Plunkett Research®, Ltd.

Industry Statistics, Trends and In-depth Analysis of Top Companies

When You Want Affordable, Timely Industry Research,
Contacts & Business Development Data

GUIDE

To the Biotech Industry

Exported from Plunkett Research Online via Plunkett's Build-A-Report
Downloaded on: July 17, 2018
A major update of this data was completed on: August 11, 2017

This report was exported by a user of Plunkett Research® Online, enabled by Plunkett's Build-A-Report℠.

Available data used in this guide may include:

- Industry Trends
- Industry Statistics
- Company Profiles
- Industry Glossary

We provide market research, analysis, statistics, research tools and corporate profiles in the following industry sectors:

- Advertising, Marketing & Branding
- Airline, Hotel & Travel
- Apparel & Textiles
- Asian Companies
- Automotive
- Banking, Mortgages & Credit
- Biotechnology
- Canadian Companies
- Chemicals, Coatings & Plastics
- Consulting
- E-Commerce
- Energy & Utilities
- Engineering & Research
- Entertainment & Media
- Food, Beverage & Tobacco
- Games, Apps & Social Media
- Green Technology
- Health Care
- InfoTech, Computers & Software
- Insurance
- International Companies
- Investment & Securities
- Job Seekers' Resources
- Manufacturing
- Middle Market Companies
- Nanotechnology & MEMS
- Outsourcing & Offshoring
- Private Companies
- Real Estate & Construction
- Renewable & Alternative Energy
- Restaurant, Hotel & Hospitality
- Retailing
- Sports
- Telecommunications
- Transportation & Logistics
- Wireless, Cellular, & RFID

TABLE OF CONTENTS

INDUSTRY TRENDS

Updated 05-10-2018

The State of the Biotechnology Industry Today

[1] **Video Tip**

For our brief video introduction to the Biotech industry, see www.plunkettresearch.com/video/biotech .

Biotechnology can be defined as the use of living organisms (such as bacteria), biological processes or biological systems to create a desired end result or end product. Primary markets for biotechnology include: 1) Agriculture, where genetically-modified seeds are now in wide use in many nations. These seeds deliver plants that have much higher crop yields per acre, and often have qualities such as disease-resistance, resistance to herbicides and drought-resistance. 2) The manufacture of enzymes, including enzymes used in food processing (such as the making of certain dairy products) and in converting organic matter into ethanol for fuel. 3) Pharmaceuticals, where biotechnology creates such therapies as antibodies, interleukins and vaccines based on living organisms (as opposed to the chemical compounds that make up traditional drugs) that can target specific cellular conditions, often with dramatic results (such as the drug Keytruda that famously fought brain cancer for former U.S. President Jimmy Carter).

Biotechnology is a modern word that describes a very old science. For example, bio-enzymes have always been essential in the production of cheese. The modern difference is that much of the world's cheese production today utilizes a bio-engineered version of an enzyme called microbial chymosin. This chymosin is made by cloning natural genes into useful bacteria. Another example: For thousands of years, mankind has used naturally-occurring microbes to convert fruit juices into wine.

Analysts at global accounting firm E&Y estimate global biotech industry revenues for publicly-held companies at $139.4 billion in 2016 (latest data available), up from $130.3 billion in 2015 and $123.1 billion in 2014. The firm also estimates that revenues of publicly-held biotech companies in the U.S. alone were $112.2 billion in 2016, up from $107.4 billion in 2015 and $93.1 billion in 2014.

Genetically-engineered drugs, or "biotech" drugs, represent roughly 11% of the total global prescription drugs market. The U.S. Centers for Medicare & Medicaid Services (CMS) forecast called for prescription drug purchases in the U.S. to total about $360.1 billion during 2017, representing about $1,102 per capita. That projected total is up from only $200 billion in 2005 and a mere $40 billion in 1990.

Estimates of the size of the drugs market vary by source, but it is generally accepted that the global prescription drugs market was more than $1 trillion in 2016. By 2022, American drug purchases alone may top $495 billion, according to the CMS, thanks to a rapidly aging U.S. population, increased access to insurance and the continued introduction of expensive new drugs.

Advanced generations of drugs developed through biotechnology continually enter the marketplace. The results may be very promising for patients, as a technology-driven tipping point of medical care is approaching where drugs that target specific genes and proteins may eventually become widespread. However, it continues to be difficult and expensive to introduce a new drug in the U.S.

According to FDA figures, 46 new molecular entities (NMEs) and new biotech drugs (BLAs) were approved in the U.S. during 2017. These NMEs are novel, new active substances that are categorized differently from "NDAs" or New Drug Applications. NDAs may seek approval for drugs based on combinations of substances that have been approved in the past. Also, a large number of generic drug applications are being approved each year. That is, an application to manufacture a drug that was created as a brand name, and has now lost its patent so that competing firms may seek FDA approval to manufacture it.

New Drug Application Categories

Applications for drug approval by the FDA fall under the following categories:

BLA (Biologics License Application): An application for approval of a drug synthesized from living organisms. That is, they are drugs created using biotechnology. Such drugs are sometimes referred to as biopharmaceuticals.

NME (New Molecular Entity): A new chemical compound that has never before been approved for marketing in any form in the U.S.

NDA (New Drug Application): An application requesting FDA approval, after completion of the all-important Phase III Clinical Trials, to market a new drug for human use in the U.S. The drug may contain active ingredients that were previously approved by the FDA.

Biosimilars (generic biotech drugs): A term used to describe generic versions of drugs that have been created using biotechnology. Because biotech drugs ("biologics") are made from living cells, a generic version of a drug may not be biochemically identical to the original branded version of the drug. Consequently, they are described as "biosimilars" or "follow-on biologics" to set them apart.

In Europe, their manufacture and sale has been allowed for some time under special guidelines. In February 2012, the FDA created guidelines for biosimilars in the U.S. Manufacturers are now able to rely to a large extent on the clinical trials research previously conducted by the maker of the original version of the drug. In early 2015, a Sandoz International biosimilar (a generic version of Amgen's popular Neupogen) received approval from the FDA and was on track to become the first biosimilar to hit the U.S. market.

Priority Reviews: The FDA places some drug applications that appear to promise "significant improvements" over existing drugs for priority approval, with a goal of returning approval within six months.

Accelerated Approval: A process at the FDA for reducing the clinical trial length for drugs designed for certain serious or life-threatening diseases.

Fast Track Development: An enhanced process for rapid approval of drugs that treat certain life-threatening or extremely serious conditions. Fast Track is independent of Priority Review and Accelerated Approval.

Dozens of exciting new, biotech drugs that target specific genes are seeking regulatory approval. Many of these drugs are for the treatment of specific forms of cancer. In a few instances, doctors are making treatment decisions based on a patient's personal genetic makeup. (This strategy is often referred to as personalized medicine.) New breakthroughs in genetically targeted drugs occur regularly. An exciting drug for certain patients who suffer from the skin cancer known as melanoma is a good example. Zelboraf, developed by drug firms Roche Holding and Daiichi Sankyo, will dramatically aid melanoma patients who are shown through genetic tests to have a mutated gene called BRAF. In trials, about 50% of such patients saw their tumors shrink, compared to only 5.5% of patients who received traditional chemotherapy.

Stem cell research is also moving ahead briskly on a global basis. The Obama administration relaxed limitations on federal funding of stem cell research

that were established by the preceding administration. In 2009, the National Institutes of Health set new guidelines for funding that will dramatically expand the number of stem cell lines that qualify for research funds from a previous 21 to as many as 700. However, research into certain extremely controversial stem cells, such as those developed via cloning, will not be funded with federal dollars. There is evidence of the potential for stem cells to treat many problems, from cardiovascular disease to neurological disorders.

Despite exponential advances in biopharmaceutical knowledge and technology, biotech companies enduring the task of getting new drugs to market continue to face long timeframes, daunting costs and immense risks. By one count, of every 1,000 experimental drug compounds in some form of pre-clinical testing, only one makes it to clinical trials. Then, only one in five of those drugs make it to market. Of the drugs that get to market, only one in three bring in enough revenue to recover their costs. Meanwhile, the patent expiration clock is ticking—soon enough, manufacturers of generic alternatives steal market share from the firms that invested all that time and money in the development of the original drug.

Global Factors Boosting Biotech Today:

1) A rapid aging of the population in nations including the EU, much of Asia and the U.S., such as more than 70 million surviving Baby Boomers in America who are entering senior years in rising numbers and require a growing level of health care. A significant portion of that care may be in the form of biotech drugs.
2) A renewed, global focus on producing and stockpiling effective vaccines.
3) Major pharmaceuticals firms paying top prices to acquire young biotech drug companies that own promising drugs.
4) A very significant market for genetically-engineered agricultural seeds ("Agribio"), with farmers in dozens of nations planting genetically modified seeds.
5) Aggressive investment in biotechnology research in Singapore, China and India, often with government sponsorship—for example, Singapore's massive Biopolis project.
6) Very promising research into synthetic biology.
7) Dramatic decreases in the cost of personal genetic studies, which can be a big boost to personalized medicine.
8) Highly advanced biotech technologies known as gene therapies are slowly beginning to prove their ability to cure patients.
9) Rapid growth in the overall prescription drug markets in developing nations.
10) An increased focus on the discovery and manufacture of new drugs ("orphan drugs") that impact rare diseases or relatively small portions of the population.
11) The advent of the genetic engineering process known as CRISPR, enabling scientists to repair defective cells.

Source: Plunkett Research, Ltd.

Internet Research Tip:

You can review current and historical drug approval reports at the following page at the FDA. www.fda.gov/Drugs/InformationOnDrugs/default.htm

The FDA regulates biologic products for use in humans. It is a source of a broad variety of data on drugs, including vaccines, blood products, counterfeit drugs, exports, drug shortages, recalls and drug safety.
www.fda.gov/BiologicsBloodVaccines/default.htm

The FDA is attempting to help the drug industry bring the most vital drugs to market in shorter time with programs that include: Fast Track, Priority Review, Breakthrough Therapy Designation and Accelerated Approval. The benefits of Fast Track include scheduled meetings to seek FDA input into development as well as the option of submitting a New Drug Application in sections rather than submitting all components at once. The Fast Track designation is intended for drugs that address an unmet medical need, but is independent of Priority Review, Breakthrough Therapy Designation and Accelerated Approval. Priority drugs are those considered by the FDA to offer improvements over existing drugs or to offer high therapeutic value. The priority program, along with increased budget and staffing at the FDA, is having a positive effect on total approval times for new drugs. Breakthrough therapies show early clinical evidence of very important improvements over currently available drugs.

The FDA quickly approved Novartis' new drug Gleevec (a revolutionary and highly effective treatment for patients suffering from chronic myeloid leukemia). After priority review and Fast Track status, it required only two and one-half months in the approval process. This rapid approval, which enabled the drug to promptly begin saving lives, was possible because of two factors aside from the FDA's cooperation. First, Novartis mounted a targeted approach to this niche disease. Its research determined that a specific genetic malfunction causes the disease, and its drug specifically blocks the protein that causes the genetic malfunction. Next, thanks to its use of advanced genetic research techniques, Novartis was so convinced of the effectiveness of this drug that it invested heavily and quickly in its development.

Key Food & Drug Administration (FDA) terms relating to human clinical trials:

Phase I—Small-scale human trials to determine safety. Typically include 20 to 60 patients and are six months to one year in length.
Phase II—Preliminary trials on a drug's safety/efficacy. Typically include 100 to 500 patients and are one and a half to two years in length.
Phase III—Large-scale controlled trials for efficacy/safety; also the last stage before a request for approval for commercial distribution is made to the FDA. Typically include 1,000 to 7,500 patients and are three to five years in length.
Phase IV—Follow-up trials after a drug is released to the public.

Generally, Fast Track approval is reserved for diseases that are life-threatening and have no current therapies, such as rare forms of cancer. However, new policies are setting the stage for accelerated approval of drugs for less deadly but more pervasive conditions such as diabetes and obesity. Approval is also being made easier through the use of genetic testing to determine a drug's efficacy, as well as the practice of drug companies working closely with federal organizations. Examples of these new policies are exemplified in the approval of Iressa, which helps fight certain types of cancer in only a small percent of patients but is associated with a genetic marker that can help predict a patient's receptivity; and VELCADE, a cancer drug that received initial approval in only four months because the company that makes it worked closely with the National Cancer Institute to review trials.

Personal genetic codes are becoming less expensive and more widely attainable. Today, the cost of decoding the most important sections of the human genome for an individual patient has dropped dramatically.

Although total drug expenditures are currently small in developing nations such as India, China and Brazil, they have tremendous potential over the mid-term. This means that major international drug makers will be expanding their presence in these nations. However, it also means that local drug manufacturers have tremendous incentive to invest in domestic research and marketing.

The Coming BioIndustrial Era:

Some of the most exciting developments in the world of technology today are occurring in the biotech sector. These include advances in agricultural biotechnology, the convergence of nanotechnology and information technology with biotech and breakthroughs in synthetic biotechnology.

The rapidly growing worldwide base of biotechnology knowledge has the potential to create a new "bioindustrial era." For example, scientists' ability to capture refinable-oils from algae and other organisms (organisms that remove carbon from the atmosphere as they grow) may eventually create a new source of transportation fuel. Oil industry giant ExxonMobil has backed research in this regard at Synthetic Genomics, Inc. with hundreds of millions of dollars.

The use of enzymes in industrial processes may enable us to bio-engineer a long list of highly desirable substances at modest cost. The result could easily be a lower carbon footprint for many industrial processes, less industrial and residential waste to deal with and a significant increase in yields in chemicals, coatings, food and other vital sectors. DuPont's 2011 acquisition of global enzyme leader Danisco is a good indicator of the looming era of bioindustrial advancements, as DuPont made a $5.8 billion bet that it can help a vast variety of manufacturers to achieve significant product enhancements and efficiencies.

Source: Plunkett Research, Ltd.

Significant ethical issues face the biotech industry as it moves forward. They include, for example, the ability to determine an individual's likelihood to develop a disease in the future, based on his or her genetic makeup today; the potential to harvest replacement organs and tissues from animals or from cloned human genetic material; and the ability to genetically alter the basic foods that we eat. These are only a handful of the powers of biotechnology that must be dealt with by society. Watch for intense, impassioned discussion of such issues and a raft of governmental regulation as new technologies and therapies emerge.

The biggest single issue may be privacy. Who should have access to your personal genetic records? Where should they be stored? How should they be accessed? Can you be denied employment or insurance coverage due to your genetic makeup?

Internet Research Tip:

For the latest biotech developments check out www.biospace.com , a private sector portal for the biotech community, and www.bio.org , the web site of the highly regarded Biotechnology Industry Organization.

Updated 08-07-2017

A Short History of Biotechnology

While the 1900s will be remembered by industrial historians as the Information Technology Era and perhaps the Advanced Physics Era, the 2000s may be marked by many as the Biotechnology Era because rapid advances in biotechnology will completely revolutionize many aspects of life in coming decades. However, the field of biotechnology can trace its true birth back to the dawn of civilization, when early man discovered the ability to ferment grains to make alcoholic beverages, and learned of the usefulness of cross-pollinating crops in order to create new hybrid strains—the earliest form of genetic engineering. In ancient China, people are thought to have harvested mold from soybean curd to use as an antibiotic as early as 500 B.C.

Robert Hooke first described cells as a concept in 1663 A.D., and in the late 1800s, Gregor Mendel conducted experiments that became the basis of modern theories about heredity. Alexander Fleming discovered the first commercial antibiotic, penicillin, in 1928.

The modern, more common concept of "biotech" could reasonably be said to have its beginnings shortly after World War II. In 1953, scientists James Watson and Francis Crick conceived the "double helix" model of DNA, and thus encouraged a spate of scientists to consider the further implications of human DNA. The Watson/Crick three-dimensional model began to unlock the mysteries of heredity and the methods by which replication of genetic material takes place within cells.

Significant steps toward biotech drugs occurred in the early 1970s. In 1973, Dr. Stanley N. Cohen, a Stanford University genetics professor, and Dr. Herb Boyer, a biochemist, genetic engineer and educator at UC-San Francisco, introduced the concept of gene-splicing and created the first form of recombinant DNA. In 1974, Cesar Milstein and Georges Kohler created monoclonal antibodies, cells that clone over and over again to create large quantities of a specific antibody. Many of today's top biotech drugs are monoclonal antibodies. These two discoveries (recombinant DNA and monoclonal antibodies) created the building blocks of the first modern commercial biotech drugs.

Boyer and Cohen's gene-splicing technique enabled scientists to cut genetic material from the cells of one organism and paste it into another organism. This was an important discovery because the genetic material they moved from one place to another instructs a cell as to how to make a particular protein. Over time, scientists have perfected the technique of splicing material that enables cells to create proteins that control the creation of insulin, the level of blood pressure and many other human functions. Such genetic engineering enabled, for the first time, the creation of massive vats of isolated proteins grown in bacteria or in cells harvested from animals—in quantities large enough for the commercial production of new drugs. (In fact, Boyer and Cohen's early experiments involved inserting a gene from an African clawed toad into bacterial DNA for duplication.)

In 1975, the first human gene was isolated, opening the door to gene therapy and creating the interest that led to the beginning of the massive, publicly funded Human Genome Project in 1990. A working draft of the Human Genome was released in 2000, and a complete genome was released in 2003.

In 1976, Bob Swanson of the now-famous Silicon Valley venture capital firm Kleiner Perkins formed a new business, Genentech, in conjunction with Herb Boyer (see above). Other early biotech firms were founded soon after, generally funded by venture capital firms, angel investors and corporate venture partners. These early biotech startups included many companies that grew into super-successful biopharma corporations: Amgen, Novartis Diagnostics (formerly Chiron), Biogen Idec and Genzyme. The creation of these startups, focused on the development of new drugs, was particularly noteworthy because it was the first time in decades that new drug companies were launched in significant numbers. In fact, most major drug companies in existence at the beginning of the 1970s were very mature and could trace their histories back to the early 1900s or before.

The commercial introduction of genetically modified (GM) seeds is a relatively new branch of biotech. By 1987, researchers were gaining enough progress with GM seeds that applications for approval for field testing and certification began to pour into the USDA (U.S. Department of Agriculture). The first commercialized food to emerge was the Flavr Savr Tomato, which was the result of a gene splicing. The added gene prevented the breakdown of cell walls as the fruit ripened, which meant that the tomatoes remained firm for an extended period of time in the truck or on the shelf. In 1995-1996, GM corn with gene modification that enables the plant to produce its own pesticide received regulatory approval and became commercially available. Today, millions of acres of GM plants, from cotton to soy to corn, are grown worldwide with tremendous efficiency. Significant new advancements in biotech crops are on the horizon.

Many researchers are experimenting with GM seeds that grow plant-based pharmaceuticals.

In 2010, one of the most significant biotech developments in years was announced when genetic engineering was used to create an entirely new organism. This is a field known as "synthetic biology."

The history of biotechnology had a major milestone in 2013 when the U.S. Supreme Court ruled that isolated human genes cannot be patented, striking down a case that had awarded Myriad Genetics patents for the BRCA1 and BRCA2 genes relating to breast cancer in the 1990s. However, the Supreme Court also ruled that DNA molecules that have been engineered by man are eligible for patents.

2014 saw the launching of Guardant Health's liquid biopsy test, which scans blood samples for small DNA fragments released by malignant tumors. Guardant's test searches for any of 68 identified cancer genes, making it a far less invasive (and less expensive) procedure than standard biopsies. As of 2016, one of the most exciting developments is the use of "checkpoint inhibitors," which control immune response, as a way to boost the effectiveness of new immunotherapies in treating cancers.

Another breakthrough in gene therapy is CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats). The technology focuses on the use of a DNA-cutting protein that is guided by an RNA molecule, targeted at a specific gene. This technology enables a scientist to quickly and easily edit or re-engineer specific bits of DNA. A defective gene can be precisely edited within the laboratory, and then reintroduced to a patient's body as a form of gene therapy with far more accuracy than previous gene therapies. CRISPR is sometimes referred to as "genetic editing," and it is considered to be a very significant breakthrough. Practical applications may include treatments or even cures for sickle-cell anemia, HIV and cystic fibrosis. Libraries of CRISPRs have been created by researchers at MIT that account for nearly all human genes.

Updated 07-12-2018

Ethanol Production Soared, But U.S. Federal Subsidy Expires

High gasoline prices, effective lobbying by agricultural and industrial interests, and a growing interest in cutting reliance on imported oil put a high national focus on bioethanol in America in recent years. Corn and other organic materials, including agricultural waste, can be converted into ethanol through the use of engineered bacteria and superenzymes manufactured by biotechnology firms. This trend gave a boost to the biotech, agriculture and alternative energy sectors. At present, corn is almost the exclusive source for bioethanol in America. This is a shift of a crop from use in the food chain to use in the energy chain that is unprecedented in all of agricultural history—a shift that had profound effects on prices of corn for consumers, livestock growers (where corn has long been a traditional animal feed) and food processors.

Ethanol is an alcohol produced by a distilling process similar to that used to produce liquors. A small amount of ethanol is added to much of the gasoline sold in America, and most U.S. autos are capable of burning "E10," a gasoline blend that contains 10% ethanol. E85 is an 85% ethanol blend that may grow in popularity due to a shift in automotive manufacturing.

