Careers in Biotechnology* does not include a list of major biotechnology companies because the biotechnology industry is young and rapidly evolving and changing. Any list of companies would be out of date in a very short time. There are many mergers and acquisitions of companies taking place, so predicting exactly which companies will be in business in the same form next year, or a few years from now is difficult. However, it is likely that the larger companies with a proven track record will still be operating.

Instead of a list of companies, this chapter includes an extensive list of web sites that include biotechnology job openings and information about biotechnology companies. It also includes information about the major areas of employment. This will offer more up-to-date information about career opportunities to job seekers, counselors and instructors.

Biotechnology Employment Opportunities

Pharmaceuticals

The majority of biotechnology companies in the state are working on pharmaceuticals. Most biotechnology job growth in California is expected in the areas of drugs (diagnostics and therapeutics), since research and development and manufacturing have been highest in these areas of the biotechnology industry. Also, large laboratories use biotechnology in medical tests. Biopharmaceutical companies are located in the San Francisco Bay area, San Diego, Los Angeles, Orange and Ventura Counties.

Instrumentation and Supplies

Equipment and supplies for bioscience research and manufacturing represent 17% of biotechnology companies. These are companies that create the specialized scientific instruments and supplies to keep the research and manufacturing processes going. Major instrumentation companies in California are located in Orange and Los Angeles Counties and the San Francisco Bay area.

Universities and Colleges

Universities employ scientists, research associates, lab technicians and lab assistants, although many of the entry level positions are likely to be held by students. Nine of the country's leading university medical centers that carry on large amounts of biotech research are located in California. There is significant additional research in this field at many other colleges and universities throughout California. Universities with major biotechnology grants include the Universities of California at San Diego, San Francisco, Davis, Irvine, Riverside and Los Angeles; Charles Drew University, California Institute of Technology (CalTech), Stanford University and the University of Southern California. The 23-campus California State University system also has active biotechnology programs.

Private Research Institutes

Private research institutes are involved in biotechnology research such as the Salk Institute and the Scripps Institute in San Diego, SRI International in Menlo Park and the City of Hope in Duarte.

Government Research Facilities

Government-funded research facilities are involved in the human genome project and other biotechnology research. These include the Lawence Livermore National Laboratory and the Lawrence Berkeley Laboratory, which are associated with the University of California Berkeley.

Agriculture and Food

California has a relatively small number of biotechnology companies concentrating on agriculture and food products. These are concentrated in the Sacramento / Davis area and in San Diego.

Bioinformatics

Some California companies are engaged in sequencing the human genome. The bioinformatics field is rapidly growing as scientists create great quantities of information and need systems to make it available for research and development activites. Companies involved in bioinformatics are concentrated in the San Francisco Bay area and in Southern California.

How to Find a Job in Biotechnology

The first step for a job seeker should be to learn as much about the industry as possible. This book is a start. There are excellent web sites listed in this chapter that can help, and many articles and other books are available. Then learn about the specific company that has current job openings. All large biotechnology companies have web sites that tell about their products, corporate culture, benefits packages and current job openings. Read the information about the company. Job seekers who know about a company always make a better impression in an interview and have a better chance of getting the job.

There are some very good web sites devoted to biotechnology that have excellent current job listings. Biotechnology web sites are listed in the Web Site section of this chapter.

In the biotechnology field, companies generally prefer to hire people with the highest level of education possible. A good first step before starting to look for a job is to get as much education in the biological sciences and chemistry as possible.

Community college programs in biotechnology offer excellent training in basic science and laboratory skills. Many of the colleges in California find that students enrolling in the biotechnology courses, degree or certificate programs already have a bachelor's, master's or even Ph.D. degree. They often are returning to college to improve their laboratory skills in order to get an entry level position. This may skew the availability of "entry level" positions for those who do not have a previous degree. Many employers prefer a bachelor's degree for laboratory or manufacturing assistant positions not because the degree is needed to do the job, but because there is a large supply of highly educated applicants available.

Methods of recruitment used by biotech employers include:

- **Employment agencies**
- **In-house promotion or transfer**
- **Internet job listings**
- **Internships**
- **Newspaper advertisements**
- **Private employment agencies**
- **Professional publications and meetings**
- **Referrals from colleges or schools**
- **Referrals from current employees**
- **Walk-in applicants**
- **Word of mouth**

Most biotechnology companies offer students internships. This is an excellent way to get experience as a student, and the internships are often paid positions. Internships help in two ways. First, they give a student experience. Second, if the intern does a good job, they are likely to be hired after they complete their education. Employers always prefer to hire people they know over strangers. An internship is a great way to get a foot in the door. Listing the internship and skills from it on a resume is also a help.