Yet, despite the millions of vehicles on the road that can run on E85 and billions of dollars in federal subsidies to participating refiners, many oil companies seem unenthusiastic about the adoption of the higher ethanol mix. E85 requires separate gasoline pumps, trucks and storage tanks, as well as substantial cost to the oil companies (the pumps alone cost about $200,000 per gas station to install). The plants needed to create ethanol cost $500 million or more to build. Many drivers who have tried filling up with E85 once revert to regular unleaded when they find as much as a 25% loss in fuel economy when burning the blend.

Ethanol is a very popular fuel source in Brazil. In fact, Brazil is one of the world's largest producers of ethanol, which provides a significant amount of the fuel used in Brazil's cars. This is due to a concerted effort by the government to reduce dependency on petroleum product imports. After getting an initial boost due to government subsidies and fuel tax strategies beginning in 1975, Brazilian producers developed methods (typically using sugar cane) that enable them to produce ethanol at moderate cost. The fact that Brazil's climate is ideally suited for sugarcane is a great asset. Also, sugar cane can be converted with one less step than corn, which is the primary source for American ethanol. Brazilian automobiles are typically equipped with engines that can burn pure ethanol or a blend of gasoline and ethanol. Brazilian car manufacturing plants operated by Ford, GM and Volkswagen all make such cars.

In America, partly in response to the energy crisis of the 1970s, Congress instituted federal ethanol production subsidies in 1979. Corn-based grain ethanol production picked up quickly, and federal subsidies have amounted to several billion dollars. The size of these subsidies and environmental concerns about the production of grain ethanol produced a steady howl of protest from observers through the years. Nonetheless, the Clean Air Act of 1990 further boosted ethanol production by increasing the use of ethanol as an additive to gasoline. Meanwhile, the largest producers of ethanol, such as Archer Daniels Midland (ADM), have reaped significant subsidies from Washington for their output. Between 2005 and 2009, the federal government spent $17 billion in tax credits. In 2010 and 2011, the subsidies amounted to between $5 billion and $6 billion yearly. However, Congress allowed the subsidy to expire on December 31, 2011.

In March 2014, the United Nations Intergovernmental Panel on Climate Change released two Working Group reports that questioned biofuels' cost to the environment, the food chain and ultimately their direct and indirect production of harmful emissions. Ethanol production requires enormous amounts of water. To produce one gallon of ethanol, up to four gallons of water are consumed by ethanol refineries. Add in the water needed to grow the corn in the first place, and the number grows to as much as 1,700 gallons of water for each gallon of ethanol. Meanwhile, Brazil has clear-cut as much as 1 million acres of tropical forest per year to produce sugarcane for ethanol.

In 2000, over 90% of the U.S. corn crop was used for human and animal consumption (much was exported to undeveloped countries), and less than 5% was used to make ethanol. By 2013, 40% was used for ethanol, 45% as feed for livestock and 15% for food and beverages. In 2016, the U.S. used approximately 4.2 billion bushels of corn (enough corn to feed 420 million people for one year) to produce more than 14.3 billion gallons of ethanol, with 5.6 million bushels used for feed. Also, high demand for corn for use in biorefineries has, from time-to-time, dramatically driven up the cost per bushel, creating burdens on consumers.

A bright note for ethanol proponents is an increase in production efficiency. The U.S. Energy Information Administration (EIA) reported yield increases in 2014 due to improvements in process technology (such as finer corn grinding to release more starch) and improved temperature control of fermentation to optimize yeast productivity. Better enzymes and yeast strains are also boosting output per bushel of corn.

On the negative side, other concerns regarding the use of corn to manufacture ethanol include the fact that a great deal of energy is consumed in planting, reaping and transporting the corn in trucks. In Brazil alone, the devastation of the rainforest and the need to ship ethanol to other countries emits about 50% more carbon than using petroleum fuels, according to agricultural nonprofit Food First.

Updated 07-12-2018

Cellulosic Ethanol Makes Slow Commercial Progress

Traditional grain ethanol is typically made from corn or sugarcane. In contrast to grain ethanol, "cellulosic" ethanol is typically made from agricultural waste like corncobs, wheat husks, stems, stalks and leaves, which are treated with specially engineered enzymes to break the waste down into its component sugars. The sugars (or sucrose) are used to make ethanol. Since agricultural waste is plentiful, turning it into energy seems a good strategy. Cellulosic ethanol can also be made from certain types of plants and grasses.

The trick to cellulosic ethanol production is the creation of efficient enzymes to treat the agricultural waste. The U.S. Department of Energy is investing heavily in research, along with major companies such as Dow Chemical, DuPont and Cargill. A joint venture between U.S. ethanol producer Poet and Royal DSM of the Netherlands is also betting on cellulosic ethanol, building a plant in Iowa next to a traditional corn-fed ethanol plant. Another challenge lies in efficient collection and delivery of cellulosic material to the refinery. It may be more costly to make cellulosic ethanol than to make it from corn. In any event, the U.S. remains far behind Brazil in cost-efficiency, as Brazil's use of sugar cane refined in smaller, nearby biorefineries creates ethanol at much lower costs per gallon.

Iogen, a Canadian biotechnology company has been operating a demonstration plant to determine how economical the process may be. Since 2004, Iogen has produced more than 500,000 gallons of cellulosic ethanol. Iogen developed and patented a new method to manufacture drop-in cellulosic biofuels from biogas using existing refinery equipment and operations in early 2014. Also in 2014, the company partnered with Raizen to open a $100 million, 10 million gallons per year cellulosic plant next to Raizen's Costa Pinto sugar cane mill in Brazil in late 2014. In mid-2009, a Shell gasoline station in Ottawa, Canada became the first retail outlet in that nation to sell a blend of gasoline that features 10% cellulosic ethanol.

In the U.S., by late 2014, two new commercial-scale plants opened, with another completed in 2015. The $275 million Project Liberty plant in Emmetsburg, Iowa is a joint venture of corn ethanol producer Poet and Royal DSM of The Netherlands. It opened in September 2014. In October, Spanish renewable energy firm Abengoa opened a $500 million facility in Hugoton, Kansas. DuPont's $200 million plant in Nevada, Iowa opened after delays in construction. Collectively, the three plants have a capacity of 80 million gallons of cellulosic ethanol per year (less than 1% of the gasoline burned in the U.S. yearly).

Biofuel production in the U.S. was seriously impacted by an EPA ruling that significantly reduced both the total renewable fuel targets and the advanced biofuels blending targets. Specifically, the target for cellulosic ethanol would drop from 1.75 billion gallons to a mere 123 million in 2015 and 230 million in 2016, with 311 million gallons set for 2017. A proposal for 2018 called for 238 million gallons.

Meanwhile, the Canadian government plans to support the Canadian biofuel industry with up to 500 million Canadian dollars for construction of next-generation plants. Iogen is expected to receive part of those funds for construction of a commercial scale cellulosic ethanol plant.

Ineos BIO began producing modest quantities of cellulosic ethanol at its Vero Beach, Florida plant in 2013. Its $130 million BioEnergy Center is a joint venture project between INEOS Bio and NPE Florida. The facility converted several types of waste biomass material into bioethanol, including vegetative and yard waste and citrus, oak, pine and pallet wood waste. It hoped to have an annual output of 8 million gallons of cellulosic ethanol and six megawatts of renewable power, but the plant closed in late 2016. In July 2017, Alliance Bio-products, Inc. a subsidiary of Alliance BioEnergy Plus, Inc., received USDA approval to acquire the Ineos BIO plant. Alliance plans to double the plant's capacity by 2020.

Novozymes, a Danish bioindustrial product manufacturer, has developed an enzyme blend containing an agent called GH-61 that has the potential to speed chemical reactions. Enzymes containing GH-61 may reduce production costs to the extent that producing ethanol can be competitive on a price basis with fossil fuels. Novozymes says that the cost of the enzyme, called Cellic, is about 50 cents per gallon, or less than a third of the projected $1.90 per gallon total cost (naturally, the retail price per gallon would be higher).

SPOTLIGHT: Biofuels

Corn and sugar cane are not the only sources for creating biofuels.

Municipal/Agricultural Waste: Might be cheaply produced, but could be in limited supply compared to the billions of gallons of fuel needed in the market place.

Wood: Easily harvested and in somewhat healthy supply; however, cellulose can be more difficult to extract from wood than from other biosources.

Algae: The slimy green stuff does have the potential for high yields per acre, but the process for distilling its cellulose is complex, requiring a source of carbon dioxide to permeate the algae.

Grasses/Wheat: Including switchgrass, miscanthus and wheat straw, the supply could be almost limitless. The challenge here is creating efficient methods for harvesting and infrastructure for delivering it to biorefineries.

Vegetable Oils: Including soybean, canola, sunflower, rapeseed, palm or hemp. It is difficult to keep production costs of these oils low.

Updated 08-07-2017

Major Drug Companies Acquire or Partner with Smaller Biotech Firms

The world's largest pharmaceutical makers have been on a buying binge, acquiring smaller biotech and drug companies at extremely high prices. This activity accelerated significantly in recent years. The companies that were purchased tended to be highly innovative firms with outstanding new drugs, typically in the biotech sector. In the end, the larger companies making these acquisitions may have saved money by obtaining exciting new drugs without years of investment in research and development. At pharmaceutical makers, profits are under constant pressure because popular drugs that have made immense profits for many years eventually lose their patent protection and face vast competition from generic versions. In the U.S., generic drugs now hold about an 88% market share by volume. This puts pressure on large research-based drug firms to develop new avenues for profits. One such avenue is partnerships with and investments in younger, smaller biotech companies. The final price paid is often dependent upon the company reaching certain milestones, such as regulatory approval or revenue growth.

Much of the future success for the world's major drug companies will lie in harnessing their immense financial power to fuel acquisitions and partnerships, along with their legions of salespeople and marketing specialists to license and sell innovative new drugs that are developed by smaller companies. There are hundreds of exciting, smaller biotech companies that are focused on state-of-the-art research that lack the marketing muscle needed to effectively distribute new drugs in the global marketplace. In addition to money to finance research and salespeople to promote new drugs to doctors, the major drug makers can offer expertise in guiding new drugs through the intricacies of the regulatory process. Some of these partnerships will eventually lead to vast revenues. Others

may not result in blockbuster drugs that will sell billions of pills yearly to treat mass market diseases, but they often lead to very exciting targeted drugs that can produce $300 million to $1 billion or more in yearly revenues once they are commercialized. A string of these mid-level revenue drugs can add up to a significant amount of yearly income.

Updated 06-14-2018

From Korea to India to Singapore to China, Nations Compete Fiercely in Biotech Development

Drug companies and government research agencies in many other countries are enhancing their positions on the biotech playing field, building their own educational and technological infrastructures, and in some case creating vast new biotech research districts or complexes. Not surprisingly, countries such as India, Singapore and China, which have already made deep inroads into other technology-based industries, are investing in major efforts in biotechnology, which is very much an information-based science. Firms that manufacture generics and provide contract research, development and clinical trials services are already common in such nations. In most cases, this was just a beginning, with original drug and technology development a rapidly evolving, symbiotic industry.

The government of Singapore, for example, has made biotechnology one of its top priorities for development, vowing to make it one of the staples of its economy. Its "Biopolis" research and development center opened in 2003. Biopolis is part of a master planned science and technology park called One-North. The complex is recognized as a center for stem cell and cell therapy research. It is a melting pot of scientists and corporations from all over the world, attracted to Singapore's central location, direct airline access to all of the world's major cities and status as a highly-respected health care center with a well-educated, largely English-speaking population. For example, the Novartis Institute for Tropical Diseases at Singapore has more than 100 researchers from 18 different nations. Biopolis was built in five phases at an estimated cost of $700 million. Phase I encompasses 1.99 million square feet and opened in 2003. Phase II added two seven-story buildings (398,268 square feet total) and opened in 2006. Phase III, completed in 2011, includes more than 400,000 square feet of laboratories, research facilities, office and retail space. Phases IV and V, adding additional space for research and clinical trials, were completed in 2013. (Another unit of the One-North development is called Fusionopolis, a 24-story building housing researchers, designers and entrepreneurs in media, software, communications and entertainment.)

Outsourcing and offshoring of biotech tasks to India has grown into a substantial industry. India's total pharmaceuticals industry revenue grew from $6 billion in 2005 to $36.7 billion in 2016, according to the India Brand Equity Foundation (IBEF), the latest data available. The Foundation expects revenues to reach $55 billion by 2020. More than 72% of prescriptions sold in India, by volume, are generics.

India already has hundreds of firms involved in biotechnology and related support services. In 2005, the nation tightened its intellectual property laws in order to provide stronger patent protection to the drug industry. As a result, drug development activity by pharma firms from around the world has increased in Indian locations in recent years, although at least one foreign firm was disappointed when it attempted to enforce its patents in India. The FDA has approved hundreds of industrial plants in India for drug manufacturing and raw material production for use in the U.S. (Many factories have also been approved within China.) Meanwhile, pharmaceutical firms have hired sales representatives within India in the thousands. McKinsey & Company forecasted that the number of pharmaceutical sales reps would triple between 2012 and 2022.

The costs of developing a new drug in India can be a small fraction of those in the U.S., although drugs developed in India still are required to go through the lengthy and expensive U.S. FDA approval process before they can be sold to American patients. India has its own robust biotech parks, including the well-established S. P. Biotech Park covering 300 acres in Hyderabad.

Stem cell (and cloning) research activity has been brisk in a number of nations outside the U.S. as well. To begin with, certain institutions around the world have stem cell lines in place, and some make them available for purchase. Groups that own existing lines include the National University of Singapore, Monash University in Australia and Hadassah Medical Centre in Israel. Sweden has also stepped onto the stage as a major player in stem cell research, with dozens of companies focused on the field, including firms such as Cellartis AB, which has one of the largest lines of stem cells in the world, and NeuroNova AB, which is focusing on regenerating nerve tissue.

More importantly, several Asian nations, including Singapore, South Korea, Japan and China, are investing intensely in biotech research centered on cloning and the development of stem cell therapies. The global lead in the development of stem cell therapies may eventually pass to China, where the Chinese Ministry of Science and Technology readily sees the commercial potential and is enthusiastically funding research. On top of funding from the Chinese government, investments in labs and research are being backed by Chinese universities, private companies, venture capitalists and Hong Kong-based investors.

China has made drug research a priority, and Chinese drug research spending has grown rapidly. The U.S. Department of Commerce estimated that China's market for drugs would rise from $108 billion in 2015 to about $167 billion by 2020. In addition, China is the world's largest producer of raw materials for drugs.

Meanwhile, leading biotech firms, including Roche, Pfizer and Eli Lilly, took advantage of China's high quality education systems and relatively low operating costs in order to establish R&D centers there. In this manner, offshore research can be complemented by offshore clinical trials. As of early 2017, China was the location of 11% of the world's clinical studies of biologic treatments, behind the U.S., which had 51%, according to the U.S. National Institutes of Health. Chinese firms with drugs in development include Hutchison China MediTech (Chi-Med), with eight drugs in development, and BeiGene Ltd. with four.

Many U.S. pharma companies have set up development centers in China. Merck opened such a center in Shanghai in 2015, while Johnson & Johnson did the same in 2014. Lilly, Merck, Tesaro, Inc. and Incyte Co. have multimillion dollar agreements to sell Chinese biotech drugs in foreign markets.

Taiwan has four biotech research parks. The Taiwanese government has a biotech development action plan which includes a $2 billion venture capital fund, a super-incubator and plans for expansion of the country's existing Development Center for Biotechnology. Meanwhile, Vietnam has plans to open six biotech research labs. Australia also has a rapidly developing biotechnology industry.

South Korea is a world leader in research and development in a wide variety of technical sectors, and it is pushing ahead boldly into biotechnology. Korean government leaders are focused on increasing research capabilities and basic sciences, particularly at research-oriented universities. The combination of government backing and extensive private capital in Korea could make this nation a biotech powerhouse. One area of emphasis there is stem cell research. (In Seoul, the government is also backing Digital Media City, a site that it hopes will become a world class hub of developers and entrepreneurs in electronic games, media content and communications technology. The project already houses tenants including LG Telecom, along with broadcasters, creative agencies and startups. The nation hopes that Digital Media City will eventually house 120,000 workers at 2,000 companies. In total, DMC is planned to contain 570,000 square meters of space.)

Another initiative is the Korea Research Institute of Bioscience and Biotechnology. In addition to fewer restrictions, many countries outside of the U.S. have

lower labor costs, even for highly educated professionals such as doctors and scientists.

Updated 09-29-2017

Patients' Genetic Profiles Plummet in Price as DNA Sequencing Technologies Advance

Scientists now believe that nearly all diseases have at least some genetic component. For example, some people have a genetic predisposition for breast cancer or heart disease. The understanding of human genetics is hoped to lead to breakthroughs in therapies for many illnesses. Organizations worldwide are experimenting with personalized drugs that are designed to provide appropriate therapies based on a patient's personal genetic makeup or their lack of specific genes.

The DNA sequencing (genetic testing) of the genes within a patient is the process of determining the order of DNA nucleotides, or bases, in the genome—that is, the entire DNA makeup of the patient. The nucleotides are described on the order of A, C, G and T. The human genome consists of about 3 billion of these genetic letters. Once the genome has been sequenced, much work remains to be done for fully understanding human genetics. Scientists must analyze and translate the strings of A, C, G and T into usable knowledge, which requires sophisticated analytical software.

DNA sequencing was first achieved in 2001 at a cost of about $100 million per genome (one patient's entire genetic makeup). However, by 2017, the price had dropped to as little as $795 per genome. Costs may continue to drop. In addition, some companies offer testing of a small, select group of genes within a patient at very modest prices—typically less than $100. The genome sequencing market is led by Illumina, Inc., a San Diego, California-based company. Competitors include Tute Genomics (which acquired Knome in late 2015), Thermo Fisher Scientific, Complete Genomics and BGI, formerly the Beijing Genomics Institute.

The scientific community's improving knowledge of genes and the role they play in disease is leading to several different tracks for improved treatment results. One track is to profile a patient's genetic makeup for a better understanding of a) which drugs a patient may respond to effectively, and b) whether certain defective genes reside in a patient and are causing a patient's disease or illness. Yet another application of genetic profiling is to study how a patient is able to metabolize medication, which could help significantly when deciding upon proper dosage. Since today's widely used drugs often produce desired results in only about 50% of patients who receive them, the use of specific medications based on a patient's genetic profile could greatly boost treatment results while cutting costs. Each year, by one count, 2.2 million Americans suffer side effects from prescription drugs. Of those, more than 100,000 die, making adverse drug reaction a leading cause of death in the U.S. A Journal of the American Medical Association study states that the annual cost of treating these drug reactions totals $4 billion each year.

Drugs that target the genetic origins of tumors may offer more effective, longer-lasting and far less toxic alternatives to conventional chemotherapy and radiation. In other cases, biotech drugs, used in combination with surgery or chemotherapy, can reduce the chance of a cancer recurrence. One of the most noted drugs that target specific genetic action is Herceptin, a monoclonal antibody that was developed by Genentech. Approved by the FDA in 1998, Herceptin, when used in conjunction with chemotherapy, shows great promise in significantly reducing breast cancer for certain patients who are known to "overexpress" the HER2 protein (that is, there is an excess of HER2-related protein on tumor cell surfaces, or there is an excess of the HER2 gene itself). A simple test is used to determine if this gene is present in the patient. Herceptin, which works by blocking genetic signals, thus preventing the growth of cancerous cells, may show potential in treating other types of cancer, such as ovarian, pancreatic or prostate cancer.

Another genetic test is marketed by Genomic Health, based in Redwood City, California, (www.genomichealth.com). Its Oncotype DX test provides breast cancer patients with an assessment of the likelihood of the recurrence of their cancer based on the expression of 21 different genes in a tumor. The test enables patients to evaluate the results they may expect from post-operative therapies such as Tamoxifen or chemotherapy. As of mid-2015, more than 500,000 patients had been tested in more than 80 countries. The firm also offers an Oncotype DX test for colon and prostate cancers. Such tests will be standard preventive treatment in coming decades.

The industry has moved onto what is commonly referred to as "Next Generation" sequencing of DNA. That is, highly advanced hardware and software that can determine the DNA of a human sample with extremely rapid output and low cost. This means that scientists worldwide will be able to conduct massive studies of human or other animal genetics at relatively affordable cost compared to the billions of dollars that the first genomic studies required.

A relatively recent entry to the field of biotechnology is epigenetics, a branch of biology focused on gene "silencers," which is used in a technique called "antisense." Scientists involved in epigenetics are studying the function within a gene that regulates whether that gene is operating at full capacity or is toned down to a lower level. The level of operation of a given gene may lead to a higher risk of disease, such as certain types of cancer. Epigenetics may be very effective in combatting abnormal gene expressions that cause cancer. In early 2013, the FDA approved a drug called Kynamro, created by Isis Pharmaceuticals and marketed by Sanofi's Genzyme. Kynamro uses antisense to shut off genes that cause abnormally high blood pressure and heart attacks in young people less than 30 years of age. By mid-2016, there were a number of epigenetic drugs on the market including Azacitidine, Decitabine, Vorinostat, Romidepsin and Ruxolitnub.

Pharmacy benefit managers (PBMs) are organizations that provide administrative services in processing and analyzing prescription claims for pharmacy benefit and coverage programs. Some PBMs are selling services that test patients for genetic variations that might indicate which drugs would be more effective for individual patients. Express Scripts (formerly Medco Health Solutions, Inc.) for example, is a PBM and pharmacy mail order business that is selling tests for patients who take drugs such as the blood thinner warfarin and breast cancer treatment Tamoxifen. CVS Caremark partners with Generation Health, Inc. to offer a similar testing service. PBMs are selling their services to employers who are willing to invest in them for improved health outcomes and lower prescription costs. If personally-tailored prescriptions become a widespread reality, billions of dollars each year could be saved as patients take only those drugs which will do them some good and avoid those which could do them harm.

Meanwhile, the American Society of Clinical Oncology (ASCO) was running a clinical trial in mid-2016 called TAPUR that offers cancer patients a genetic test and then selects drugs that appear to be a good match, even if that drug was developed to treat a different kind of malignancy. In a similar vein, the U.S. National Cancer Institute has a trial named MATCH which sends tumor biopsies to gene-testing laboratories to scan for more than 4,000 possible variants of 143 pertinent genes.

Updated 08-07-2017

Gene Therapies Target Defective Genes/CRISPR Advances DNA Editing

A major goal of DNA research and the sequencing of the genetic profiles of patients is to attack, and attempt to alter, specific defective genes within the patient. This practice is known as gene therapy, a strategy that targets defective genes (mutations) within a patient by introducing new copies of normal genes. These new, normal genes may be introduced through the use of viruses or proteins that carry them into the patient's body.

Internet Research Tip: Gene Therapies

A "gene therapy" is based on first identifying the fact that a patient has a specific gene mutation related to a specific disease, followed by the introduction of healthy genes into the patient's body with the goal of altering or replacing the defective genes. This is the Holy Grail of the biotechnology industry, as it offers the potential to cure otherwise incurable diseases. It has also proven to be extremely difficult to carry out without significant side effects. The American Society of Gene & Cell Therapy, www.asgct.org , publishes extremely useful data for those researching the promise and current status of gene therapies. Their online tools include data on clinical trials, a glossary and a list of "breakthroughs." The group also publishes an extremely useful newsletter.

A major commercial hurdle was passed in late 2012, when the European Medicines Agency (EMA) approved a gene therapy to treat a rare lipoprotein lipase (LPL) deficiency. The therapy, called Glybera, developed by Dutch biotech company uniQure, was the first approved gene therapy drug in the Western world. One of the biggest concerns with the use of gene therapies is potential side effects. Glybera so far appears to help patients who have specific mutations in the LPL gene, without complications from side effects. However patients may be required to take immunosuppressive drugs in order to use Glybera, and those drugs may cause side effects.

Glybera was commercially launched in Europe by uniQure and pharma company Chiesi Farmaceutici in early 2015. Unfortunately, the cost for the drug is $1.4 million for a full course of treatment, and only one patient has been treated with it. uniQure has since dropped plans for U.S. approval and announced that it will not pursue the renewal of the drug's marketing authorization in Europe when it expires in 2017. uniQure had one other gene therapy (a treatment for Hemophilia B) in clinical trials as of mid-2017, and four others in the pipeline. These include treatments for Huntington's Disease and congestive heart failure.

Numerous applications of gene therapy are in research in the U.S. and elsewhere for treatment of a wide variety of diseases. For example, gene therapy may be highly effective in the treatment of rare immune system disorders, melanoma and cystic fibrosis. In February 2015, Voyager Therapeutics and Genzyme Corp. (a unit of Sanofi) announced an $845 million collaboration to discover, develop and commercialize gene therapy treatments for central nervous system disorders such as Parkinson's disease and Huntingdon's disease. By mid-2017, Spark Therapeutics had a gene therapy for inherited retinal disease (which affects an estimated 3,500 people in the U.S. and five European countries) called LUXTURNA, that had completed Phase III/IV clinical studies, and was accepted for filing a Biologics License Application with the FDA.

Another breakthrough in gene therapy is CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats). The technology focuses on the use of a DNA-cutting protein that is guided by an RNA molecule, targeted at a specific gene. This technology enables a scientist to quickly and easily edit or re-engineer specific bits of DNA. A defective gene can be precisely edited within the laboratory, and then reintroduced to a patient's body as a form of gene therapy with far more accuracy than previous gene therapies. CRISPR is sometimes referred to as "genetic editing," and it is considered to be a very significant breakthrough. Practical applications may include treatments or even cures for sickle-cell anemia, HIV and cystic fibrosis. Libraries of CRISPRs have been created by researchers at MIT that account for nearly all human genes.

First demonstrated in 2012, CRISPR technologies were being used in therapies in early clinical trials for the treatment of certain cancers starting in 2016 in the U.S. and China. Tests in mice have successfully cured HIV and hemophilia. Pigs are being engineered to have organs suitable for use in humans, and Microsoft cofounder Bill Gates is investing $75 million to study the annihilation of a species of mosquito that spreads malaria using CRISPR.

CRISPR startups include Intellia Therapeutics (www.intelliatx.com), Editas Medicine (www.editasmedicine.com) and CRISPR Therapeutics (www.crisprtx.com). The recent success of gene therapies is helping to fuel a global surge in biotech investment, including venture capital, partnerships and outright acquisitions of promising biotech companies.

Updated 08-07-2017

Vaccines and Viruses in Drug Delivery

Viruses: Yet another weapon for the war on cancer is a growing assortment of viruses that replicate in tumors and thereby kill them, while sparing healthy tissue. Viruses are also being developed with the ability to carry a gene into a cancer, which makes the tumor more vulnerable to radiation and chemotherapy. This new method will also lessen the side effects associated with conventional treatments.

Onyx Pharmaceuticals and the former Calydon (now part of Cell Genesys) pioneered the modern application of viruses to cancer cells, using variants of the adenovirus (the cause of the common cold) to attack tumors. Research continues at various biotechnology companies and institutions such as Johns Hopkins. One of the most prevalent techniques is engineering the viruses to attack cells with certain active proteins or enzymes. For example, a virus that attacks cells with excessive amounts of melanin (the protein that makes cells darken) could be used for the destruction of melanoma cancer cells.

In 2014, the Ludwig Cancer Research center described the results of a study in which a virus from birds (the Newcastle disease virus which normally does not affect humans) was injected directly into melanoma tumors that had been implanted in mice. Next, scientists injected an antibody that encourages immune system to react to the melanoma. This combination of virus and antibody therapy created an immune system response that was so powerful that the melanoma tumors were destroyed. The same research has shown significant promise for attacking colorectal and prostate tumors. Meanwhile, Amgen received approval from the FDA for its talimogene laherparepvec (T-VEC) melanoma treatment in October 2015, based on a virus, the first oncolytic virus therapy to gain approval in the U.S.

Vaccines: Vaccines cannot prevent cancer, but they can help fight it. Vaccines that are used to fight existing cancers are called therapeutic vaccines. (Vaccines that prevent disease are known as prophylactic vaccines.) The basic principal is to teach the immune system to identify tumors as an enemy and help fight them. For the most part, this is done by introducing an altered, harmless form of the cancer into the patient, much like a classic vaccine. As techniques have been refined, scientists have been able to find the specific proteins that have proven to be the most effective in educating the body to fight cancer.

Pharmaceutical companies and universities around the world are developing dozens of vaccines. These vaccines target the most common types of cancer including melanoma, kidney, lung and breast cancer. They have proven effective enough to send the cancers into remission or, at the very least, slow the spread of the cancer. One woman with late-stage melanoma experienced a remission of the cancer for 32 months after being treated with an early vaccine. Although not all of the vaccines have proven so effective, the prospects are certainly remarkable; many have even reached late-stage human trials. Many of

these vaccines have been in clinical trials for the treatment of kidney, prostate and colorectal cancer, as well as metastatic melanoma. Unfortunately, most clinical trial results have been disappointing.

An exception is vaccines developed by Dendreon for the treatment of prostate, breast, ovarian and colon cancer vaccines. The company's prostate cancer drug, Provenge, was released in 2010.

Biopharma companies are working on vaccines to carry specific proteins that can stimulate the human immune system to have a desired response to an infectious disease. For example, biotech vaccines that fight hepatitis B have been introduced. Vaccines are under development at various firms for such conditions as herpes and tuberculosis.

Chimeric Antigen Receptor Cells: In this therapy for leukemia, doctors remove millions of white blood cells called T-cells from the patient and insert new genes that enable the cells to fight the malignancy. A disabled form of HIV is used in the process because the virus quickly and easily carries the inserted genetic material into the T-cells, which are reprogrammed to attack the cancerous cells. The altered T-cells, called chimeric antigen receptor cells, are put back in the patient's bloodstream via an intravenous drip. The treatment sparks a violent reaction including extremely high fevers and chills, but has been successful in achieving lasting remission in a number of patients, including a six-year old girl in Pennsylvania in 2012.

Updated 09-29-2017

New Blockbuster Drugs Come to Market/Drug Prices Soar

Drug spending in the U.S. reached $342.1 billion in 2016, up from $328.4 billion in 2015, according to the Centers for Medicare & Medicaid Services (CMS). Median drug prices rose 8.9% in 2016, far above the U.S. inflation rate of 2%, according to Raymond James & Associates. Consumers' voracious need for drugs will continue to soar, thanks in part to the rapidly aging populations of such nations as the U.S., most of Europe and much of Asia, including Japan and China, and also due to the continuing introduction of new drugs. In coming years, taming pharmaceutical costs will be one of the biggest challenges facing the health care system. Prescription drug costs already account for about 10% of all health care expenditures in the U.S. Managed care must be able to determine which promising new drugs can deliver meaningful clinical benefits proportionate to their costs.

Following a brief period in recent years when a number of extremely lucrative "blockbuster" drugs such as the cholesterol therapy Lipitor went off patent and thus opened the door for exploding sales of generic equivalents, several highly effective and extremely expensive new drugs began to hit the market.

Part of the reason that many new drugs command astronomical prices is the total expense and level of risk that drug companies incur in order to develop medicines, including the investment in drugs that fail to be effective or win regulatory approval, and therefore never make it to market, despite massive investments in research and testing.

Extraordinarily high new drug prices are causing backlash, and attempts are being made to limit pharmaceutical costs. With regard to cancer drugs, for example, the American Society of Clinical Oncology released a "value framework" in 2015. Points are awarded to drugs based on their effectiveness, possible side effects and costs, not only from the patient's point of view, but also the overall cost of the drug to the health system. Roche's Avastin, for example, received a low 16 out of 130 possible points as a lung cancer treatment, largely because its monthly cost was $11,907.87, compared to $182.09 for using chemotherapy as an alternative.

A growing trend has created a new category for blockbuster drugs based on vanity, convenience or personal choices. Historically, pharmaceutical research was focused primarily on curing life-threatening or severely debilitating illnesses. But a segment of drugs, commonly referred to as "lifestyle" drugs, is transforming the pharmaceutical industry. Lifestyle drugs target a variety of human conditions, ranging from the painful to the inconvenient, including obesity, impotence, memory loss, urinary urgency and depression. Drug companies also continue to develop lifestyle treatments for hair loss and skin wrinkles in an effort to capture their share of the huge anti-aging market aimed at older generations. The use of lifestyle drugs dramatically increases the total annual consumer intake of pharmaceuticals, and creates a great deal of controversy over which drugs should be covered by managed care and which should be paid for by the consumer alone.

Factors leading to high expenditures in the American health care system:

70+ million surviving Baby Boomers are beginning to enter their senior years. The lifespan of Americans is increasing, and chronic illnesses are increasing as the population ages.

Obesity-related illnesses, for patients young and old, are estimated by Plunkett Research to cost as much as $200 billion yearly.

Fraud, abuse and billing errors in the Medicare and Medicaid system cost an estimated $100 billion yearly. Fraud and billing abuse throughout the rest of the health care system could easily cost another $150 billion+ yearly.

Malpractice insurance, lawsuits and "defensive" treatment practices intended to limit exposure to lawsuits add billions of dollars to overall health care costs each year.

Drug prices and total drug expenditures are soaring. Breakthroughs in research and development are creating significant new drug therapies, allowing a wide range of popular, but sometimes extraordinarily expensive, treatments that were not previously available.

The hospital and clinic industry has merged and consolidated to the extent that major metro markets across the U.S. are often served by only two or three very large health care companies. This limits competition and gives these few companies the ability to command high prices.

A rapid expansion of government-funded health care, particularly through the Affordable Care Act (ACA), has driven demand and expenses while doing very little to lower costs or prices.

"Lifestyle" drug use is high, as shown by the popularity of such drugs as Viagra (for the treatment of sexual dysfunction), Propecia (for the treatment of male baldness) and Botox (for the treatment of facial wrinkles). Such drugs are often quite expensive.

Source: Plunkett Research, Ltd.

It is clear that the largest pharma companies, such as Pfizer, invest vast sums in their efforts to develop new drugs, and the number of drugs they finally commercialize as a result is very small. Smaller drug firms that are more focused on a particular type of disease or therapy are likely to spend less, as are firms based in lower-cost nations. Exorbitantly high prices paid in the U.S. foot the bill for much of global drug development, marketing and profits, to the benefit of billions of patients worldwide.

Updated 09-29-2017

Generic Drugs Have Biggest Market Share by Unit Volume, but not by Total Revenues

U.S. patent policy grants drug manufacturers the normal 20 years' protection from the date of the original patent (which is most likely filed very early in the research process), plus a period of 14 years after FDA approval. Once the patent on an existing drug expires, competing drug companies may be allowed to market cheaper generic versions which are nearly-identical chemical compounds. (However, the FDA must approve the generic version, which may require several years of effort and a substantial financial investment on the part of the generic manufacturer.) Generic prescriptions as a percentage of all U.S. pharmaceutical sales rose from 49% by volume in 2000 to 91% in 2015 (but accounted for a significantly lower percentage of total drug expenditures), according to PhRMA. Some drugs sell in such low volume that they aren't taken up by generic manufacturers even though they have gone off-patent.

Retailers including Wal-Mart, Target, Walgreens, Kmart and Publix offer a large number of generic drugs for a flat monthly fee. As of 2016, Wal-Mart offered 90-day supplies of hundreds of generic drugs for $10 each in an effort to undercut mail-order pharmacy businesses.

Some major drug companies are trying to get in on the generic business by quietly creating their own generic drug subsidiaries. Pfizer, for example, has a division called Greenstone, LLC, which produces generic versions of its blockbuster drugs including Zoloft, an antidepressant that brought in upwards of $2 billion in 2006 sales, at which time its patent expired.

There's a wild card where generic drugs are concerned that has some doctors and patients wary of choosing generics over brand-name drugs. The FDA has a broad definition of bioequivalence, stating that a generic's maximum concentration of active ingredient in the blood must not fall more than 20% below or 25% above that of the brand-name equivalent. The result is a significant potential difference to the original, brand name drug. Also, while the generic must contain the same active ingredient as the original, additional ingredients (called "excipients") can be different and may be of lower quality in a generic. Concern is greatest over generic versions of "narrow therapeutic index drugs" which require precise dosing because even minor variations can cause life threatening complications. In 2012, the FDA's advisory committee for pharmaceutical science and clinical pharmacology voted to support the tightening of bioequivalence standards for these narrow therapeutic drugs. In addition, the U.S. Congress passed the Generic Drug User Fee Amendments of 2012, which calls for generic drug manufacturers to pay the FDA $299 million annually to beef up inspections of generic manufacturing plants abroad and speed up the review and approval of generic drug applications at home.

Updated 09-29-2017

Coupons and Other Marketing Schemes Obscure the Retail Prices of Drugs in the U.S., Which Are Vastly Higher than Prices Paid in Other Nations

Among all the world's nations, the U.S. is in a unique and painfully costly conundrum regarding the retail prices paid for drugs. American universities and corporations discover, test and produce a vast supply of innovative drugs each year. However, while U.S. taxpayers and patients support much of this vital research (through R&D tax credits, cash donations to encourage research and hundreds of billions of dollars in yearly drug purchases), much of the financial benefit (in terms of extremely low drug prices) is passed along to patients everywhere in the world outside of America. Meanwhile patients and payers in the U.S. bear astonishingly high prices, often 10-times the price paid in other nations. Americans spend 44% more on drugs per person than Canadians, the next highest country on the list.

Mail-Order, Discount Drugs, From Canada to a Pacific Island, to U.S. Patients at One-Fifth the Price

Even in generic drugs, which make up most of the volume of drugs sold in America, prices can be dramatically higher in the U.S. than elsewhere. A good example is Tadalafil, the generic version of prostate health and erectile function drug Cialis (developed by GlaxoSmithKline, but developed by Icos Corporation in Washington State in the U.S.) A 2016 search showed typical retail prices at major U.S. stores such as Walgreens of about $300 for a 30-day supply of 5 mg tablets.

At the same time, Canadian online pharmacies typically offered a price of about $60. (It is legal for U.S. patients to order from Canadian pharmacies with a valid doctor's prescription.) The supply chain might go like this: The American patient sends his prescription to Canada. Canada processes the order, and in order to achieve the lowest possible cost, has a pharmacy in the Indian Ocean nation of Mauritius mail the drug to America after obtaining it at wholesale from a manufacturer in India. The total price is about $70 with shipping. An example in higher priced drugs is Nilutamide, used for cancer patients. A 2016 search showed retail prices as high as $6,500 for a 30-day supply of 150 mg tablets at retail American pharmacies. Americans can order the drug from Canadian pharmacies for a typical cost of $332. In one supply chain, pharmaceutical giant Sanofi Aventis makes the drug in its plant in Australia, which supplies it to a pharmacy in the South Pacific island kingdom of Vanuatu, which mails it directly to the U.S. patient.

U.S. government regulations do not regulate drug prices (in most other nations they are highly regulated), and they prohibit Medicare from negotiating drug prices. (The Veterans Affairs Administration and Medicaid may do so, but they still end up paying vastly higher prices than those paid elsewhere). Agents for U.S. health insurers negotiate modest discounts on prices, but final prices remain extremely high and the discounts are not necessarily passed along to patients.

In Germany, pricing rules came into effect in 2010 under which any new drug must prove that it has greater efficacy or more benefits than rival medications in order to be priced at a higher level than the rival. In 2014, Germany went even further, announcing plans to publish the discounts agreed to by drug makers. This transparency might be used by payers outside of Germany to drive down prices in other countries.

Norway, which sets maximum drug prices that can be charged within its borders, uses a QALY gauge which describes a drug's cost per quality-adjusted life year. The same system has been adopted by other government health systems to set thresholds for determining coverage, including the National Institute for Health and Care Excellence (NICE) in Great Britain. Should a drug company refuse to lower prices to what Norway deems acceptable, then Norway refuses to cover the drug at all. A number of drug companies have been willing to cut prices in order to market their products in Norway and other countries with government-controlled health care systems.

Of course, there is the widely-publicized scandal wherein drug maker Mylan jacked up the price for its EpiPen epinephrine injection system repeatedly, so that by 2016 it cost $600 for a two-pack, up from only $93.80 in 2007. Meanwhile a similar device (not an exact duplicate, but an effective design) can be purchased in other nations for as little as $30, and American allergy doctors are known to fill syringes with epinephrine for patients to take home in case of emergency at a cost of about $5. This drug is a critical safety measure for millions of Americans who have serious allergies, including food allergies. A true

generic version of the EpiPen was very slow to come to market, and was finally launched in late 2016.

While retail prices for many non-generic drugs have become astronomical in America (prices of $100,000+ yearly for new cancer drugs are becoming common), the final pricing has become convoluted and confusing as many drug makers attempt to encourage drug purchases using non-traditional methods such as coupons. The high prices may not only boost drug firms' profits, but also generate larger fees for pharmacy benefits management firms. These are companies that negotiate with drug companies over prices, acting as agents for private health care insurers that are clients. The benefits management companies earn gross fees based on a percentage of the retail drug price, then pass any discount on to the insurance companies after deducting their fees. The higher the retail price, the higher the managers' fees. Patients do not always see benefits from these discounts. For example, a patient who has not yet met his yearly insurance deductible threshold may end up paying a full drug retail price out-of-pocket, while the discount nonetheless gets passed along to the insurer. Another issue is the lists (called formularies) of drugs that are approved by various insurers. In many cases, a doctor will prescribe a drug with recent innovations and advantages, although there may be lower-cost alternatives on the market. The insurer refuses to cover the newer drug, so if the patient desires the drug he must pay full retail out-of-pocket.

Drug makers are attempting to help circumvent high deductibles or high co-pays by offering discount coupons to the patient. The coupons are often available online and in magazines. They are also handed out by doctors in an effort to ease patients' financial pain, even though the doctors may strongly disapprove of the drug makers' pricing and marketing schemes. For example, in late 2016 the maker of the EpiPen was offering a coupon that can "be used to reduce the amount of your out-of-pocket expense of up to a maximum of $300 per EpiPen 2-Pak." This scheme may work well in eliminating the effect of the co-pay for privately insured patients. However, this coupon, similar to those of other firms, cannot be used by patients in any federal or state-funded plan, including Medicare, Medicaid, VA/TriCare, or "if the patient's insurance plan is paying the entire cost of this prescription." In other words, if the money can be pried out of the government or an insurer, then the discount doesn't apply. Worse still, it doesn't work at all for uninsured patients. Total yearly drug expenditures have been soaring. The total cost will get much worse as more and more Baby Boomers hit their senior years. There can be little change without government action.