The largest and most well-known biotechnology companies tend to require a higher level of education than the mid-sized companies. Some require at least a bachelor's degree for almost all jobs in research and development. Generally, there are more entry-level jobs available for people with an associate degree in mid-sized biotechnology companies. There are also more openings in the manufacturing divisions for people with high school diplomas, some college courses or associate degrees.

It pays to be assertive in tracking down employers and jobs. Remember: employers need good employees as much as job seekers need the job. Recruiters *want* applicants. Although job announcements sometimes state "no phone calls", human resource professionals may be willing to speak with counselors and others who can help send them good job candidates.

Larger companies and universities often have formal protocols for applying for jobs. However, knowing someone in the company, even if they are not responsible for the hiring, often helps an applicant get an interview and a job. An informational interview can be a helpful way to gain access to information and referrals. It helps to speak with employers who are not currently hiring and ask when they will be hiring. Most companies

have a good idea of when they will be adding employees well into the future.

A job seeker should use as many job search resources as possible. More job leads mean more applications. More applications lead to more interviews and finding a job sooner.

Some of the best ways to find biotechnology employers are:

Referrals from Current Employees

Employers like to hire new workers that are referred by current employees. Current employees are often the first to know when positions are open at their company. Many community college biotechnology programs use instructors who are employees of biotechnology companies. They are likely to recommend their best students for jobs when they learn of openings at their company.

Internet

The internet is a great source of information about biotechnology. All large biotechnology companies have web sites. The "Web Sites" section of this chapter lists many other types of sites. There are various types of useful sites. Some provide background information about the science of biotechnology. Others are sites devoted to job listings in biotechnology or broader areas of science. Some are sites run by industry groups or scientific organizations, which often provide links to member companies' web sites where jobs are listed. In addition, some sites offer general information about occupations. These can be useful in researching different careers.

Employment Agencies

Most biotechnology companies hire many temporary employees through agencies. Some companies may have hundreds of contract and temporary employees in manufacturing, research or other positions. Job seekers can call a company they are interested in and ask what temporary employment agency they use. There are several in California that specialize in recruiting temporary employees for scientific and laboratory jobs. Biotechnology companies also use employment agencies to fill permanent positions.

Newspapers and Magazines

Classified advertisements are well known as a source of job listings. However, the business section of the newspapers contains valuable information about companies that are making scientific breakthroughs, opening new facilities, getting big contracts, growing or moving. Even if they do not list jobs in the paper, these companies are well worth contacting. Professional and technical job openings are often listed in the business section of the newspapers. Major newspapers sometimes have special sections on jobs or information about job fairs.

Scientific journals and magazines with articles about recent research projects are excellent sources of information for job seekers. Job seekers can learn of successful research projects at companies or research institutes who might need more staff to continue research. When a new biotechnology drug is approved by the FDA, this information will be publicized. It is very likely that the company will soon be hiring more manufacturing technicians and other staff.

Local Career Centers

Many community organizations offer job listings and other resources for job seekers.

These may not be specifically oriented toward biotechnology, but the knowledgeable staff will often know of good local job search resources.

Professional and Industry Organizations

Many professional and industry organizations have job listings on the Internet and many list job openings in professional journals. The Biotechnology Industry Organization (BIO) is the largest organization representing this industry. Their website, www.bio.org, is an excellent source of information about companies around the country and about other organizations. Other especially good sites are www.scijobs.org, which links to many science jobs and www.biospace.com, which features careers by region across the country. Professional meetings are excellent places to meet people who know about job openings, especially at the professional level. Most professional organizations have organized times for job recruiting during their meetings.

College Placement Offices

Students should start at their college placement office. Many colleges and universities allow alumni to use these services after they graduate, sometimes for a fee.

Public Libraries

Several good printed directories of the biotechnology industry are available. However, they are quite expensive. They may be available at public libraries at no charge to the user. Libraries also offer free high speed Internet access, which will help job seekers who do not otherwise have good access to the Internet. Larger public libraries have a business department with information about companies, trade organizations or professional associations. There are excellent databases of companies available at libraries as well. Reference librarians are fantastic sources of information. Ask them for assistance; they can help find information about practically anything.