Updated 09-29-2017

Biotech and Orphan Drugs Create New Revenues for Drug Firms

Many biotech companies have focused on developing drugs for relatively small patient populations. For example, biotech pioneers Genentech and Biogen Idec developed Rituxan for the treatment of non-Hodgkin's lymphoma, an important but relatively small market.

Drugs such as Rituxan are commonly referred to as "orphan drugs," which means that they treat illnesses that no other drug on the market addresses, which are needed by relatively small patient populations. Technically, a drug designated by the FDA with orphan status provides therapeutic benefit for a disease or condition that affects less than 200,000 people in the U.S. These drugs enjoy a unique status due to the Orphan Drug Act of 1983, which gives pharmaceutical companies a seven-year monopoly on the drug without having to file for patent protection, plus a 50% tax credit for research and development costs. Analysts at global accounting firm EY estimate global biotech industry revenues for U.S. and EU companies at $139.4 billion in 2016, up from $132.7 billion in 2015 and $123.1 billion in 2014.

Orphan drugs, however, receive expedited approval from the FDA, greatly reducing the costs of clinical trials. Long-term profit is also more likely for orphans. While brand-name drugs lose 80% of their market value within one year of patent expiration, biotech and orphan drugs face less generic competition because of the difficulty in developing generic versions once they go off-patent.

The number of new drugs approved by the U.S. FDA in 2016 was 22, of which nine were orphan drugs. Orphan drugs approved during 2016 were the first-ever treatments for the rare diseases Spinal Muscular Atrophy (SMA), Duchenne Muscular Dystrophy (DMD), and severe hepatic veno-occlusive disease (VOD).

Commentary: The Challenges Facing the Biopharmaceuticals Industry

Working with governments to develop methods to safely and effectively speed approval of new drugs. Many observers contend that FDA approval is much too slow and cumbersome.

Working with the investment community to build confidence and foster patience for the lengthy timeframe required for commercialization of promising new drugs.

Working with civic, government, religious and academic leaders to deal with ethical questions centered on stem cells, personalized medicine and other new technologies.

A growing level of discontent with soaring drug prices.

Fostering payer acceptance, diagnostic practices and physician practices that will harness the full potential of genetically targeted, personalized medicine as the base of potentially expensive but highly effective biopharmaceuticals grows.

Source: Plunkett Research, Ltd.

Updated 08-07-2017

Biosimilars (Generic Biotech Drugs) Receive FDA Guidelines for Accelerated Aproval/Competition Will Be Fierce

The Biologics Price Competition and Innovation Act of 2009 provided FDA guidelines for generic biotech drugs, which are called "biosimilars" or "follow-on biologics." The Act establishes standards for FDA approval of biosimilars and details ways of handling patent disputes. The Act also grants 12 years of intellectual property protection to biologic drugs, which would significantly extend the life of branded biotech-based drugs. This exclusivity would protect the original maker of a biologic, because a generic competitor would not be able to utilize data from the clinical trials conducted by the original maker until the 12 years had passed and the original patent had also expired.

In February 2012, the FDA published guidelines that promised to speed the entry to the marketplace for generic versions of popular biotech drugs as they reach the end of their patent protection. Companies desiring to receive FDA approval to manufacture biosimilars now have a list of steps they must take. Most important to the speedy introduction of these generics is the fact that manufacturers are now allowed to rely to a large extent on the original clinical trials that

were conducted by the manufacturers of the original drugs, despite the fact that the generics will likely be slightly different in biological makeup. Thanks to the guidelines, the FDA approved its first biosimilar in May 2015. Called Zarxio and produced by Sandoz International GmbH, the drug is a copy of Amgen Inc.'s Neupogen for the prevention of infections in patients receiving chemotherapy. However, Amgen immediately launched an extensive legal battle in an attempt to keep the generic off the market.

Biosimilars will have dramatic effects on the biopharmaceutical industry, as competition will ensue and generics will eventually force prices down. A large number of important biotech drugs will lose patent protection by 2020.

Because biotech drugs ("biologics") are made from living cells, a generic version of a drug may not be biochemically identical to the original branded version of the drug. In fact, it is likely that it won't be exactly identical. Therefore, they are described as "follow-on biologics" to set them apart. There are concerns that follow-on biologics may not be as safe or effective as the originals.

In addition, the development of generic versions of biologics is very costly. Industry analysts estimate that initial generic development for one compound runs between $100 million and $150 million, compared to $5 million to $10 million for non-biologic generic drugs.

In the European Union, the first biosimilars were approved in April 2006 by the EMA (European Medicines Agency), the regulatory body responsible for new drugs. The first approved biosimilar was Omnitrope, a generic substitute for growth hormone Genotropin. The second was Valtropin.

In 2013, inVentive Health and Oncobiologics announced a joint venture to develop biosimilars of some of the best-selling biotech drugs. Popular drugs they might target include Humira, Rituxan, Avastin, Herceptin and Erbitux. The venture received approval in The Netherlands to begin a Phase I trial for a copy of Humira in mid-2014. In a 2016 study of 500 patients, a biosimilar developed by Mylan Pharmaceuticals called Myl-14010 was shown to be essentially equivalent to Herceptin.

In late 2013, California governor Jerry Brown vetoed a bill that might have limited the use of less expensive biosimilars. The proposed law restricted pharmacists' ability to dispense biosimilars and required that pharmacists inform doctors and patients that substitutions had been made. The veto was a win for insurers and generic drug makers.

India-based Dr. Reddy's Laboratories, one of the nation's leading drug firms, is already manufacturing a few biogenerics in India, including versions of Roche's Rituxan and Amgen's Neupogen. Other Indian drug manufacturers, including Reliance Life Sciences, are also marketing biogenerics. Ranbaxy began marketing biogenerics in India as early as 2003. In 2008, Reliance Life Sciences launched three biosimilars (ReliPoietin, ReliFeron and ReliGrast) for sale in South Asia, South East Asia and several countries in Latin America. This was followed by a fourth (TPA Reteplase) in 2009, and plans for another three products over the near term. By 2016, the company had several biosimilars in India and overseas.

By early 2015, there were 19 biosimilars approved for the market in the EU. European guidelines for approval of biosimilars include:

1. Comparability studies. The proof or lack of proof of comparability to the original drug will dictate how many new clinical studies may be required.
2. Clinical studies to prove the biosimilar's safety and efficacy.
3. Nonclinical studies.
4. Continuing safety and efficacy study commitments after the biosimilar is approved and brought to market.

In June 2017, the U.S. Supreme Court ruled to allow biosimilars to come to market more quickly. In the case, the court overturned another court's ruling in which Novartis subsidiary Sandoz was required to wait 180 days after the FDA approval of the Amgen cancer drug called Neupogen, before it could sell its biosimilar Zarxio. The case sets a new precedent that will significantly shorten the timeline for new biosimilars to reach the market.

Updated 09-29-2017

Stem Cells—Multiple Sources Stem from New Technologies

During the 1980s, a biologist at Stanford University, Irving L. Weissman, was the first to isolate the stem cell that builds human blood (the mammalian hematopoietic cell). Later, Weissman isolated a stem cell in a laboratory mouse and went on to co-found SysTemix, Inc. (now part of drug giant Novartis) and StemCells, Inc. to continue this work in a commercial manner.

In November 1998, two different university-based groups of researchers announced that they had accomplished the first isolation and characterization of the human embryonic stem cell (HESC). One group was led by James A. Thomson at the University of Wisconsin at Madison. The second was led by John D. Gearhart at the Johns Hopkins University School of Medicine at Baltimore. The HESC is among the most versatile basic building blocks in the human body. Embryos, when first conceived, begin creating small numbers of HESCs, and these cells eventually differentiate and develop into the more than 200 cell types that make up the distinct tissues and organs of the human body. If scientists can reproduce and then guide the development of these basic HESCs, then they could theoretically grow replacement organs and tissues in the laboratory—even such complicated tissue as brain cells or heart cells.

Ethical and regulatory difficulties arose from the fact that the only source for human "embryonic" stem cells was, as per the name, human embryos. A laboratory can obtain these cells in one of three ways: 1) inserting a patient's DNA into an egg, thus producing a blastocyst that is a clone of the patient—which is then destroyed after only a few days of development; 2) harvesting stem cells from aborted fetuses; or 3) harvesting stem cells from embryos that are left over and unused after an in vitro fertilization of a hopeful mother. (Artificial in vitro fertilization requires the creation of a large number of test tube embryos per instance, but only one of these embryos is used in the final process.)

A rich source of similar but "non-embryonic" stem cells is bone marrow. Doctors have been performing bone marrow transplants in humans for decades. This procedure essentially harnesses the healing power of stem cells, which proliferate to create healthy new blood cells in the recipient. Several other non-embryonic stem cell sources have great promise.

Fortunately, tremendous strides have been made in harvesting stem cells through non-embryonic means. Scientists have discovered that there are stem cells in existence in many diverse places in the adult human body, and they are thus succeeding in creating stem cells without embryos, by utilizing "post-embryonic" cells, such as cells from marrow. Such cells are already showing the ability to differentiate and function in animal and human recipients. Best of all, these types of stem cells may not be plagued by problems found in the use of HESCs, such as the tendency for HESCs to form tumors when they develop into differentiated cells.

Methods of developing "post-embryonic" stem cells without the use of human embryos:

Adult Skin Cells—Exposure of harvested adult skin cells to viruses that carry specific genes, capable of reprogramming the skin cells so that they act as stem cells.

Parthenogenesis—manipulation of unfertilized eggs.

Other Adult Cells—Harvesting adult stem cells from bone marrow or brain tissue.
Other Cells—harvesting of stem cells from human umbilical cords, placentas or other cells.
De-Differentiation—use of the nucleus of an existing cell, such as a skin cell, that is altered by an egg that has had its own nucleus removed.
Transdifferentiation—making a skin cell de-differentiate back to its primordial state so that it can then morph into a useable organ cell, such as heart tissue.
Pluripotent state cells (iPSCs). Adult cells are drawn from a skin biopsy and treated with reprogramming factors.
Most recently, researchers have found it possible to harvest stem cells from a wide variety of tissue.

INDUSTRY STATISTICS

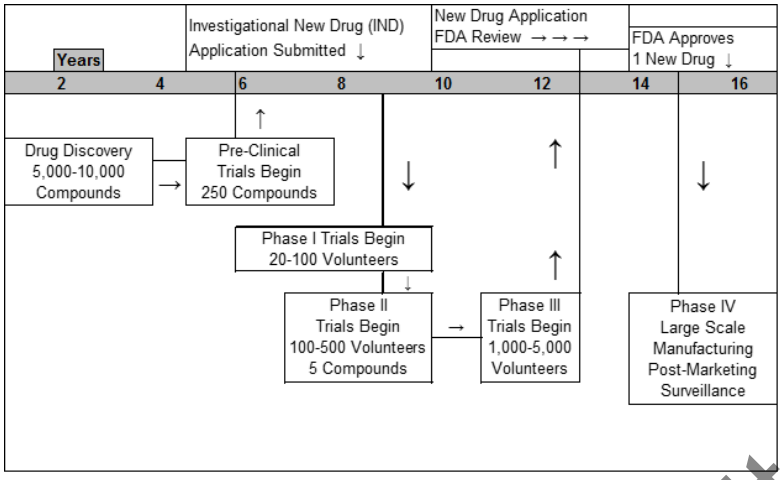
Biotech Industry Statistics and Market Size Overview

Global	Amount	Units	Year	Source
Public Biotech Companies (US and EU)	708	Companies	2016	E&Y
Biotech Revenues (US and EU)	139.4	Bil. US$	2016	E&Y
Total Pharmaceutical Sales, Worldwide	1.1	Tril. US$	2016	IMS
Total Pharmaceutical Sales, Worldwide Forecast	1.5	Tril. US$	2021	IMS
Total R&D Expenses, PhRMA Member Companies (Estimated)	58.8	Bil. US$	2015	PhRMA
Area of Biotech Crops	185.1	Mil. Hectares	2016	ISAAA
U.S.				
Public Biotech Companies	449	Companies	2016	E&Y
Revenues	112.2	Bil. US$	2016	E&Y
Area of Biotech Crops	72.9	Mil. Hectares	2016	ISAAA
Prescription Drug Spending (invoiced prices, before discounts)	450.0	Bil. US$	2016	IMS
Number of FDA Approvals for New Drug Applications (NDAs) and Biologic License Applications (BLAs), including Generics	101	Approvals	2016	FDA
Number of Approvals for New Drugs (NMEs and BLAs)	22	Approvals	2016	FDA
Patents Granted for "Multicellular Living Organisms & Unmodified Parts Thereof & Related Processes"	17,498	Patents	2015	USPTO
Total Requested Budget, National Institutes of Health (NIH)	26.9	Bil. US$	2018	NIH
Total Requested Budget for Biological Science Research, U.S. (NSF)	672.1	Mil. US$	2018	NSF
Mean Annual Salary for Biochemists & Biophysicists	94,340	US$	May-16	BLS
Employment of Biochemists and Biophysicists	29,200	Employees	May-16	BLS
Average Cost of Developing a Biologic Drug (in 2013 dollars)	2.6	Bil. US$	2016	PhRMA
Average Time to Develop a New Drug	10-15	Years	2016	PhRMA
PhRMA[1] Member Statistics				
Pharmaceutical Sales, Domestic	189.8	Bil. US$	2015	PhRMA
% Generic (by volume)	91.0	%	2015	PhRMA
Pharmaceutical Sales, Foreign[2]	106.6	Bil. US$	2015	PhRMA
Pharmaceutical R&D Spending, Domestic	47.1	Bil. US$	2015	PhRMA
as a Percentage of Domestic Sales	24.8	%	2015	PhRMA
Share of R&D Spending by Function:				
Prehuman/Preclinical	21.2	%	2014	PhRMA
Phase I	8.9	%	2014	PhRMA
Phase II	10.7	%	2014	PhRMA
Phase III	28.7	%	2014	PhRMA
Approval	5.1	%	2014	PhRMA
Phase IV	16.6	%	2014	PhRMA
Uncategorized	8.9	%	2014	PhRMA

[1] PhRMA = Pharmaceutical Research and Manufacturers Association, a group of leading pharmaceutical and biotechnology companies headquartered in the U.S. [2] Not including foreign divisions of foreign companies.

E&Y = Ernst & Young; IMS = IMS Health; PRE = Plunkett Research Estimate; ISAAA = International Service for the Acquisition of Agri-Biotech Applications; FDA = U.S. Food & Drug Administration; USPTO = U.S. Patent & Trademark Office; NSF = U.S. National Science Foundation; BLS = U.S. Bureau of Labor Statistics.

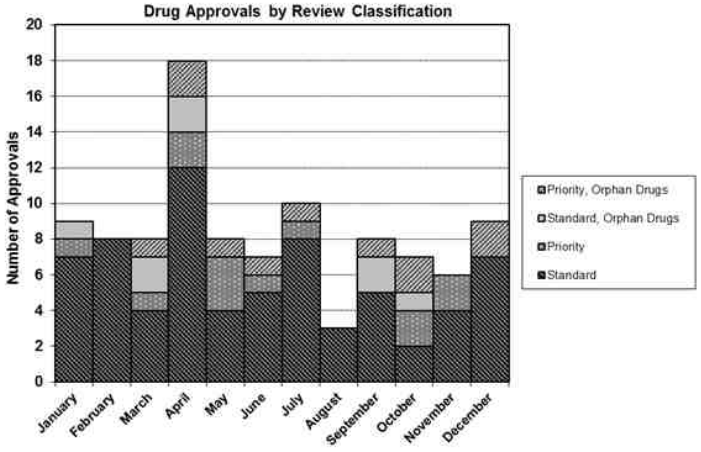
The U.S. Drug Discovery & Approval Process



Note: From drug discovery through FDA approval, developing a new medicine on average takes at least 10-15 years and costs $2.6 billion (in 2013 dollars). Less than 12% of the candidate medicines that make it into phase I clinical trials will be approved by the FDA.

Source: Pharmaceutical Research and Manufacturers Association (PhRMA)

U.S. FDA New Drug (NDA) and Biologic (BLA) Approvals, 2016



	January	February	March	April	May	June
Standard	7	8	4	12	4	5
Priority	1	0	1	2	3	1
Standard (Orphan)	1	0	2	2	0	0
Priority (Orphan)	0	0	1	2	1	1

	July	August	September	October	November	December
Standard	8	3	5	2	4	7
Priority	1	0	0	2	2	0
Standard (Orphan)	0	0	2	1	0	0
Priority (Orphan)	1	0	1	2	0	2

Notes: Priority Review classifies drugs that are a significant improvement compared to marketed products, in the treatment, diagnosis, or prevention of a disease. Standard Review classifies drugs that do not qualify for priority review. Orphan Designation is assigned to drugs pursuant to Section 526 of the Orphan Drug Act (Public Law 97-414 as amended). Data refers to CDER's approvals of New Drug Applications (NDAs) and Biologic License Applications (BLAs).

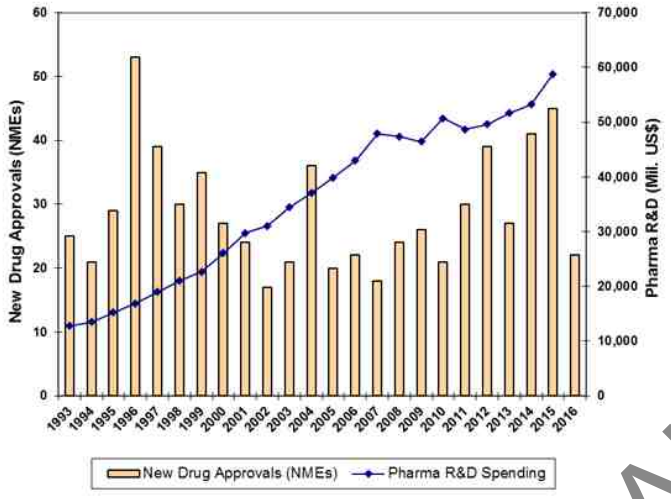
An NDA is an application requesting FDA approval, after completion of the all-important Phase III Clinical Trials, to market a new drug for human use in the U.S. The drug may contain chemical compounds that were previously approved by the FDA as distinct molecular entities suitable for use in drug trials (NMEs). Generally, more NDAs are approved yearly than NMEs. A "biologic" is a drug developed through bioengineering of a living organism (biotechnology). The approval to market a new biologic is obtained under a "BLA" or Biologics License Application.

Source: U.S. Food & Drug Administration (FDA)

Plunkett Research, Ltd.

www.plunkettresearch.com

U.S. Pharmaceutical R&D Spending Versus the Number of New Molecular Entity (NME) Approvals: 1993-2016



* Beginning in 2004, these figures include new BLAs for therapeutic biologic products transferred from CBER to CDER.

Notes: The FDA defines a New Molecular Entity (NME) as a medication containing an active substance that has never before been approved for marketing in any form in the U.S. Pharmaceutical R&D Spending includes expenditures inside and outside the U.S. by U.S.-owned PhRMA member companies and R&D conducted inside and outside the U.S. by the U.S. divisions of foreign-owned PhRMA member companies. R&D performed by the foreign divisions of foreign-owned PhRMA member companies is excluded.

Source: Pharmaceutical Research and Manufacturers Association (PhRMA); U.S. Food and Drug Administration

Plunkett Research, ® Ltd.

www.plunkettresearch.com

U.S. Exports & Imports of Pharmaceutical Products:
2012-1st Quarter 2018

(In Thousands of US$)

Exports

Partner	2012	2013	2014	2015	2016	2017	1Q 2017	1Q 2018
World Total	**40,129,283**	**39,707,839**	**44,029,853**	**47,094,047**	**46,830,921**	**44,935,704**	**11,148,730**	**11,645,880**
Belgium	3,219,174	4,067,377	5,534,852	6,465,697	5,487,367	3,780,630	801,842	994,195
Netherlands	2,920,466	3,380,673	4,096,009	4,225,975	4,138,259	3,689,064	959,667	1,160,392
Japan	3,903,673	3,278,463	3,530,065	3,481,414	3,841,034	3,658,604	987,128	1,017,197
Canada	4,141,815	3,851,252	4,055,071	3,818,228	3,768,865	3,635,663	925,072	978,741
Ireland	1,185,386	1,362,998	1,753,428	2,279,708	2,117,743	3,361,923	430,977	814,390
United Kingdom	3,888,410	2,400,963	2,659,260	3,714,591	3,665,654	3,126,436	953,713	740,434
Italy	1,826,448	1,787,308	1,818,221	2,526,418	3,811,158	3,095,472	1,061,476	657,383
Germany	2,558,080	2,189,200	2,431,022	2,299,752	2,855,492	3,068,413	684,991	816,292
China	1,066,894	1,219,912	1,597,349	1,848,601	2,001,157	2,448,914	493,253	598,820
Switzerland	1,688,108	2,074,556	2,277,195	2,094,028	2,087,003	1,989,512	521,304	585,139
Spain	1,845,853	2,078,590	1,782,764	2,192,101	1,715,813	1,720,941	489,608	482,696
Mexico	1,636,726	1,470,895	1,612,930	1,587,576	1,458,199	1,314,110	343,438	363,643
France	1,929,685	1,601,493	1,580,289	1,387,024	873,077	1,188,767	289,500	178,179
Brazil	1,096,824	1,155,968	1,379,282	1,048,447	1,045,528	1,079,440	316,243	236,357
Australia	837,440	869,790	734,282	820,255	808,822	898,391	216,958	256,907

Imports

Partner	2012	2013	2014	2015	2016	2017	1Q 2017	1Q 2018
World Total	**64,563,003**	**62,908,417**	**72,607,079**	**85,526,894**	**92,042,924**	**96,055,206**	**24,200,792**	**28,373,440**
Ireland	11,007,610	7,423,219	10,345,470	15,164,253	15,841,788	23,759,578	6,329,236	6,266,976
Germany	10,716,706	11,042,819	14,030,837	14,530,053	13,364,499	12,036,049	3,157,305	4,510,702
Switzerland	7,386,313	8,308,846	9,581,155	9,420,947	10,237,018	11,944,378	2,884,453	2,975,740
India	4,223,414	4,485,993	4,812,100	5,922,403	7,418,783	6,128,690	1,617,670	1,486,475
Italy	1,854,610	2,211,358	2,248,463	3,142,643	4,365,061	5,200,765	1,011,262	1,272,495
Israel	5,368,042	5,476,133	4,445,464	5,964,383	5,077,000	4,337,907	1,348,156	934,885
United Kingdom	3,532,699	3,285,636	3,841,652	5,174,877	5,383,336	4,328,256	1,022,353	1,835,508
Canada	3,926,725	3,633,486	4,395,918	5,254,085	4,944,786	3,767,825	1,014,776	1,100,981
Denmark	2,512,139	2,617,320	3,072,120	3,355,822	3,722,127	3,228,189	865,033	1,070,911
Singapore	850,764	972,133	1,012,808	1,481,634	1,587,936	2,887,612	614,477	972,779
France	3,026,086	2,648,128	2,469,498	2,794,651	2,864,873	2,873,481	641,608	909,794
Japan	1,186,269	1,127,328	1,019,546	1,571,489	2,106,657	2,247,185	561,973	705,763
Austria	1,210,704	1,167,119	1,200,320	1,376,044	1,766,220	1,906,882	488,268	540,177
Netherlands	1,316,428	1,632,637	1,512,076	1,540,248	1,190,822	1,640,086	404,677	478,189
Belgium	2,064,641	2,594,103	3,359,203	3,073,924	2,385,003	1,592,954	299,828	548,790

Note: "Pharmaceutical Products" refers to HS (Harmonized Commodity Description and Coding System) Code 30.