Networking

Probably the most effective way of finding a job is to find job leads through friends, acquaintances and relatives. Even if they do not know of current job leads, personal contacts can often lead to meeting people who work in the industry. Friends, acquaintances, members of community organizations and relatives can often refer job seekers to someone who knows about the jobs they want. College and high school instructors often have great contacts in the industry. Ask them for leads. Speaking with people working in an occupation will help job seekers learn about the job and about job openings. The best advice job seekers can get is, "Tell everyone you know that you are looking for a job." Even job seekers in a technical field like biotechnology may unexpectedly find a friend of a friend who works in a biotechnology company with current job openings.

Web Sites

This is a selection of job and career web sites that are useful for researching job opportunities in biotechnology. Always be very careful when using Internet information, since there is no quality control on the Internet. Also, web addresses tend to change frequently. If the address we have listed is not longer valid, try looking the organization up with a search engine to find a new address. The web sites are divided into four sections:

- **California Community College Biotechnology Sites** includes web sites within the Community College system that have information about biotechnology.
- **Sites About Biotechnology That Include Job Listings** includes web sites that have job listings. Many of these also include general and scientific information about biotechnology.
- **General Information Sites About Biotechnology** lists sites that do not presently include job listings but do have lots of other very interesting information about the field.
- **General Occupational Information and Job Sites** includes web sites that are not specific to biotechnology, but can be useful to anyone looking for a job or researching occupations.

California Community College Biotechnology Sites

www.cccbiotech.org

The site for the California Community Colleges Biotechnology Initiative.

www.bio-link.org

This organization is funded by the National Science Foundation to expand education and training for jobs in biotechnology. It works with community colleges throughout the country and has its national headquarters at City College of San Francisco and a regional center in San Diego. This is an excellent site with general information about biotechnology, jobs listings, newsletters, curriculum information and information about training programs.

www.ednet.cc.ca.us

The California Community Colleges Economic Development Network (ED>Net) describes the statewide biotechnology initiative in the community colleges. Click on services, then biotechnology initiative.

www.arc.losrios.cc.ca.us/biotech

North Valley and Mountain Biotechnology Center based at American River College in Sacramento

www2.bc.cc.ca.us/biotech

San Joaquin Biotechnology center based at Bakersfield College.

http://biotech.org

Northern California Biotechnology Center based at City College of San Francisco.

www.paccd.cc.ca.us/biotech/ednet.htm

Los Angeles/Orange County Biotechnology Center based at Pasadena City College.

www.ccbcweb.net

Central Coast Biotechnology Center based at Ventura College.

www.cact-sd.org

Southern California Biotechnology Center based at San Diego City College.

Sites About Biotechnology That Include Job Listings

www.aalas.org

The American Association for Laboratory Animal Science offers certification for laboratory animal technicians. This site includes a list of job openings available for members only, but probably worth the cost of joining.

www.agbiotechnet.com

Agbiotechnet lists jobs in agricultural biotechnology. Most jobs require a Ph.D.

www.bayareabioscience.org

The Bay Area Bioscience Center offers information about biotechnology in the San Francisco Bay area, including information on companies, education and training. The career center includes job announcements, links to many companies and to biotechnology employment web sites.

www.bio.com

Bio.com is a private organization that serves as an information source about the biotechnology industry. The site includes a career center featuring articles about biotechnology careers, company profiles, job fairs, and job listings.

www.biospace.com

This is a provider of web services and product to the biotechnology industry. The site features career centers by region throughout the United States, including Northern and Southern California.

www.biotech-calendar.com

This site lists biotechnology events and job openings in Southern California.

www.bioview.com

This site lists many biotechnology, pharmaceutical and science jobs throughout the United States at all levels.

www.gene.com

This is the site for Genentech, the first biotechnology company in California. It has excellent information about the industry's history and the science of biotechnology as well

as specific information about Genentech.

www.jobscience.com

This site contains job listings for healthcare and biotechnology jobs.

www.laboratorynetwork.com

Laboratory Network Career Center has information about products, suppliers and lists jobs for all types of careers in the laboratory/research industry.

www.llnl.gov

The Lawrence Livermore National Laboratory has interesting information about research projects in bioengineering, genomics, biotechnology, and the Human Genome Project. Click on the Science and Technology link, then the biology link.

www.medzilla.com

Medzilla is an excellent site with a huge number of job listings in biotechnology pharmaceuticals, science, medical and healthcare fields. Site also includes a salary survey.

www.nature.com/naturejobs

Nature.com is associated with Nature Magazine and offers job listings in scientific fields worldwide.

http://nextwave.sciencemag.org

Nextwave offers a weekly on-line publication from science magazine and the American Association for the Advancement of Science. It includes job market information, job listings, science articles and much more. Some parts of the site are free, some require a subscription, but many colleges subscribe. Individual subscriptions are also available.

www.nih.gov

The National Institutes of Health, part of the U.S. Department of Health and Human Services offers news and information about many types of medical research as well as job listings.

www.ornl.gov/hgmis

Oak Ridge National Laboratory site offers information about careers in genetics and biosciences. It includes resources on careers and many excellent links, and gives information about the Human Genome Project. A great publication, *Genomics and Its Impact on Medicine and Society: A 2001 Primer* is available on the site.

www.scijobs.org

Scijobs.org has a huge number of jobs in many areas of science. It has links to many biotechnology jobs which take you directly to the employers website for more information. A very good site.

www.sciam.com/careers

Scientific American Magazine sponsors this career site with articles, job listings, salary information and more.

www.sciencejobs.com

This site lists jobs for scientists, but most are higher level jobs requiring a bachelor's or

higher degree.

General Information Sites About Biotechnology

www.accessexcellence.org/AB

The National Health Museum site includes information about biotechnology and a great section on careers in biotechnology with job descriptions, resources and interviews with people employed in biotechnology jobs.

www.bio.org

The Biotechnology Industry Organization, the trade group for biotechnology, is a great source of information about the biotechnology industry and companies across the United States. Click on the BIO members link to view a list of companies. Most have links directly to the company's web site.

www.bioability.com

Bioability sells an annual directory of biotechnology companies in the United States, which is costly, but libraries, biotechnology programs and counselors might want to purchase it.

www.biocom.org

Biocom is the life science industry association in San Diego. The site offers information about meetings, professional development courses, and links to the website of all the member organizations.

www.biotech-resource.com

An excellent source of links to biotechnology sites. Many links to sites that list jobs.

www.bioworld.com

Bioworld is a daily newspaper on biotechnology and offers market research on the biotechnology industry.

www.csuchico.edu/csuperb

The California State University Program for Education and Research in Biotechnology (CSUPERB) has a great site with job links, information on the industry and links to many biotechnology sites.

http://doegenomestolife.org

Genomes to Life, a U.S. Department of Energy site focusing on how the information from the Human Genome will be used for further research.

www.er.doe.gov/production/ober/hug_top.html

United State Department of Energy site offers background information on Human Genome Project research conducted or funded by the U.S. Government.

www.geneticengineering.org

This site has many articles and links about the science and ethics of genetic engineering, a dictionary and other resources.

www.nsf.gov

The National Science Foundation provides billions of dollars for biotechnology research projects in California. This site tells about the research programs.

General Occupational Information and Job Sites

www.bls.gov/oco

The Occupational Outlook Handbook at the U.S. Bureau of Labor Statistics site gives a detailed description of just about every occupation in the country including skills, training, wages, employment trends. This is an excellent source of general career information.

www.calmis.cahwnet.gov

The California Employment Development Department, Labor Market Information Division site offers occupational guides, salary information employment data and much more about all occupations in California.

www.dol.gov

The United States Department of Labor offers a wealth of information on all types of issues related to employment.

www.hoovers.com

Excellent general business site, a good place to learn about the business aspects of biotechnology. It has great links to biotechnology companies. Click on the Companies and Industries link for an industry snapshot of biotechnology and for a very extensive list of biotechnology companies throughout the United States and abroad.

www.jobstar.org

Jobstar is a great general job and career site from public libraries in several areas of California. It includes links to salary information, career planning and job search resources, and California and national job listings.

http://online.onetcenter.org

O*Net Online is an occupational information site developed by the U.S. Department of Labor. It gives detailed information about all types of occupations including skills, knowledge, training and interests.

www.spb.ca.gov

The site of the California State Personnel Board lists available jobs in state government.

www.usajobs.opm.gov

USAJobs is the online site of the U.S. Department of Personnel Management. This is the site for job listings if you are interested in working for federal government agencies.