Source: Foreign Trade Division, U.S. Census Bureau

Plunkett Research,® Ltd.

www.plunkettresearch.com

U.S. Prescription Drug Expenditures, Aggregate & Per Capita Amounts, Percent Distribution: 2009-2025

(By Source of Funds)

Year	Total	Out-of-Pocket Payments	Health Insurance[1]					Other Third Party Payers[3]
			Total	Private Health Insurance	Medicare	Medicaid	Other Programs[2]	
Historical Estimates *(in Billions of US$)*								
2009	252.7	49.1	200.1	116.1	54.5	20.3	9.1	3.5
2010	253.0	45.2	204.4	116.0	58.9	20.4	9.1	3.4
2011	258.7	45.2	210.6	116.9	63.3	21.0	9.4	2.8
2012	259.1	45.1	211.4	112.8	67.5	21.6	9.5	2.6
2013	265.1	43.6	219.1	113.5	74.1	22.4	9.1	2.4
2014	297.9	44.8	251.0	128.2	84.8	28.0	10.1	2.0
2015	324.6	45.5	277.0	139.8	94.1	31.8	11.4	2.0
Projected								
2016	340.7	45.5	293.1	146.2	101.0	34.2	11.7	2.0
2017	360.1	46.5	311.6	153.4	109.3	36.4	12.5	2.1
2018	387.4	48.2	337.1	164.8	120.6	38.6	13.1	2.1
2019	412.3	50.3	359.9	175.4	129.4	41.3	13.8	2.2
2020	438.2	53.2	382.7	183.9	140.3	44.0	14.5	2.3
2021	465.8	55.6	407.8	194.1	151.5	46.9	15.3	2.4
2022	495.7	58.1	435.1	205.3	163.8	50.0	16.1	2.5
2023	527.5	60.8	464.1	217.0	177.1	53.2	16.8	2.6
2024	561.2	63.6	494.8	229.3	191.3	56.6	17.6	2.7
2025	597.1	66.8	527.5	241.9	206.9	60.3	18.4	2.8
Historical Estimates *(Per Capita Amount)*								
2009	825	160	(4)	(4)	(4)	(4)	(4)	(4)
2010	819	146	(4)	(4)	(4)	(4)	(4)	(4)
2011	831	145	(4)	(4)	(4)	(4)	(4)	(4)
2012	826	144	(4)	(4)	(4)	(4)	(4)	(4)
2013	839	138	(4)	(4)	(4)	(4)	(4)	(4)
2014	936	141	(4)	(4)	(4)	(4)	(4)	(4)
2015	1,011	142	(4)	(4)	(4)	(4)	(4)	(4)
Projected								
2016	1,052	141	(4)	(4)	(4)	(4)	(4)	(4)
2017	1,102	142	(4)	(4)	(4)	(4)	(4)	(4)
2018	1,175	146	(4)	(4)	(4)	(4)	(4)	(4)
2019	1,239	151	(4)	(4)	(4)	(4)	(4)	(4)
2020	1,304	158	(4)	(4)	(4)	(4)	(4)	(4)
2021	1,373	164	(4)	(4)	(4)	(4)	(4)	(4)
2022	1,449	170	(4)	(4)	(4)	(4)	(4)	(4)
2023	1,528	176	(4)	(4)	(4)	(4)	(4)	(4)
2024	1,611	183	(4)	(4)	(4)	(4)	(4)	(4)
2025	1,700	190	(4)	(4)	(4)	(4)	(4)	(4)
Historical Estimates *(Percent Distribution)*								
2009	100	19.4	79.2	45.9	21.6	8.1	3.6	1.4
2010	100	17.9	80.8	45.8	23.3	8.1	3.6	1.3
2011	100	17.5	81.4	45.2	24.5	8.1	3.6	1.1
2012	100	17.4	81.6	43.6	26.1	8.3	3.7	1.0
2013	100	16.4	82.6	42.8	27.9	8.5	3.4	0.9
2014	100	15.0	84.3	43.0	28.5	9.4	3.4	0.7
2015	100	14.0	85.4	43.1	29.0	9.8	3.5	0.6
Projected								
2016	100	13.4	86.0	42.9	29.7	10.0	3.4	0.6
2017	100	12.9	86.5	42.6	30.3	10.1	3.5	0.6
2018	100	12.4	87.0	42.5	31.1	10.0	3.4	0.5
2019	100	12.2	87.3	42.5	31.4	10.0	3.3	0.5

2020	100	12.1	87.3	42.0	32.0	10.0	3.3	0.5
2021	100	11.9	87.5	41.7	32.5	10.1	3.3	0.5
2022	100	11.7	87.8	41.4	33.0	10.1	3.2	0.5
2023	100	11.5	88.0	41.1	33.6	10.1	3.2	0.5
2024	100	11.3	88.2	40.9	34.1	10.1	3.1	0.5
2025	100	11.2	88.4	40.5	34.6	10.1	3.1	0.5

NOTES: Projections include effects of the Affordable Care Act and an alternative to the sustainable growth rate.

[1]Includes Private Health Insurance (Employer Sponsored Insurance and other private insurance, which includes Marketplace plans), Medicare, Medicaid, Children's Health Insurance Program (Titles XIX and XXI), Department of Defense, and Department of Veterans' Affairs.

[2]Children's Health Insurance Program (Titles XIX and XXI), Department of Defense, and Department of Veterans' Affairs.

[3]Includes worksite health care, other private revenues, Indian Health Service, workers' compensation, general assistance, maternal and child health, vocational rehabilitation, other federal programs, Substance Abuse and Mental Health Services Administration, other state and local programs, and school health.

[4]Calculation of per capita estimates is not applicable.

Source: Centers for Medicare & Medicaid Services (CMS), Office of the Actuary

Plunkett Research, ® Ltd.

www.plunkettresearch.com

Prescription Drug Expenditures, U.S.: Selected Years, 1965-2025

(In Billions of US$)

Year	Total	Out-of-Pocket Payments	Health Insurance[1]					Other Third Party Payers[3]
			Total	Private Health Insurance	Medicare	Medicaid	Other Programs[2]	
Historical Estimates								
1965	3.7	3.4	0.1	0.1	0.0	0.0	0.0	0.1
1970	5.5	4.5	0.9	0.5	0.0	0.4	0.0	0.1
1975	8.1	6.1	1.9	1.0	0.0	0.9	0.0	0.1
1980	12.0	8.6	3.2	1.8	0.0	1.4	0.0	0.2
1985	21.8	13.9	7.4	5.0	0.0	2.3	0.0	0.5
1990	40.3	22.9	16.2	10.9	0.2	5.1	0.1	1.2
1995	59.8	23.4	35.1	24.4	0.7	9.7	0.3	1.4
2000	120.9	33.9	84.7	60.7	2.1	19.8	2.1	2.3
2001	138.7	36.6	99.3	70.6	2.4	23.3	2.9	2.7
2002	158.2	40.9	114.1	79.9	2.5	27.4	4.3	3.1
2003	177.0	45.6	127.8	87.2	2.5	32.1	5.9	3.6
2004	193.0	48.3	141.0	95.2	3.4	35.7	6.7	3.7
2005	205.3	51.5	149.9	102.2	3.9	36.4	7.4	3.9
2006	224.5	51.4	169.0	102.1	39.6	19.1	8.2	4.1
2007	235.9	52.1	180.1	107.4	46.0	18.4	8.3	3.8
2008	242.7	49.9	189.2	111.0	50.6	19.2	8.4	3.7
2009	252.7	49.1	200.1	116.1	54.5	20.3	9.1	3.5
2010	253.0	45.2	204.4	116.0	58.9	20.4	9.1	3.4
2011	258.7	45.2	210.6	116.9	63.3	21.0	9.4	2.8
2012	259.1	45.1	211.4	112.8	67.5	21.6	9.5	2.6
2013	265.1	43.6	219.1	113.5	74.1	22.4	9.1	2.4
2014	297.9	44.8	251.0	128.2	84.8	28.0	10.1	2.0
2015	324.6	45.5	277.0	139.8	94.1	31.8	11.4	2.0
Projected								
2016	340.7	45.5	293.1	146.2	101.0	34.2	11.7	2.0
2017	360.1	46.5	311.6	153.4	109.3	36.4	12.5	2.1
2018	387.4	48.2	337.1	164.8	120.6	38.6	13.1	2.1
2019	412.3	50.3	359.9	175.4	129.4	41.3	13.8	2.2
2020	438.2	53.2	382.7	183.9	140.3	44.0	14.5	2.3
2021	465.8	55.6	407.8	194.1	151.5	46.9	15.3	2.4
2022	495.7	58.1	435.1	205.3	163.8	50.0	16.1	2.5
2023	527.5	60.8	464.1	217.0	177.1	53.2	16.8	2.6
2024	561.2	63.6	494.8	229.3	191.3	56.6	17.6	2.7
2025	597.1	66.8	527.5	241.9	206.9	60.3	18.4	2.8

Notes: Projections include effects of the Affordable Care Act and an alternative to the sustainable growth rate.

[1] Includes Private Health Insurance (Employer Sponsored Insurance, State Health Insurance Exchanges, and other private insurance), Medicare, Medicaid, Children's Health Insurance Program (Titles XIX and XXI), Department of Defense, and Department of Veterans' Affairs.

[2] Children's Health Insurance Program (Titles XIX and XXI), Department of Defense and Department of Veterans' Affairs.

[3] Includes worksite health care, other private revenues, Indian Health Service, workers' compensation, general assistance, maternal and child health, vocational rehabilitation, other federal programs, Substance Abuse and Mental Health Services Administration, other state and local programs and school health.

Source: Centers for Medicare & Medicaid Services (CMS), Office of the Actuary

Plunkett Research, ® Ltd.

www.plunkettresearch.com

Total U.S. Biotechnology Patents Granted per Year by Patent Class: 1977-2015

(Original & Cross-Reference Classifications; Duplicates Eliminated)

Year	Patent Class*						
	47	71	119	426	435	800	930
1977-87	1,853	938	2,271	7,582	7,669	66	1,573
1988	183	61	234	793	1,070	23	317
1989	221	80	265	1,157	1,432	22	255
1990	235	60	311	1,030	1,405	13	6
1991	244	68	391	1,003	1,561	29	12
1992	241	94	399	908	1,969	48	58
1993	225	73	341	899	2,258	38	76
1994	273	78	355	823	2,176	99	66
1995	272	93	313	884	2,250	91	38
1996	345	75	348	902	3,081	254	59
1997	296	100	362	816	4,139	283	85
1998	469	89	554	981	6,133	498	79
1999	325	87	501	1,261	6,215	670	79
2000	351	64	469	1,268	5,605	632	48
2001	305	97	447	1,226	6,274	667	46
2002	306	112	540	1,064	5,729	556	33
2003	283	70	532	1,015	5,298	527	31
2004	186	60	396	874	4,616	614	40
2005	160	46	407	518	4,131	521	29
2006	157	37	442	636	5,277	779	32
2007	124	32	381	525	5,195	907	23
2008	98	33	285	420	4,792	763	18
2009	141	40	308	462	4,915	952	12
2010	227	77	404	722	6,439	1,082	19
2011	207	80	456	733	6,552	1,150	13
2012	273	92	498	932	6,810	1,387	17
2013	277	91	500	1,054	7,153	1,537	25
2014	245	102	550	1,094	7,670	1,657	15
2015	315	126	435	1,249	8,180	1,633	6
Total	**8,837**	**3,055**	**13,695**	**32,831**	**135,994**	**17,498**	**3,110**

* The patent classes are as follows:
47: Plant Husbandry
71: Chemical Fertilizers
119: Animal Husbandry
426: Food or Edible Material: Processes, Compositions and Products
435: Chemistry: Molecular Biology & Microbiology
800: Multicellular Living Organisms and Unmodified Parts Thereof and Related Processes
930: Peptide or Protein Sequence
The agricultural classes 47, 71, 119 and 426 include only a small portion of patents that are related to biotechnology. All patents in classes 435, 800 and 930 are biotechnology-related.

Source: U.S. Patent & Trademark Office (USPTO)

Plunkett Research, ® Ltd.

www.plunkettresearch.com

Global Area of Biotech Crops by Country: 2016

(In Millions of Hectares)

Rank	Country	Area	Biotech Crops
1*	USA	72.9	Maize, soybean, cotton, canola, sugar beet, alfalfa, papaya, squash, potato
2*	Brazil	49.1	Soybean, maize, cotton
3*	Argentina	23.8	Soybean, maize, cotton
4*	Canada	11.6	Canola, maize, soybean, sugar beet, alfalfa
5*	India	10.8	Cotton
6*	Paraguay	3.6	Soybean, maize, cotton
7*	Pakistan	2.9	Cotton
8*	China	2.8	Cotton, papaya, poplar
9*	South Africa	2.7	Maize, soybean, cotton
10*	Uruguay	1.3	Soybean, maize
11*	Bolivia	1.2	Soybean
12*	Australia	0.9	Cotton, canola
13*	Philippines	0.8	Maize
14*	Myanmar	0.3	Cotton
15*	Spain	0.1	Maize
16*	Sudan	0.1	Cotton
17*	Mexico	0.1	cotton, soybean
18*	Colombia	0.1	Cotton, maize
19	Vietnam	<0.1	Maize
20	Honduras	<0.1	Maize
21	Chile	<0.1	Maize
22	Portugal	<0.1	Maize
23	Bangladesh	<0.1	Brinjal/Eggplant
24	Costa Rica	<0.1	Cotton, soybean, pineapple
25	Slovakia	<0.1	Maize
26	Czech Republic	<0.1	Maize
	Total	**185.1**	

* 18 biotech mega-countries growing 50,000 hectares or more of biotech crops.

Source: James, Clive. 2016. Global Status of Commercialized Biotech/GM Crops: 2016. ISAAA Brief No. 52. ISAAA: Ithaca, NY

Plunkett Research, ® Ltd.

www.plunkettresearch.com

Domestic & Foreign Pharmaceutical Sales, PhRMA Member Companies: 1980-2015

(In Millions of US$)

Year	Domestic Sales	APC	Sales Abroad[1]	APC	Total Sales	APC
2015[2]	189,761.4	6.2%	106,642.4	-0.7%	296,403.8	3.6%
2014	178,645.6	1.6%	107,438.2	0.5%	286,083.9	1.2%
2013	175,759.6	-1.5%	106,880.1	-0.7%	282,639.7	-1.2%
2012	178,437.6	-5.0%	107,677.8	-8.1%	286,115.4	-6.2%
2011	187,870.7	1.7%	117,138.5	9.9%	305,009.2	4.7%
2010	184,660.3	2.0%	106,593.2	12.0%	291,253.5	5.4%
2009	181,116.8	-1.1%	95,162.5	-7.5%	276,279.3	-3.4%
2008	183,167.2	-1.1%	102,842.4	16.6%	286,009.6	4.6%
2007	185,209.2	4.2%	88,213.4	14.8%	273,422.6	7.4%
2006	177,736.3	7.0%	76,870.2	10.0%	254,606.4	7.9%
2005	166,155.5	3.4%	69,881.0	0.1%	236,036.5	2.4%
2004[3]	160,751.0	8.6%	69,806.9	14.6%	230,557.9	10.3%
2003[3]	148,038.6	6.4%	60,914.4	13.4%	208,953.0	8.4%
2002	139,136.4	6.4%	53,697.4	12.1%	192,833.8	8.0%
2001	130,715.9	12.8%	47,886.9	5.9%	178,602.8	10.9%
2000	115,881.8	14.2%	45,199.5	1.6%	161,081.3	10.4%
1999	101,461.8	24.8%	44,496.6	2.7%	145,958.4	17.1%
1998	81,289.2	13.3%	43,320.1	10.8%	124,609.4	12.4%
1997	71,761.9	10.8%	39,086.2	6.1%	110,848.1	9.1%
1996	64,741.4	13.3%	36,838.7	8.7%	101,580.1	11.6%
1995	57,145.5	12.6%	33,893.5	(4)	91,039.0	(4)
1994	50,740.4	4.4%	26,870.7	1.5%	77,611.1	3.4%
1993	48,590.9	1.0%	26,467.3	2.8%	75,058.2	1.7%
1992	48,095.5	8.6%	25,744.2	15.8%	73,839.7	11.0%
1991	44,304.5	15.1%	22,231.1	12.1%	66,535.6	14.1%
1990	38,486.7	17.7%	19,838.3	18.0%	58,325.0	17.8%
1989	32,706.6	14.4%	16,817.9	-4.7%	49,524.5	7.1%
1988	28,582.6	10.4%	17,649.3	17.1%	46,231.9	12.9%
1987	25,879.1	9.4%	15,068.4	15.6%	40,947.5	11.6%
1986	23,658.8	14.1%	13,030.5	19.9%	36,689.3	16.1%
1985	20,742.5	9.0%	10,872.3	4.0%	31,614.8	7.3%
1984	18,026.1	13.2%	10,450.9	0.4%	29,477.0	8.3%
1983	16,805.0	14.0%	10,411.2	-2.4%	27,216.2	7.1%
1982	14,743.9	16.4%	10,667.4	0.1%	25,411.3	9.0%
1981	12,665.0	7.4%	10,658.3	1.4%	23,323.3	4.6%
1980	11,788.6	10.7%	10,515.4	26.9%	22,304.0	17.8%
Average		**8.5%**		**7.2%**		**7.8%**

Notes: Total values may be affected by rounding. APC = Annual Percent Change.

[1] Sales abroad includes sales generated outside the United States by U.S.-owned PhRMA member companies and sales generated abroad by the U.S. divisions of foreign-owned PhRMA member companies. Sales generated abroad by the foreign divisions of foreign-owned PhRMA member companies are excluded. Domestic sales, however, includes sales generated within the United States by all PhRMA member companies; [2] Estimated; [3] Revised in 2007 to reflect updated data; [4] Sales Abroad affected by merger and acquisition activity.

Source: Pharmaceutical Research and Manufacturers of America (PhRMA), *PhRMA Annual Membership Survey*, 2016

Plunkett Research, ® Ltd.

www.plunkettresearch.com

Sales By Geographic Area, PhRMA Member Companies: 2014

(In Millions of US$; Latest Year Available)

Geographic Area*	Amount	Share
Africa		
Egypt	373.8	0.1%
South Africa	449.9	0.2%
Other Africa	1,427.4	0.5%
Americas		
United States	178,645.6	62.4%
Canada	6,170.6	2.2%
Mexico	2,048.2	0.7%
Brazil	3,536.8	1.2%
Argentina	953.5	0.3%
Venezuela	1,806.0	0.6%
Columbia	887.0	0.3%
Chile	338.4	0.1%
Peru	146.8	0.1%
Other Latin America[1]	1,238.5	0.4%
Asia-Pacific		
Japan	13,203.9	4.6%
China	6,364.9	2.2%
India	785.7	0.3%
Taiwan	1,035.9	0.4%
South Korea	1,791.6	0.6%
Other Asia-Pacific	3,385.5	1.2%
Australia & New Zealand	2,441.5	0.9%
Europe		
France	8,157.4	2.9%
Germany	9,426.1	3.3%
Italy	6,053.2	2.1%
Spain	5,055.2	1.8%
United Kingdom	5,702.1	2.0%
Other Western European nations	12,115.9	4.2%
Czech Republic	523.3	0.2%
Hungary	386.8	0.1%
Poland	929.1	0.3%
Turkey	1,139.6	0.4%
Russia	1,652.9	0.6%
Central and Eastern Europe[2]	5,176.0	1.8%
Middle East		
Saudi Arabia	933.9	0.3%
Middle East[3]	1,764.3	0.6%
Uncategorized	36.5	0.0%
Total Sales	**286,083.9**	**100.0%**

Note: Total values may be affected by rounding.