Sources

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Sources

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Amgen, Inc.

Bio-Rad Laboratories, Inc.

Calgene, Inc.

City of Hope National Medical Center

Diagnostic Products Corporation

Genentech, Inc.

NutraSweet Kelco Company

Specialty Laboratories

Stratagene Cloning Systems, Inc.

UCLA

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Glossary of Biotechnology Terms

This glossary defines biotechnology terms used in this book.

Amino Acid: Any of 20 different molecules that combine to form proteins.

Antibiotics: Drugs used to treat infection.

Antibody: A protein produced by humans and animals in response to a foreign substance or antigen. Antibodies protect the body and fight disease.

Aseptic: Free of disease-causing organisms, sterile.

Assay: To measure the effect of a substance on animals, tissues or organisms and compare results to a standard material.

Autoclave: An instrument used to sterilize glass and other items used in a laboratory.

Bacteria: Microscopic organisms with a very simple cell structure.

Bacteriology: The scientific study of bacteria, a branch of microbiology.

Biochemistry: The scientific study of the chemistry of living things.

Bioinformatics: The use of advanced computer technology for biological research. Bioinformatics is particularly important in managing and analyzing the large, complex data in genome research.

Biology. The scientific study of life.

Biopesticide: A substance created from living things that is used to kill insects and other pests.

Bioremediation: The use of microorganisms to clean up environmental problems, especially hazardous waste.

Biotechnology: The application of living things or their products to industry or technology. Usually involves the use or alteration of genetic material of living organisms.

Calibration: To make fine corrections or adjust the measuring system of instruments.

Cancer: Diseases in which abnormal cells divide without control. Cancer cells can invade nearby tissue and spread through the body.

Cell culture: Growth of living organisms in a laboratory in a specially prepared medium outside of their normal growing environment. In biotechnology, host cells containing recombinant DNA are grown in cell cultures.

Cell: The smallest unit of any living thing. All living things are made up of cells.

Chemistry: The science of the composition and reactions of atomic and molecular systems.

Clinical trials: Studies of new drugs on patients to measure the effectiveness of the drug.

Clone: A group of identical copies of a gene, cell or organism all grown from the same parent. Cloning a gene involves creating a collection of genetically identical host cells - usually bacteria, yeast or certain mammalian cells - which all contain the same piece of recombinant DNA, including the target gene.

Culture: To grow cells in a laboratory in a specially prepared medium.

Diagnostic: A product used for the diagnosis of disease or medical condition. Monoclonal antibodies and DNA probes are diagnostic products developed through biotechnology.

DNA fingerprinting: A method of comparing the genetic similarities or differences between individuals. This technology is often used as a forensic tool to identify the source of blood and tissue samples found at crime scenes.

DNA: Deoxyribonucleic acid: The molecule that carries the genetic information for most living systems. DNA is essentially a blueprint for an organism.

Drug: Any material used to diagnose, treat, or prevent disease or other abnormal conditions.

Enzyme: A protein that assists chemical reactions needed for cell growth and reproduction.

FDA: The United States Food and Drug Administration. Regulates and approves all drugs.

Fermentation: The process of growing microorganisms to produce chemicals or pharmaceutical compounds. Microorganisms are usually grown under controlled conditions in large tanks called fermentors.

Fermentor: The large tank in which cells containing recombinant DNA are grown. Fermentors can vary in size from less than a liter to thousands of liters.

Forensic testing: Testing for the purpose of use in legal proceedings or law enforcement.

Fungus: A group of organisms that includes yeast, molds and mushrooms.

Gene: A segment of DNA in a specific location on a chromosome.

Gene mapping: Finding the locations of genes on a chromosome.

Gene sequencing: Decoding the sequence of bases on a strand of DNA.

Gene therapy: The replacement of a defective gene with a properly functioning one to treat a hereditary disease. Recombinant DNA techniques are used to insert the functioning gene into cells.

Genetic code: The molecular mechanism by which genetic information is stored in living organisms.

Genetic engineering: A technique used to change genetic material of living cells in order to make them produce new substances or products or to perform different functions.

Genetic testing: The use of a specific biological test of a person's genes to screen for inherited diseases or medical conditions.

Genetics: The scientific study of heredity or how particular characteristics or traits are passed from one generation to the next.