*Sales abroad includes sales generated outside the United States by US-owned PhRMA member companies and sales generated abroad by the US divisions of foreign-owned PhRMA member companies. Sales generated abroad by the foreign divisions of foreign-owned PhRMA member companies are excluded. Domestic sales, however, include sales generated within the United States by all PhRMA member companies.

[1]Other South America, Central America, and all Caribbean nations. [2]Cyprus, Estonia, Slovenia, Bulgaria, Lithuania, Latvia, Romania, Slovakia, Malta, and other Eastern European countries and the Newly Independent States. [3]Yemen, United Arab Emirates, Iraq, Iran, Kuwait, Israel, Jordan, Syria, Afghanistan, and Qatar.

Source: Pharmaceutical Research and Manufacturers of America (PhRMA), *PhRMA Annual Membership Survey*, 2016

Plunkett Research, ® Ltd.

www.plunkettresearch.com

SELECTED COMPANY PROFILES

1. GlaxoSmithKline plc
2. Merck KGaA
3. Novartis AG
4. Novo-Nordisk AS
5. Roche Holding AG

GLAXOSMITHKLINE PLC (WWW.GSK.COM)

Ticker: GSK
Exchange: NYS
Year Established: 1999
Employees: 98,462
Fiscal Year Ends in December

Phone: 44 20-8047-5000
Fax: 44 20-8047-7807
Address: 980 Great West Road
Brentford, Middlesex TW8 9GS United Kingdom

Types Of Business

Industry NAICS code: 325412

Prescription Medications
Asthma Drugs
Respiratory Drugs
Antibiotics
Antivirals
Dermatological Drugs
Over-the-Counter & Nutritional Products

Industry Ranks

1. Johnson & Johnson	76,450,000,000
2. Roche Holding AG	56,298,850,000
3. Pfizer Inc	52,546,000,000
4. Novartis AG	50,135,000,000
5. Sanofi SA	42,561,400,000
6. Bayer AG	41,163,610,000
7. Merck & Co Inc	40,122,000,000
8. GlaxoSmithKline plc	**40,107,890,000**
9. AbbVie Inc	28,216,000,000
10. Abbott Laboratories	27,390,000,000

Contacts

Text Excel

Emma Walmsley	CEO/Director
Simon Dingemans	CFO/Director
Moncef Slaoui	Chairman of the Board, Divisional/Director
Philip Hampton	Chairman of the Board/Director
Hal Barron	Chief Scientific Officer/Director
Laurie Glimcher	Director
Manvinder Singh Banga	Director
Vivienne Cox	Director
Jesse Goodman	Director
Urs Rohner	Director
Stacey Cartwright	Director
Hans Wijers	Director
Deryck Maughan	Director
Lynn Elsenhans	Director
Stephanie Burns	Director
Judy Lewent	Director
Daniel Podolsky	Director
Andrew Witty	Director/CEO
Dan Troy	General Counsel/Senior VP
David Redfern	Other Executive Officer
Abbas Hussain	President, Divisional
Roger Connor	President, Divisional
Victoria Whyte	Secretary
Phil Thomson	Senior VP, Divisional
Bill Louv	Senior VP, Divisional
Claire Thomas	Senior VP, Divisional
Nick Hirons	Senior VP, Divisional

Auditor: Deloitte LLP
Legal Advisor: Allen & Overy LLP

Description

GlaxoSmithKline plc (GSK) is a leading research-based pharmaceutical company. Its subsidiaries consist of global drug and health companies engaged in the creation, discovery, development, manufacturing and marketing of pharmaceuticals and consumer health products. GSK researches and develops a broad range of innovative products in three primary areas: pharmaceuticals, vaccines and consumer healthcare. The pharmaceuticals division (representing 57% of the firm's net revenue in 2017) develops and makes medicines to treat a broad range of acute and chronic diseases. These medicines are made up of both patent-protected and off patent medicines. The vaccines division (17% of revenue) produces pediatric and adult vaccines against a range of infectious diseases. In 2017, it distributed more than 2 million vaccine doses per day to people in over 160 countries. The consumer healthcare division (26%) develops and markets a range of consumer healthcare products based on scientific innovation. Its brands fall within four main categories, wellness, oral health, skin health and nutrition, and include names such as Sensodyne, Panadol and Horlicks. In addition to its primary areas, the firm also researches new options for the care and treatment of people living with HIV/AIDS through subsidiary ViiV Healthcare. Through Stiefel Laboratories, Inc., GSK also offers a portfolio of dermatological products for such conditions as psoriasis, eczema, atopic dermatitis and superficial skin infections. In early 2018, GSK agreed to buy out Novartis' 36.5% stake in their consumer healthcare joint venture for $13 billion, in order to hold full ownership of the business; and GSK agreed to transfer its rare disease gene therapy portfolio to Orchard Therapeutics, enabling GSK to continue to invest in the development of its cell and gene therapies, with a focus on oncology.

Financials Financial Details | Compare to Industry Averages | Build Custom Table | Compare Companies

$USD, In whole numbers, except marked * or %	2017	2016	2015	2014	2013	2012
Financials						
Revenue	40,107,896,712	37,055,891,188	31,786,298,716	30,567,888,152	35,216,981,460	35,118,658,252
Cost of Revenue	13,741,332,664	12,343,548,680	11,762,910,276	9,730,011,516	11,406,820,820	10,488,694,648
Gross Margin %	65.74	66.69	62.99	68.17	67.61	70.13
R&D Expense	5,947,225,392	4,820,494,576	4,730,143,520	4,583,987,400	5,212,458,716	5,272,249,856
Operating Income	8,053,202,212	8,006,697,992	3,491,802,576	5,721,347,752	7,820,681,112	8,192,714,872
Operating Margin %	20.08	21.61	10.99	18.72	22.21	23.33
SGA Expense	12,851,107,695	12,444,529,272	12,266,484,544	10,956,394,232	11,267,308,160	11,611,439,388
Net Income	2,035,556,144	1,211,767,104	11,190,244,024	3,661,875,152	7,222,769,712	6,065,478,980
Earnings Per Share	0.63	0.38	3.49	1.15	2.25	1.86
Dividends	1.60	1.55	1.57	1.60	1.56	1.47
Book Value Per Share	0.70	0.07	3.30	3.23	4.06	3.83
Operating Cash Flow	9,191,891,256	8,632,511,924	3,413,409,748	6,877,309,792	9,595,813,624	5,813,027,500
Capital Expenditure	2,925,779,784	3,125,083,584	2,525,843,492	2,326,539,692	2,260,105,092	2,019,611,840
Free Cash Flow	6,266,111,472	5,507,428,340	887,566,256	4,550,770,100	7,335,708,532	3,793,415,660
Profitability						
EBITDA	8,194,043,564	5,864,846,488	17,106,909,500	6,829,476,880	11,675,216,604	11,801,442,344
Return on Assets %	2.65	1.62	17.90	6.66	13.01	11.06
Return on Equity %	290.15	29.24	179.63	48.95	84.89	65.96
Net Margin %	5.08	3.27	35.20	11.98	20.51	17.27
Assets Turnover	0.52	0.50	0.51	0.56	0.63	0.64
Financial Leverage	-	52.56	10.45	9.54	6.01	7.14

Brands, Divisions and Affiliates

Sensodyne
Panadol
Horlicks
ViiV Healthcare
Stiefel Laboratories Inc

Top Salaries

Name	Title	Salary (GBP)	Bonus (GBP)
Emma Walmsley	CEO/Director	1,282,188	2,046,185
Patrick Vallance	Director	1,036,380	1,497,436
Simon Dingemans	CFO/Director	1,001,834	1,448,274
Andrew Witty	CEO/Director	370,705	-
Moncef Slaoui	Director	311,000	-

Other Thoughts

Apparent Female Officers or Directors:

Corporate Culture

MERCK KGAA (WWW.EMDGROUP.COM/EN/COMPANY.HTML)

Ticker: MRK
Exchange: Frankfurt
Employees: 50,500
Fiscal Year Ends in N/A

Phone: 49 6151720
Fax: 49 6151722000
Address: Frankfurter St. 250
Darmstadt, 64293 Germany

Types Of Business

Industry NAICS code: 325412

Pharmaceuticals
Over-the-Counter Drugs & Vitamins
Generic Drugs
Chemicals
LCD Components
Reagents & Diagnostics
Nanotechnology Research

Industry Ranks

1. Johnson & Johnson	76,450,000,000
2. Roche Holding AG	56,298,850,000
3. Pfizer Inc	52,546,000,000
4. Novartis AG	50,135,000,000
5. Sanofi SA	42,561,400,000
6. Bayer AG	41,163,610,000
7. Merck & Co Inc	40,122,000,000
8. GlaxoSmithKline plc	40,107,890,000
9. AbbVie Inc	28,216,000,000
10. Abbott Laboratories	27,390,000,000
20. Merck KGaA	**18,150,960,000**

Contacts

Text Excel

Stefan Oschmann	CEO
Marcus Kuhnert	CFO
Stefan Oschmann	Head-Patents & Scientific Svcs
Kai Beckmann	Head-Site Oper.
Walter Huber	Head-Group Comm.
Bernd Reckmann	CEO-Chemicals
Stefan Oschmann	Chmn.

Description

Merck KGaA, headquartered in Germany, is a science and technology company engaged in research and discovery. The firm's business segments include healthcare, life science and performance materials. The healthcare segment consists of Merck's biopharma, consumer health, allergopharma and biosimilars businesses. Biopharma primarily engages in prescription medicines in relation to neurodegenerative diseases, oncology, fertility, endocrinology and cardiometabolic diseases, and also produces general medicines. Consumer health comprises over-the-counter pharmaceuticals to address mobility, women's and children's health, cough, cold and everyday health protection. Allergopharma comprises products for diagnostic testing and the treatment of allergies. Biosimilars focuses on the development of biosimilars. Merck operates its healthcare business in the U.S. and Canada as EMD Serono. The life science segment provides: in-vitro diagnostic manufacturers with raw materials, equipment and services for their assay development, scale-up and manufacturing needs; expertise, products and solutions to biotech clients, from discovery to commercialization; environmental testing services; testing solutions for the food/beverage and industrial industries; government and academic research, from concept inception to pre-clinical development; manufacturing solutions that support pharmaceutical and biopharmaceutical manufacturers; and quality control services and solutions. Last, the performance materials segment offers a wide range of products and solutions to the following industries: architecture, automotive, cosmetic, display, pigment, functional technology, optoelectronic and semiconductor. In April 2018, Merck agreed to sell its consumer health business to Procter & Gamble Co. for approximately $4.2 billion. The proceeds will increase flexibility and strengthen Merck's three primary business segments.

Financials

$USD, In whole numbers	2017	2016	2015	2014	2013	2012	2011
Sales	18,150,960,000	17,795,060,000	14,396,659,712	12,890,383,360	12,435,664,896	12,522,864,640	11,518,045,184
Profits	3,084,780,000	1,898,320,000	1,249,495,680	1,297,130,624	1,347,455,744	635,171,520	704,998,912

Brands, Divisions and Affiliates

EMD Serono

Top Salaries

	Salary	Bonus

Other Thoughts

Corporate Culture

NOVARTIS AG (WWW.NOVARTIS.COM)

Ticker: NVS
Exchange: NYS
Year Established: 1996
Employees: 118,393
Fiscal Year Ends in December

Phone: 41 613241111
Fax: 41 613248001
Address: Lichtstrasse 35
Basel, 4056 Switzerland

Types Of Business

Industry NAICS code: 325412

Drugs-Diversified
Therapeutic Drug Discovery
Therapeutic Drug Manufacturing
Generic Drugs
Over-the-Counter Drugs
Ophthalmic Products
Nutritional Products
Veterinary Products

Industry Ranks

1. Johnson & Johnson	76,450,000,000
2. Roche Holding AG	56,298,850,000
3. Pfizer Inc	52,546,000,000
4. Novartis AG	**50,135,000,000**
5. Sanofi SA	42,561,400,000
6. Bayer AG	41,163,610,000
7. Merck & Co Inc	40,122,000,000
8. GlaxoSmithKline plc	40,107,890,000
9. AbbVie Inc	28,216,000,000
10. Abbott Laboratories	27,390,000,000

Contacts

Text Excel

Joseph Jimenez	CEO
F. Ball	CEO, Divisional
Paul Hudson	CEO, Divisional
Richard Francis	CEO, Divisional
Bruno Strigini	CEO, Divisional
Harry Kirsch	CFO
Joerg Reinhardt	Chairman of the Board/Director
Pierre Landolt	Director
Srikant Datar	Director
Andreas Planta	Director
William Winters	Director
Charles Sawyers	Director
Ann Fudge	Director
Dimitri Azar	Director
Elizabeth Doherty	Director
Frans Van Houten	Director
Nancy Andrews	Director
Ton Buechner	Director
Enrico Vanni	Director/Vice Chairman of the Board
Felix Ehrat	General Counsel
Steven Baert	Other Corporate Officer
Vasant Narasimhan	Other Corporate Officer/Other Executive Officer
James Bradner	President, Divisional
James Bradner	President, Divisional
Andre Wyss	President, Divisional/President, Geographical
Bruno Heynen	Secretary

Auditor: PricewaterhouseCoopers AG
Legal Advisor:

Description

Novartis AG researches, develops and manufactures pharmaceuticals, as well as a large number of consumer and animal healthcare products. The company has a diverse portfolio, operating through three primary divisions: innovative medicines, which develops, manufactures, distributes and sells innovative patent-protected prescription medicines; Sandoz, which develops, manufactures, distributes and sells generic pharmaceuticals and biosimilars; and Alcon, which develops, manufactures, distributes and sells surgical and vision care products. Each of these divisions are supported by the following cross-divisional organizational units: Novartis Institutes for BioMedical Research, Global Drug Development, Novartis Technical Operations (NTO) and Novartis Business Services (NBS). Novartis Institutes for BioMedical Research is the innovation engine of Novartis. It supports the innovative medicines division and collaborates with the Sandoz division. Global Drug Development oversees all drug development activities for the innovative medicines division and biosimilars portfolio. NTO centralizes management of Novartis' manufacturing operations across the innovative medicines and Sandoz divisions. NBS delivers integrated solutions to all Novartis divisions and units worldwide. Headquartered in Switzerland, the company's products are sold in approximately 155 countries worldwide. In March 2018, Novartis agreed to sell its 36.5% stake in GlaxoSmithKline plc's consumer healthcare joint venture, to GlaxoSmithKline for $13 billion. That April, Novartis agreed to acquire AveXis, Inc., a U.S.-based gene-therapy company, for $8.7 billion.

Financials Financial Details | Compare to Industry Averages | Build Custom Table | Compare Companies

$USD, In whole numbers, except marked * or %	2017	2016	2015	2014	2013	2012
Financials						
Revenue	50,135,000,000	49,436,000,000	50,387,000,000	53,634,000,000	58,831,000,000	57,561,000,000
Cost of Revenue	17,175,000,000	17,520,000,000	17,404,000,000	17,345,000,000	19,608,000,000	18,756,000,000
Gross Margin %	65.74	64.56	65.46	67.66	66.67	67.42
R&D Expense	8,972,000,000	9,039,000,000	8,935,000,000	9,086,000,000	9,852,000,000	9,332,000,000
Operating Income	8,629,000,000	8,268,000,000	8,977,000,000	11,089,000,000	10,910,000,000	11,511,000,000
Operating Margin %	17.21	16.72	17.82	20.68	18.54	20.00
SGA Expense	14,997,000,000	14,192,000,000	14,247,000,000	14,993,000,000	17,609,000,000	17,290,000,000
Net Income	7,703,000,000	6,712,000,000	17,783,000,000	10,210,000,000	9,175,000,000	9,505,000,000
Earnings Per Share	3.28	2.82	7.40	4.21	3.76	3.93
Dividends	2.72	2.72	2.67	2.72	2.53	2.48
Book Value Per Share	31.20	31.58	32.31	29.74	29.70	28.54
Operating Cash Flow	12,621,000,000	11,475,000,000	11,897,000,000	13,897,000,000	13,174,000,000	14,194,000,000
Capital Expenditure	2,746,000,000	2,879,000,000	3,505,000,000	3,404,000,000	3,571,000,000	3,068,000,000
Free Cash Flow	9,875,000,000	8,596,000,000	8,392,000,000	10,493,000,000	9,603,000,000	11,126,000,000
Profitability						
EBITDA	15,852,000,000	14,567,000,000	14,260,000,000	17,658,000,000	16,343,000,000	16,887,000,000
Return on Assets %	5.85	5.13	13.84	8.11	7.33	7.86
Return on Equity %	10.34	8.84	24.06	14.07	12.79	14.09
Net Margin %	15.36	13.58	35.29	19.04	15.60	16.51
Assets Turnover	0.38	0.38	0.39	0.43	0.47	0.48
Financial Leverage	1.79	1.74	1.71	1.77	1.70	1.80

Brands, Divisions and Affiliates

Sandoz
Alcon
Novartis Institutes for BioMedical Research
Global Drug Development
Novartis Technical Operations
Novartis Business Services

Top Salaries

Name	Title	Salary (CHF)	Bonus (CHF)
Joseph Jimenez	CEO	2,120,827	1,988,275
F. Ball	CEO, Divisional	1,120,000	873,600
James Bradner	President, Divisional	1,066,385	898,800
Paul Hudson	CEO, Divisional	967,837	959,826
Harry Kirsch	CFO	1,048,631	808,742

Other Thoughts

Apparent Female Officers or Directors:

Corporate Culture

NOVO-NORDISK AS (WWW.NOVONORDISK.COM)

Ticker: NVO
Exchange: NYS
Year Established: 1931
Employees: 42,500
Fiscal Year Ends in December

Phone: 45 44448888
Fax: 45 44490555
Address: Novo Alle
Bagsværd, 2880 Denmark

Types Of Business

Industry NAICS code: 325412

Drugs-Diabetes
Hormone Replacement Therapy
Growth Hormone Drugs
Hemophilia Drugs
Insulin Delivery Systems
Educational & Training Services

Industry Ranks

1. Johnson & Johnson	76,450,000,000
2. Roche Holding AG	56,298,850,000
3. Pfizer Inc	52,546,000,000
4. Novartis AG	50,135,000,000
5. Sanofi SA	42,561,400,000
6. Bayer AG	41,163,610,000
7. Merck & Co Inc	40,122,000,000
8. GlaxoSmithKline plc	40,107,890,000
9. AbbVie Inc	28,216,000,000
10. Abbott Laboratories	27,390,000,000
701. Novo-Nordisk AS	-

Contacts

Text Excel

Lars Jorgensen	CEO/President
Jesper Brandgaard	CFO/Executive VP
Liz Hewitt	Director
Soren Pedersen	Director
Stig Strobaek	Director
Helge Lund	Director
Kasim Kutay	Director
Brian Daniels	Director
Sylvie Gregoire	Director
Anne Kverneland	Director
Liselotte Hyveled	Director
Goran Ando,	Director/Chairman of the Board
Jeppe Christiansen	Director/Vice Chairman of the Board
Maziar Doustdar	Executive VP, Divisional
Henrik Wulff	Executive VP, Divisional
Camilla Sylvest	Executive VP, Divisional
Doug Langa	Executive VP, Divisional
Lars Green	Executive VP, Divisional
Mads Thomsen	Executive VP/Chief Scientific Officer

Auditor: PricewaterhouseCoopers
Legal Advisor:

Description

Novo Nordisk AS is a global healthcare company engaged in the discovery, development, manufacturing and marketing pharmaceutical products. As a leader in diabetes care, it has one of the broadest diabetes product portfolios in the industry, including new generation insulins, a full portfolio of modern insulins as well as a human once-daily GLP-1 analog. In addition, Novo Nordisk has a leading position within hemophilia care, growth hormone therapy and hormone replacement therapy. Operations are divided into two segments: diabetes and obesity care, and biopharmaceuticals. The diabetes and obesity care segment covers insulin, GLP-1 (glucagon-like peptide), other protein-related products (such as glucagon, protein-related delivery systems and needles) and oral antidiabetic drugs. The biopharmaceuticals segment covers the therapy areas of hemophilia care, growth hormone therapy and hormone replacement therapy. Novo products include: Tresiba (insulin degludec) is a once-daily new-generation insulin launched in more than 50 countries, including the U.S.; Xultophy, a once-daily single-injection combination of insulin degludec (Tresiba) and liraglutide (Victoza), which is marketed in 18 countries, including the U.S.; Ryzodeg, a soluble formulation of insulin degludec and insulin aspart, which is marketed in 18 countries; and Fiasp, a fast-acting insulin aspart, launched in 17 countries and was due to launch in the U.S. during 2018. The major production facilities owned by Novo Nordisk are located in Denmark, and internationally in the U.S., France, China and Brazil. Active pharmaceutical ingredient (API) production is located in Denmark, primarily in Kalundorg, with secondary locations in Hillerod and Gentofte, although two API production sites in the U.S. are currently being established, and expected to commence operation in 2020. Construction of a new facility in Hillerod, Denmark, for producing medicines for the treatment of diabetes and obesity is expected to commence operation in 2019.

Financials Financial Details | Compare to Industry Averages | Build Custom Table | Compare Companies

$USD, In whole numbers, except marked * or %	2017	2016	2015	2014	2013	2012
Financials						
Revenue	17,604,339,542	17,617,578,732	17,010,309,714	13,996,660,376	13,171,732,777	12,297,631,044
Cost of Revenue	2,778,968,941	2,708,202,320	2,551,380,967	2,295,108,083	2,228,596,916	2,122,210,571
Gross Margin %	84.21	84.63	85.00	83.60	83.08	82.74
R&D Expense	2,208,738,132	2,295,265,692	2,144,748,715	2,169,020,563	1,849,231,090	1,717,469,632
Operating Income	7,717,659,490	7,633,338,461	7,792,839,174	5,436,263,425	4,963,592,834	4,645,379,456
Operating Margin %	43.84	43.33	45.81	38.84	37.68	37.77
SGA Expense	5,063,044,366	5,096,930,387	5,070,136,789	4,217,627,544	4,237,801,547	3,917,539,246
Net Income	6,009,646,422	5,977,336,495	5,494,263,684	4,173,654,521	3,969,235,130	3,377,884,661
Earnings Per Share	15.42	14.99	13.56	10.10	9.40	7.82
Dividends	7.58	9.33	5.04	4.51	3.61	2.80
Book Value Per Share	3.01	2.30	2.43	2.34	2.63	2.57
Operating Cash Flow	6,488,463,779	7,614,740,552	6,034,391,098	4,994,957,105	4,088,703,055	3,501,135,212
Capital Expenditure	1,363,005,934	1,302,956,910	1,009,645,816	683,236,749	574,328,654	570,861,247
Free Cash Flow	5,125,457,688	6,311,783,642	5,024,745,281	4,311,720,356	3,514,374,401	2,930,273,965
Profitability						
EBITDA	8,188,123,549	8,046,905,526	7,330,255,585	5,921,385,158	5,578,269,494	5,069,821,570
Return on Assets %	38.15	40.06	41.29	35.93	37.03	32.88
Return on Equity %	80.20	82.23	79.90	63.92	60.54	54.90
Net Margin %	34.14	33.93	32.30	29.82	30.13	27.47
Assets Turnover	1.12	1.18	1.28	1.20	1.23	1.20
Financial Leverage	2.05	2.15	1.95	1.91	1.65	1.62

Brands, Divisions and Affiliates

Tresiba
Xultophy
Ryzodeg
Fiasp

Top Salaries

Name	Title	Salary (US$)	Bonus (US$)
Henrik Wulff	Executive VP, Divisional	4,900,000	1,700,000
Lars Sorensen	Former CEO/Former President	1,875,552	945,656
Lars Jorgensen	CEO/President	866,852	283,697
Jakob Riis	Executive VP, Divisional	567,394	283,697
Jesper Brandgaard	Executive VP/CFO	567,394	283,697

Other Thoughts

Apparent Female Officers or Directors:

Corporate Culture

ROCHE HOLDING AG (WWW.ROCHE.COM)

Ticker: RHHBY
Exchange: PINX
Year Established: 1896
Employees: 80,080
Fiscal Year Ends in December

Phone: 41-61-688-1111
Fax: 41-61-691-9391
Address: F. Hoffmann-La Roche AG
Grenzacherstrasse 124
Basel, CH-4070 Switzerland

Types Of Business

Industry NAICS code: 325412

Pharmaceuticals Manufacturing
Antibiotics
Diagnostics
Cancer Drugs
Virology Products
HIV/AIDS Treatments
Transplant Drugs

Industry Ranks

1. Johnson & Johnson	76,450,000,000
2. Roche Holding AG	**56,298,850,000**
3. Pfizer Inc	52,546,000,000
4. Novartis AG	50,135,000,000
5. Sanofi SA	42,561,400,000
6. Bayer AG	41,163,610,000
7. Merck & Co Inc	40,122,000,000
8. GlaxoSmithKline plc	40,107,890,000
9. AbbVie Inc	28,216,000,000
10. Abbott Laboratories	27,390,000,000

Contacts

Text Excel

Severin Schwan	CEO
Alan Hippe	CFO
Cristina A. Wilbur	Head-Human Resources
John C. Reed	Head-Roche Pharmaceutical Research & Early Dev.
Alan Hippe	CIO
Gottlieb Keller	General Counsel
Daniel ODay	COO-Pharmaceuticals
Stephen Feldhaus	Head-Comm.
Richard Scheller	Head-Genentech Research & Early Dev.
Roland Diggelmann	COO-Diagnostics
Sophie Kornowski-Bonnet	Head-Roche Partnering
Christoph Franz	Chmn.
Osamu Nagayama	CEO/Pres., Chugai

Auditor: KPMG AG
Legal Advisor:

Description

Roche Holding AG, also referred to as F. Hoffmann-La Roche Ltd. and based in Switzerland, is a world-leading healthcare and biotechnology company. The firm occupies an industry-leading position in the global diagnostics market and ranks as one of the top producers of pharmaceuticals, with recognition in the areas of oncology, autoimmune disease and metabolic disorder treatments, virology and transplantation medicine. The company's operations currently extend to over 100 countries, with additional alliances and research and development agreements with corporate and institutional partners furthering Roche's collective reach. It operates in two divisions: pharmaceuticals, which generates the majority of the firm's annual sales; and diagnostics. The pharmaceuticals division focuses on translating science into breakthrough medicines for patients, with research at Roche and wholly-owned Genentech, Inc. in the U.S., as well as Chugai Pharmaceutical Co., Ltd. in Japan. This segment has more than 150 worldwide partners engaged in clinical development, manufacturing and commercial operations, with a focus on oncology, immunology, ophthalmology, infectious diseases and neuroscience. More than half of the compounds in this division's product pipeline are biopharmaceuticals. The diagnostics division performs blood, tissue and other types of patient samples, as well as in vitro diagnostics for the purpose of obtaining information in relation to improved disease management and patient care. Diagnostic services and solutions provide prevention, screening, diagnosis, prognosis, stratification, treatment and monitoring capabilities in regard to diseases. In April 2018, the firm acquired Flatiron Health, specializing in U.S. cancer data analytics. Earlier that year, Roche acquired an additional stake of Ignyta, Inc., for a total 84.71% holding. Ignyta develops precisely-targeted therapeutics guided by diagnostic tests to patients with cancer.

Financials Financial Details | Compare to Industry Averages | Build Custom Table | Compare Companies

$USD, In whole numbers, except marked * or %	2017	2016	2015	2014	2013	2012
Financials						
Revenue	56,298,833,082	53,157,991,212	50,902,846,551	50,360,521,122	49,094,085,204	47,914,502,148
Cost of Revenue	18,359,281,143	16,340,457,060	15,613,316,820	13,513,699,377	12,066,488,316	12,295,739,475
Gross Margin %	67.39	69.26	69.33	73.17	75.42	74.34
R&D Expense	11,403,982,764	11,646,362,844	9,676,014,777	9,993,128,715	9,361,930,590	9,646,727,184
Operating Income	13,131,950,751	14,208,522,273	13,958,062,857	14,229,730,530	16,538,400,792	14,265,077,625
Operating Margin %	23.33	26.73	27.42	28.26	33.69	29.77
SGA Expense	13,403,618,424	10,962,649,035	11,655,452,097	12,623,962,500	11,127,265,506	11,706,957,864
Net Income	8,718,613,461	9,670,964,182	8,950,894,371	9,424,545,444	11,274,713,388	9,633,598,263
Earnings Per Share	1.27	1.41	1.30	1.37	1.65	1.41
Dividends	1.03	1.01	0.96	0.99	0.90	0.83
Book Value Per Share	3.41	2.66	2.54	2.59	2.32	2.34
Operating Cash Flow	18,202,744,008	15,149,764,917	15,402,244,167	16,087,977,810	15,928,410,924	15,153,804,585
Capital Expenditure	4,254,780,321	5,196,022,965	4,150,758,870	3,367,063,278	2,882,303,118	2,429,860,302
Free Cash Flow	13,947,963,687	9,953,741,952	11,251,485,297	12,720,914,532	13,046,107,806	12,723,944,283
Profitability						
EBITDA	17,047,398,960	18,017,929,197	16,853,494,896	16,446,498,345	18,552,175,290	16,912,070,082
Return on Assets %	11.25	12.55	11.71	13.54	17.59	15.10
Return on Equity %	34.29	42.66	43.70	48.00	66.08	71.75
Net Margin %	15.49	18.19	17.58	18.71	22.97	20.11
Assets Turnover	0.73	0.69	0.67	0.72	0.77	0.75
Financial Leverage	2.90	3.21	3.61	3.86	3.22	4.47

Brands, Divisions and Affiliates

F Hoffmann-La Roche Ltd
Genentech Inc
Chugai Pharmaceutical Co Ltd
Flatiron Health
Ignyta Inc

Top Salaries

Other Thoughts

Apparent Female Officers or Directors:

Corporate Culture

INDUSTRY ASSOCIATIONS AND ORGANIZATIONS

Agricultural Biotechnology Industry Associations:

International Service for the Acquisition of Agri-Biotech Applications (ISAAA)

Address1: 105 Leland Lab
Address2: Cornell University
City: Ithaca
State: NY
Zip Code:14853
Country:USA
Toll-Free:
Phone: 607-255-1724
Fax: 607-255-1215
Web: www.isaaa.org
The International Service for the Acquisition of Agri-Biotech Applications (ISAAA) is a not-for-profit organization that provides bioengineered seeds to poor and developing countries. In general, such seeds will enhance production per acre due to resistance to drought, insects and disease, and will offer additional crop enhancements.

Agricultural Biotechnology Resources:

UK Agricultural Biodiversity Coalition (UKabc)

Address1: UK Food Group
Address2: 56-64 Leonard St.
City: London
State:
Zip Code:EC2A 4LT
Country:UK
Toll-Free:
Phone: 44-207-065-0879
Fax:
Web: www.ukabc.org
The UK Agricultural Biodiversity Coalition (UKabc) provides links to life science and seed companies, databases and information resources, publicly funded research bodies and industry associations. UKabc is an activity of the UK Food Group (UKFG).

Agriculture Industry Resources:

Consultative Group on International Agricultural Research (CGIAR)

Address1: 1000 Ave. Agropolis
Address2:
City: Montpellier
State:
Zip Code:F-34394 cedex 5
Country:France
Toll-Free:
Phone: 33-4-67-04-7575
Fax: 33-4-67-04-75-83
Web: www.cgiar.org
The Consultative Group on International Agricultural Research (CGIAR), established in 1971, and operating as part of The World Bank, is a strategic partnership of countries, international and regional organizations and private foundations supporting the work of 15 international Centers. In collaboration with national agricultural research systems, civil society and the private sector, the CGIAR fosters sustainable agricultural growth through high-quality science aimed at benefiting the poor through stronger food security, better human nutrition and health, higher incomes and improved management of natural resources.

Agriculture Industry Resources:

Food and Agriculture Organization of the United Nations

Address1: Viale delle Terme di Caracalla
Address2:
City: Rome
State:
Zip Code:00153
Country:Italy
Toll-Free:
Phone: 39-06-570-51
Fax:
Web: www.fao.org
The Food and Agriculture Organization of the United Nations leads international efforts to defeat hunger. Serving both developed and developing countries, FAO acts as a forum where nations meet to negotiate agreements and debate policy. FAO is also a source of knowledge and information. It helps nations in their efforts to modernize and improve agriculture, forestry and fisheries practices and ensure good nutrition. The FAO's web site provides extensive statistical data on food production, costs and world hunger.

Alternative Energy-Biomass:

Biofuels Association of Australia (BAA)

Address1: C5, Level 1

Address2: 2 Main St.
City: Point Cook
State: VIC
Zip Code:3030
Country:Australia
Toll-Free:
Phone: 61-3-9394-6309
Fax:
Web: www.biofuelsassociation.com.au
The Biodiesel Association of Australia (BAA) is an organization that works to represent the interests of the biofuels industry. In February 2007, the group merged with Renewable Fuels Australia and incorporated.

Alternative Energy-Biomass:
Biomass Research and Development (BR&D)

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.biomassboard.gov/
Biomass Research & Development (BRD) is a multi-agency effort to coordinate and accelerate all federal bio-based products and bioenergy research and development.

Alternative Energy-Biomass:
Centre for the Development of Renewable Energy Sources (CEDER)

Address1: Autovia de Navarra A15
Address2: Salida 56
City: Lubia
State:
Zip Code:42290
Country:Spain
Toll-Free:
Phone:
Fax:
Web: www.ceder.es
The Centre for the Development of Renewable Energy Sources (CEDER) is a unit of Spain's CIEMAT (Research Centre for Energy, Environment and Technology). CEDER focuses on biomass energy, wind energy and energy efficiency.

Alternative Energy-Biomass:
EERE Bioenergy Technologies Office

Address1: 1000 Independence Ave. SW
Address2: EE-3B, 5H-021
City: Washington
State: DC
Zip Code:20585
Country:USA
Toll-Free:
Phone: 202-586-5188
Fax:
Web: www1.eere.energy.gov/bioenergy/
The Bioenergy Technology Office of the Office of Energy Efficiency and Renewable Energy (EERE), a division of the U.S. Department of Energy, provides information on biomass and biodiesel technology.

Alternative Energy-Biomass:
National Biodiesel Board (NBB)

Address1: 605 Clark Ave.
Address2:
City: Jefferson City
State: MO
Zip Code:65101
Country:USA
Toll-Free: 800-929-3437
Phone: 573-635-3893
Fax: 573-635-7913
Web: www.biodiesel.org
The National Biodiesel Board (NBB) is a national trade association that promotes the biodiesel industry.

Alternative Energy-Biomass:

Northeast Regional Biomass Program (NRBP)

Address1: 400 N. Capitol St. NW
Address2: Ste. 382
City: Washington
State: DC
Zip Code:20001
Country:USA
Toll-Free:
Phone: 202-624-8464
Fax: 202-624-8463
Web: www.nrbp.org
The Northeast Regional Biomass Program (NRBP) is one of five Regional Biomass Energy Programs established and funded by the U.S. Department of Energy. The Northeast region consists of 11 states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont. The NRBP is administered by the CONEG Policy Research Center, Inc.

Alternative Energy-Ethanol:

Renewable Fuels Association (RFA)

Address1: 425 3rd St. SW
Address2: Ste. 1150
City: Washington
State: DC
Zip Code:20024
Country:USA
Toll-Free:
Phone: 202-289-3835
Fax: 202-289-7519
Web: www.ethanolrfa.org
The Renewable Fuels Association (RFA) is a trade organization representing the ethanol industry. It publishes a wealth of useful information, including a listing of biorefineries and monthly U.S. fuel ethanol production and demand.

Biology-Synthetic:

BioBricks Foundation (BBF)

Address1: 955 Massachusetts Ave.
Address2: Ste. 330
City: Cambridge
State: MA
Zip Code:02139
Country:USA
Toll-Free:
Phone:
Fax:
Web: www.biobricks.org
The BioBricks Foundation (BBF) is a not-for-profit organization founded by engineers and scientists from MIT, Harvard, and UCSF with significant experience in both nonprofit and commercial biotechnology research. BBF encourages the development and responsible use of technologies based on BioBrick standard DNA parts that encode basic biological functions.

Biology-Synthetic:

SyntheticBiology.org

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: syntheticbiology.org
Synthetic Biology is a consortium of individuals, labs and groups working together to advance the development of biological engineering. Its members include 37 labs from 22 different universities, including MIT, Cambridge and Harvard. Synthetic Biology does not maintain a headquarters, instead allowing members to update and edit the web site in order to disseminate knowledge.

Biotechnology & Biological Industry Associations:

All India Biotech Association (AIBA)

Address1: 2 Local Shopping Ctr. Block EFGH
Address2: Masjig Moth, Greater Kailash-II
City: New Delhi
State:

Zip Code:110048
Country:India
Toll-Free:
Phone: 91-11-2921-1487
Fax: 91-11-2922-3089
Web: www.aibaonline.com
All India Biotech Association (AIBA) was established in 1994 as a nonprofit group to represent India's biotechnology industry.

Biotechnology & Biological Industry Associations:
American Peptide Society (APS)

Address1: P.O. Box 13796
Address2:
City: Albuquerque
State: NM
Zip Code:87192
Country:USA
Toll-Free:
Phone: 505-459-4808
Fax: 775-667-5332
Web: www.americanpeptidesociety.org
The American Peptide Society (APS) is a nonprofit organization for the advancement and promotion of knowledge and research in the field of peptide chemistry and biology.

Biotechnology & Biological Industry Associations:
American Society for Microbiology (ASM)

Address1: 1752 N St. NW
Address2:
City: Washington
State: DC
Zip Code:20036
Country:USA
Toll-Free:
Phone: 202-737-3600
Fax:
Web: www.asm.org
The American Society for Microbiology (ASM) is a life science membership organization that specializes in the advancement of the study of bacteria, viruses, rickettsiae, mycoplasma, fungi, algae and protozoa.

Biotechnology & Biological Industry Associations:
American Society of Gene & Cell Therapy (ASGCT)

Address1: 555 East Wells St.
Address2: Ste. 1100
City: Milwaukee
State: WI
Zip Code:53202
Country:USA
Toll-Free:
Phone: 414-278-1341
Fax: 414-276-3349
Web: www.asgct.org
The American Society of Gene & Cell Therapy (ASGCT) is a nonprofit medical and professional organization that represents researchers and scientists devoted to the discovery of new gene therapies. Formerly known as the American Society of Gene Therapy, the organization was established in 1996 by Dr. George Stamatoyannopoulos, professor of medicine at the University of Washington 's School of Medicine. ASGCT is the largest association of individuals involved in gene therapeutics.

Biotechnology & Biological Industry Associations:
Association of Biotechnology Led Enterprises (ABLE)

Address1: 123/C, 16th Main Rd., 5th Cross, 4th Block
Address2: Koramangala
City: Bangalore
State:
Zip Code:560034
Country:India
Toll-Free:
Phone:
Fax: 91-80-4163-6853
Web: ableindia.in
The Association of Biotechnology Led Enterprises (ABLE) is an organization focused on accelerating the pace of Biotechnology in India by enabling strategic alliances between researchers, the government and the global Biotech industry.

Biotechnology & Biological Industry Associations:

Association of German Biotechnology Companies (VBU)

Address1: Theodor-Heuss-Allee 25
Address2:
City: Frankfurt am Main
State:
Zip Code:60486
Country:Germany
Toll-Free:
Phone: 49-69-7564-124
Fax: 49-69-7564-169
Web: www.v-b-u.org
The Association of German Biotechnology Companies (in German, Vereinigung Deutscher Biotechnologie-Unternehmen, VBU), founded in 1996, is one of the oldest and largest industrial biotechnology associations in Europe. Since its foundation, VBU has devoted itself to the promotion of science and technology and the transfer of research findings into innovations.

Biotechnology & Biological Industry Associations:
AusBiotech

Address1: 627 Chapel St.
Address2: Fl. 4
City: South Yarra
State: VIC
Zip Code:3141
Country:Australia
Toll-Free:
Phone: 03-9828-1400
Fax: 03-9827-2180
Web: www.ausbiotech.org
AusBiotech is a professional organization for the biotech industry in Australia, with members in the human health, agricultural, medical device, bioinformatics, environmental and industrial sectors.

Biotechnology & Biological Industry Associations:
BioAlberta

Address1: 314 Capital Pl.
Address2: 9707-110 St.
City: Edmonton
State: AB
Zip Code:T5K 2L9
Country:Canada
Toll-Free:
Phone: 780-425-3804
Fax: 780-409-9263
Web: www.bioalberta.com
BioAlberta is a private, nonprofit industry association representing Alberta, Canada's biotech industry.

Biotechnology & Biological Industry Associations:
Biochemical Society

Address1: 12 Roger St.
Address2: Charles Darwin House
City: London
State:
Zip Code:WC1N 2JU
Country:UK
Toll-Free:
Phone: 44-20-7685-2400
Fax: 44-20-7685-2467
Web: www.biochemistry.org
The Biochemical Society is a professional association that promotes the advancement of the science of biochemistry, viewing cellular and molecular life sciences as a seamless continuum.

Biotechnology & Biological Industry Associations:
BIOCOM

Address1: 10996 Torreyana Rd.
Address2: Ste. 200
City: San Diego
State: CA
Zip Code:92121
Country:USA
Toll-Free:
Phone: 858-455-0300
Fax:

Web: www.biocom.org
BIOCOM is a trade organization which seeks to promote the interests of life science industry through advancements in health, energy and agriculture. Its covers a range of areas, including diagnostic, pharmaceuticals, biotechnology, medical device, bio-renewable energy, agriculture and connected health. With over 700 member companies, service providers and research institutions, the organization offers talent development, networking, public policy initiatives and capital development opportunities.

Biotechnology & Biological Industry Associations:
BioForward

Address1: 214 N. Hamilton
Address2: Ste. 202
City: Madison
State: WI
Zip Code:53703
Country:USA
Toll-Free:
Phone: 608-236-4693
Fax:
Web: www.bioforward.org
BioForward, formerly the Wisconsin Biotechnology and Medical Devices Association, is a professional organization devoted to the promotion of the biotech industry in Wisconsin.