Genome: All the genetic information in the chromosomes of a particular organism.

Genomics: The study of genes and their functions.

Good Laboratory Practices: FDA rules that must be followed in design, practice and record keeping in laboratory studies of drugs and other materials regulated by Food and Drug Administration.

Good Manufacturing Practices: Strict FDA rules regarding methods and facilities used for manufacturing, packaging and storage of pharmaceuticals and other products regulated by Food and Drug Administration

Growth hormone: A protein produced by the pituitary gland that is involved in cell growth. Human growth hormone, used to treat dwarfism, was one of the first biotechnology drugs.

Heredity: Transfer of genetic information from parents to offspring.

Hormones: Chemicals produced by cells in the body that regulate the function of other cells or organs.

Human Genome Project: An international research effort to map and sequence all the genes found in human DNA.

Instrumentation: The study, development and manufacture of scientific instruments and equipment.

Life science: Any of the science disciplines that studies living things.

Media (or medium): A substance containing nutrients needed for cell growth.

Metabolism: The physical and chemical reactions and processes involved in maintaining life.

Microbiology: Study of living organisms that can only been seen under a microscope.

Microorganism: Any organism that can be seen only with the aid of a microscope. Also called microbe.

Molecular biology: The study of the molecules that direct processes in cells; a specialty within biochemistry.

Monoclonal antibody: Highly specific, purified antibody that is derived from only one clone of cells and recognizes only one antigen.

Mutation: A change in the genetic makeup of a cell.

Nanotechnology: Use of technology to create materials on an atomic scale.

Nucleus: Part of the cell containing the chromosomes.

Organism: A living thing, which may be an animal, plant, bacterium, virus, fungus or other form.

Pathology: The scientific study of diseases.

PCR: see Polymerase chain reaction.

pH: A measure of acidity or alkalinity.

Pharmaceuticals: Drugs, including therapeutics that treat disease and diagnostics that are used to diagnose disease.

Pipette: A scientific instrument used to transfer small quantities of liquids.

Plasmid: A small circle of bacterial DNA, capable of copying itself independently in a host cell. Used in biotechnology to transfer DNA from one organism to another.

Polymerase chain reaction: PCR. A method of copying DNA sequences that uses cycles of heating and cooling.

Polymerases: Enzymes that assemble DNA (or RNA) chains from free nucleotides, using pre-existing DNA or RNA as models.

Protein purification: The process of extracting a desired protein material from cell cultures. Used to create drugs from recombinant cells.

Protein: A large, complex molecule. Many different proteins carry out essential functions in cells. Examples are hormones, enzymes and antibodies.

Proteomics: The study of proteins within cells, including idenfitying the different proteins in each type of cell in an organism, how the proteins function and interact with other proteins.

Protocol: The steps used in a scientific experiment.

Quality control: Quality control ensures that a biotechnology product is pure and that it meets specifications.

Recombinant DNA: DNA formed by combining segments of DNA from different organisms.

Recombination: The process of breaking apart and reconnecting DNA strands to create a new organism.

Replication: Duplication, such as making an exact copy of a strand of DNA.

RNA: Ribonucleic acid: A long chain-like molecule, similar to DNA. RNA helps translate the instructions encoded in DNA to build proteins.

Sequencing: Decoding the order of information on a strand of DNA.

Standard Operating Procedures: Exact procedures established by a company covering laboratory and manufacturing practices, including design, practice and record keeping in laboratory studies and methods and facilities used for manufacture, packaging and storage of materials. These must be followed to ensure accuracy of laboratory studies and purity of manufactured materials.

Therapeutics: Substances that are used to treat specific diseases or medical conditions.

Tissue culture: Growing cells in a laboratory in a specially prepared medium.

Toxic: Pertaining to a poisonous (or toxic) substance.

Transformation: Incorporation of foreign DNA into a cell.

Vaccine: A substance containing dead or weakened disease-causing organisms or parts of organisms used to give immunity against a disease caused by the organism.

Validation: To verify that a manufacturing process is being carried out according to approved methods.

Virus: A submicroscopic organism that contains genetic information but cannot reproduce itself. To reproduce, it must invade another cell and use parts of that cell's reproductive processes.

Yeast: A general term for single-celled fungi that reproduce by budding. Yeasts can ferment carbohydrates (starches and sugars) and thus are important in biotechnology, brewing and baking.