Biotechnology & Biological Industry Associations:
BioIndustry Association

Address1: 105 Victoria St.
Address2: Southside, 7th Fl.
City: London
State:
Zip Code:SW1E 6QT
Country:UK
Toll-Free:
Phone: 44-20-7630-2180
Fax: 44-20-7900-2443
Web: www.bioindustry.org
The BioIndustry Association promotes bioscience development in the U.K. The organization operates a public affairs program, a conference and seminar program, trade missions and publications for internal and external audiences.

Biotechnology & Biological Industry Associations:
Biomedical Engineering Society (BMES)

Address1: 8201 Corporate Dr.
Address2: Ste. 1125
City: Landover
State: MD
Zip Code:20785-2224
Country:USA
Toll-Free: 877-871-2637
Phone: 301-459-1999
Fax: 301-459-2444
Web: www.bmes.org
The Biomedical Engineering Society (BMES) supports and advances the use of engineering and technology for human health and well being. It promotes the development of professionals in the biomedical engineering and bioengineering industry.

Biotechnology & Biological Industry Associations:
Biomedical Engineering Society of India

Address1: c/o Department of Biomedical Engineering
Address2: Manipal Insatiate of Technology
City: Manipal
State: Karnataka
Zip Code:576 104
Country:India
Toll-Free:
Phone: 91-820-2924-214
Fax: 91-820-2571-071
Web: www.bmesi.org.in
The Biomedical Engineering Society of India is an all India association which seeks to advance interdisciplinary cooperation among scientists, engineers, and medical doctors for the growth of teaching, research and practices of biomedical engineering.

Biotechnology & Biological Industry Associations:
BioQuebec

Address1: 500 Cartier Blvd. W.
Address2: Ste. 130

City: Laval
State: QB
Zip Code:H7V 5B7
Country:Canada
Toll-Free:
Phone: 450-781-3965
Fax: 450-781-3966
Web: www.bioquebec.com
BIOQuebec is a biotechnology and life science industry association representing more than 250 member companies and R&D centers in Quebec. The association works to create a positive influence on the growth of the life science industry, including capital access, public policy, workforce development and international promotion.

Biotechnology & Biological Industry Associations:
BioSingapore

Address1:
Address2:
City: Singapore
State:
Zip Code:
Country:Singapore
Toll-Free:
Phone:
Fax:
Web: www.biosingapore.org
BioSingapore is an industry association for life sciences business in Singapore, helping local businesses network with financial institutions and other important sectors.

Biotechnology & Biological Industry Associations:
BIOTECanada

Address1: 1 Nicholas St.
Address2: Ste. 600
City: Ottawa
State: ON
Zip Code:K1N 7B7
Country:Canada
Toll-Free:
Phone: 613-230-5585
Fax: 613-563-8850
Web: www.biotech.ca
BIOTECanada is a trade organization that promotes the Canadian biotech industry.

Biotechnology & Biological Industry Associations:
Biotechnology and Biological Sciences Research Council (BBSRC)

Address1: N. Star Ave.
Address2: Polaris House
City: Swindon
State:
Zip Code:SN2 1UH
Country:UK
Toll-Free:
Phone: 44-1793-413200
Fax: 44-1793-413201
Web: www.bbsrc.ac.uk
The Biotechnology and Biological Sciences Research Council (BBSRC) provides funding for biotech research in the U.K.

Biotechnology & Biological Industry Associations:
Biotechnology Industry Organization (BIO)

Address1: 1201 Maryland Ave. SW
Address2: Ste. 900
City: Washington
State: DC
Zip Code:20024
Country:USA
Toll-Free:
Phone: 202-962-9200
Fax: 202-488-6301
Web: www.bio.org
The Biotechnology Industry Organization (BIO) represents members involved in the research and development of health care, agricultural, industrial and environmental biotechnology products. BIO has both small and large member organizations.

Biotechnology & Biological Industry Associations:

Biotechnology Research Institute of the National Research Council Canada (NRC-BRI)

Address1: 6100 Royalmount Ave.
Address2:
City: Montreal
State: QC
Zip Code:H4P 2R2
Country:Canada
Toll-Free:
Phone: 514-496-6100
Fax:
Web: www.nrc-cnrc.gc.ca/eng/ibp/bri.html
The Biotechnology Research Institute of the National Research Council Canada (NRC-BRI) is one of the largest Canadian research facilities that focuses solely on biotechnology.

Biotechnology & Biological Industry Associations:

California Healthcare Institute (CHI)

Address1: 250 E. Grand Ave.
Address2: Ste. 26
City: La Jolla
State: CA
Zip Code:92037
Country:USA
Toll-Free:
Phone: 650-871-3250
Fax:
Web: http://califesciences.org
California Life Sciences Association (CLSA) was formed in 2015 through the merger between California Health Care Institute and Bay Area Bioscience Association. It works to promote California's life sciences industry in collaboration with government, academia as well as other stakeholders to form public policy and business solutions. CLSA membership includes over 750 biotechnology, pharmaceutical, medical device and diagnostics companies, research universities and institutes, investors and service providers.

Biotechnology & Biological Industry Associations:

Connecticut BioScience Cluster (CURE)

Address1: 350 Church St.
Address2: Fl. 3
City: Hartford
State: CT
Zip Code:06103
Country:USA
Toll-Free:
Phone: 203-777-8747
Fax:
Web: www.curenet.org
Connecticut BioScience Cluster (CURE) is a partnership with the Department of Economic and Community Development to promote Connecticut's biotech clusters.

Biotechnology & Biological Industry Associations:

Council for Biotechnology Information (CBI)

Address1: 1201 Maryland Ave. SW
Address2: Ste. 900
City: Washington
State: DC
Zip Code:20024
Country:USA
Toll-Free:
Phone: 202-962-9200
Fax:
Web: www.whybiotech.com
The Council for Biotechnology Information (CBI) is a trade organization dedicated to promoting the agricultural biotechnology industry.

Biotechnology & Biological Industry Associations:

Environmental Mutagen Society (EMS)

Address1: 1821 Michael Faraday Dr.
Address2: Ste. 300
City: Reston
State: VA
Zip Code:20190
Country:USA
Toll-Free:
Phone: 703-438-8220
Fax: 703-438-3113
Web: www.ems-us.org
The Environmental Mutagen Society (EMS) provides information on the process of biological mutagenesis and the application of this process in the field of genetic toxicology.

Biotechnology & Biological Industry Associations:
European Association for Bioindustries (EuropaBio)

Address1: Ave. de l'Armee 6
Address2:
City: Brussels
State:
Zip Code:1040
Country:Belgium
Toll-Free:
Phone: 32-2-735-0313
Fax: 32-2-735-4960
Web: www.europabio.org
The European Association for Bioindustries (EuropaBio) promotes the biotechnology industry in Europe. The organization is comprised of 66 corporate and 7 associate members, as well as 4 Bioregions and 22 national biotechnology associations representing more than 1,800 small and medium sized enterprises.

Biotechnology & Biological Industry Associations:
Federation of American Societies for Experimental Biology (FASEB)

Address1: 9650 Rockville Pike
Address2:
City: Bethesda
State: MD
Zip Code:20814
Country:USA
Toll-Free:
Phone: 301-634-7000
Fax: 301-634-7001
Web: www.faseb.org
The Federation of American Societies for Experimental Biology (FASEB) works with its 23 member societies to advance biological sciences through advocacy for research policies that promote scientific progress.

Biotechnology & Biological Industry Associations:
German Association of Biotechnology Industries (DIB)

Address1: Hallerstrasse 6
Address2:
City: Berlin
State:
Zip Code:10587
Country:Germany
Toll-Free:
Phone: 49-30-343-816-0
Fax: 49-30-343-819-28
Web: www.nordostchemie.de
The German Association of Biotechnology Industries, in German, Deutsche Industrievereinigung Biotechnologie (DIB), represents the biotechnology industry in Germany.

Biotechnology & Biological Industry Associations:
International Biometric Society (IBS)

Address1: 1444 I St. NW
Address2: Ste. 700
City: Washington
State: DC
Zip Code:20005
Country:USA
Toll-Free:
Phone: 202-712-9049
Fax: 202-216-9646
Web: www.biometricsociety.org
The International Biometric Society (IBS) is an association that is devoted to the development and application of statistical and mathematical theory and methods in the biosciences.

Biotechnology & Biological Industry Associations:
International Society for Clinical Biostatistics (ISCB)

Address1: Bregnerodvej 132 A
Address2:
City: Birkerod
State:
Zip Code:DK-3460
Country:Denmark
Toll-Free:

Phone: 45-26-82-79-70
Fax:
Web: www.iscb.info
The International Society for Clinical Biostatistics (ISCB) is a professional organization that aims to stimulate research on the biostatistical principles and methodology used in clinical research, to increase the relevance of statistical theory to clinical medicine and to promote better understanding of the use and interpretation of biostatistics by the general public.

Biotechnology & Biological Industry Associations:
International Society for Stem Cell Research (ISSCR)

Address1: 5215 Old Orchard Rd.
Address2: Ste. 270
City: Skokie
State: IL
Zip Code:60077
Country:USA
Toll-Free:
Phone: 224-592-5700
Fax: 224-365-0004
Web: www.isscr.org
The International Society for Stem Cell Research (ISSCR) is an independent, nonprofit organization established to promote the exchange and dissemination of information and ideas relating to stem cells; to encourage the general field of research involving stem cells; and to promote professional and public education in all areas of stem cell research and application.

Biotechnology & Biological Industry Associations:
Iowa Biotechnology Association

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free: 800-709-8907
Phone:
Fax:
Web: www.iowabiotech.com
The Iowa Biotech Association promotes the biotechnology industry in Iowa. The organization's web site includes an industry directory, as well as job listings and current news and events.

Biotechnology & Biological Industry Associations:
Japan Bioindustry Association (JBA)

Address1: 2-26-9 Hatchobori, Chuo-ku
Address2: Grande Bldg. 8F
City: Tokyo
State:
Zip Code:104-0032
Country:Japan
Toll-Free:
Phone: 81-3-5541-2731
Fax: 81-3-5541-2737
Web: www.jba.or.jp
The Japan Bioindustry Association (JBA) is a nonprofit organization dedicated to the promotion of bioscience, biotechnology and bioindustry in both Japan and the rest of the world. Established through the support and cooperation of industry, academia and government, JBA is the only organization of its kind in Japan.

Biotechnology & Biological Industry Associations:
KoreaBio

Address1: 1F. #C, Korea Bio Park
Address2: Sampyeong-dong, Bundang-gu
City: Seongnam-si
State: Gyeonggi-do
Zip Code:694-1
Country:Korea
Toll-Free:
Phone: 82-31-628-0037
Fax: 82-31-628-0054
Web: www.koreabio.org
KoreaBio was established in 1991 to promote and facilitate growth and development of the bioindustry within Korea.

Biotechnology & Biological Industry Associations:
Massachusetts Biotechnology Council (MBC)

Address1: 300 Technology Sq.
Address2: Fl. 8
City: Cambridge
State: MA
Zip Code:02139
Country:USA
Toll-Free:
Phone: 617-674-5100
Fax: 617-674-5101
Web: www.massbio.org
The Massachusetts Biotechnology Council (MBC) is a nonprofit organization that promotes the Massachusetts biotech industry.

Biotechnology & Biological Industry Associations:
Michigan Biotechnology Association

Address1: 3520 Green Ct.
Address2: Ste. 175
City: Ann Arbor
State: MI
Zip Code:48105-1579
Country:USA
Toll-Free:
Phone: 734-527-9150
Fax: 734-302-4933
Web: www.michbio.org
The Michigan Biotechnology Association is a nonprofit organization dedicated to promoting the biotech industry in Michigan.

Biotechnology & Biological Industry Associations:
Missouri Biotechnology Association (MOBIO)

Address1: 428 E. Capitol
Address2: P.O. Box 148
City: Jefferson City
State: MO
Zip Code:65102-0148
Country:USA
Toll-Free:
Phone: 573-761-7600
Fax: 573-761-7601
Web: www.mobio.org
The Missouri Biotechnology Association (MOBIO) is an industry organization that promotes the biotech industry in Missouri.

Biotechnology & Biological Industry Associations:
National Association for Biomedical Research (NABR)

Address1: 818 Connecticut Ave. NW
Address2: Ste. 900
City: Washington
State: DC
Zip Code:20006
Country:USA
Toll-Free:
Phone: 202-857-0540
Fax: 202-659-1902
Web: www.nabr.org
The National Association for Biomedical Research (NABR) is a nonprofit advocacy group that supports sound public policy regarding the role of humane animal use in biomedical research, higher education and product safety testing.

Biotechnology & Biological Industry Associations:
New York Biotechnology Association (NYBA)

Address1: 25 Health Sciences Dr.
Address2: Ste. 203
City: Stony Brook
State: NY
Zip Code:11790
Country:USA
Toll-Free:
Phone: 631-444-8895
Fax: 631-444-8896
Web: www.nyba.org
The New York Biotechnology Association (NYBA) is a not-for-profit trade association dedicated to the development and growth of biotechnology-related industries and institutions in New York.

Biotechnology & Biological Industry Associations:
Organibio

Address1: 14, rue de la Republique
Address2: Le Diamant A
City: Puteaux
State:
Zip Code:92800
Country:France
Toll-Free:
Phone: 33-1-4653-1197
Fax: 33-1-4653-1100
Web: www.organibio.org
ORGANIBIO represents the French bioscience industry, particularly the biotechnology sector.

Biotechnology & Biological Industry Associations:
Pennsylvania Bioscience Association (PBA)

Address1: 650 E. Swedesford Rd.
Address2: Ste. 190
City: Wayne
State: PA
Zip Code:19087
Country:USA
Toll-Free:
Phone: 610-947-6800
Fax: 610-947-6801
Web: www.pabio.org
The Pennsylvania Bioscience Association (PBA) is a nonprofit organization promoting bioscience in Pennsylvania.

Biotechnology & Biological Industry Associations:
Society for Biomaterials

Address1: 1120 Route 73
Address2: Ste. 200
City: Mt. Laurel
State: NJ
Zip Code:08054
Country:USA
Toll-Free:
Phone: 856-439-0826
Fax: 856-439-0525
Web: www.biomaterials.org
The Society for Biomaterials is a professional society that promotes advances in all phases of materials research and development by encouraging cooperative educational programs, clinical applications and professional standards in the biomaterials field.

Biotechnology & Biological Industry Associations:
Society for In Vitro Biology (SIVB)

Address1: 514 Daniels St.
Address2: Ste. 411
City: Raleigh
State: NC
Zip Code:27605
Country:USA
Toll-Free:
Phone: 919-562-0600
Fax: 919-562-0608
Web: www.sivb.org
The Society for In Vitro Biology (SIVB) is an association of scientists working to foster the exchange of knowledge in the field of in vitro biology. The group maintains a variety of publications, national and local conferences, meetings and workshops.

Biotechnology & Biological Industry Associations:
Society for Industrial Microbiology and Biotechnology (SIMB)

Address1: 3929 Old Lee Hwy.
Address2: Ste. 92A
City: Fairfax
State: VA
Zip Code:22030-2421
Country:USA
Toll-Free:
Phone: 703-691-3357
Fax: 703-691-7991

Web: www.simhq.org
The Society for Industrial Microbiology and Biotechnology (SIMB) is a nonprofit professional association that works for the advancement of microbiological sciences as they apply to industrial products, biotechnology, materials and processes.

Biotechnology & Biological Industry Associations:
Tech Council of Maryland-MdBio Division

Address1: 9210 Corp. Blvd.
Address2: Ste. 470
City: Rockville
State: MD
Zip Code:20850
Country:USA
Toll-Free:
Phone: 240-243-4026
Fax: 240-243-4060
Web: www.mdbio.org
The Tech Council of Maryland-MdBio Division is a nonprofit organization that promotes the biotech industry in Maryland. Areas of emphasis include corporate and business development, networking and community building, education and workforce development and communications.

Biotechnology & Biological Industry Associations:
Virginia Biotechnology Association

Address1: 800 E. Leigh St.
Address2: Ste. 14
City: Richmond
State: VA
Zip Code:23219-1534
Country:USA
Toll-Free:
Phone: 804-643-6360
Fax: 804-643-6361
Web: www.vabio.org
The Virginia Biotechnology Association is a nonprofit organization that promotes the development of the biotechnology industry within Virginia.

Biotechnology Investing:
BioTech Stock Report

Address1: P.O. Box 7274
Address2:
City: Beaverton
State: OR
Zip Code:97007-7274
Country:USA
Toll-Free:
Phone: 503-649-1355
Fax: 503-649-4490
Web: www.biotechnav.com
The BioTech Stock Report is a monthly newsletter that provides analysis, commentary, news and company developments for biotechnology investors.

Biotechnology Investing:
Burrill & Company

Address1: 1 Embarcadero Ctr.
Address2: Ste. 2700
City: San Francisco
State: CA
Zip Code:94111
Country:USA
Toll-Free:
Phone: 415-591-5400
Fax: 415-591-5401
Web: www.burrillandco.com
Burrill & Company is a leading private merchant bank concentrated on companies in the life sciences industries: biotechnology, pharmaceuticals, medical technologies, agricultural technologies, animal health and nutraceuticals.

Biotechnology Investing:
Medical Technology Stock Letter

Address1: P.O. Box 40460
Address2:
City: Berkeley
State: CA

Zip Code:94704
Country:USA
Toll-Free:
Phone: 510-843-1857
Fax:
Web: www.bioinvest.com
The Medical Technology Stock Letter is a newsletter that provides financial advice about investing in biotechnology.

Biotechnology Resources:
About Biotech

Address1: 1500 Broadway
Address2: Fl. 6
City: New York
State: NY
Zip Code:10036
Country:USA
Toll-Free:
Phone:
Fax:
Web: biotech.about.com
About Biotech provides news and information on the biotech industry.

Biotechnology Resources:
BioAbility

Address1: P.O. Box 14569
Address2:
City: Research Triangle Park
State: NC
Zip Code:27709-4569
Country:USA
Toll-Free:
Phone: 919-544-5111
Fax: 919-544-5401
Web: www.bioability.com
BioAbility provides strategic business information to the biotechnology, pharmaceutical and life science industries.

Biotechnology Resources:
BioBasics

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: biobasics.gc.ca
BioBasics is a Canadian web site that offers information and links related to gene therapy, genetic testing and xenotransplantation. It also contains information on food, health, industrial biotechnology, natural resources and sustainable development.

Biotechnology Resources:
Bioengineering Industry Links

Address1: 210 S. 33rd St., Rm. 240 Skirkanich Hall
Address2: UPenn, Dept. of Bioengineering, School of Eng. & Applied Science
City: Philadelphia
State: PA
Zip Code:19104-6321
Country:USA
Toll-Free:
Phone: 215-898-8501
Fax: 215-573-2071
Web: www.seas.upenn.edu/be/misc/bmelink/cell.html
Bioengineering Industry Links is a web site provided by the University of Pennsylvania's Department of Bioengineering. This site features links to companies involved in cell and tissue engineering.

Biotechnology Resources:
Biofind

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.biofind.com
Biofind offers a biotech news directory, job search, chat room and event announcements, as well as a place to post announcements about biotech innovations.

Biotechnology Resources:
Biologic Patent Watch

Address1: 3909 Witmer Rd.
Address2: Ste. 416
City: Niagara Falls
State: NY
Zip Code:14305
Country:USA
Toll-Free:
Phone:
Fax:
Web: www.biologicpatentwatch.com
BiologicPatentWatch concentrates deep knowledge on biologic drugs from more than 60 biotechnology companies, including more than 2,800 active and expired US patents and 41,000 international patents spanning 91 countries and regional patent offices. Access is available through subscription.

Biotechnology Resources:
BioMed Central

Address1: 236 Gray's Inn Rd.
Address2: Fl. 6
City: London
State:
Zip Code:WC1X 8HB
Country:UK
Toll-Free: 800-389-8136
Phone: 44-20-3192-2009
Fax: 44-20-3192-2010
Web: www.biomedcentral.com
BioMed Central is an independent publishing house that prints approximately 160 peer-reviewed journals for the medical industry. Its web site provides free, open access to all of its research.

Biotechnology Resources:
Biospace, Inc.

Address1: 6465 S. Greenwood Plz.
Address2: Ste. 400
City: Centennial
State: CO
Zip Code:80111
Country:USA
Toll-Free: 877-277-7585
Phone:
Fax:
Web: www.biospace.com
Biospace.com offers information, news and profiles on biotech companies. It also provides an outlet for business and scientific leaders in bioscience to communicate with each other.

Biotechnology Resources:
BiotechBlog

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.biotechblog.com
An outstanding blog about the commercialization of biotechnology. It also covers legal, political and research trends. The blog is written by widely followed researcher and author Yali Friedman.

Biotechnology Resources:
Biotechnology Information Directory Section

Address1: 4364 S. Alston Ave.
Address2: c/o Cato Research Ltd.
City: Durham
State: NC
Zip Code:27713-2280
Country:USA
Toll-Free:
Phone: 919-361-2286
Fax: 919-361-2290
Web: www.cato.com/pub.shtml
The Biotechnology Information Directory Section contains links to companies, research institutes, universities, sources of information and other directories related to biotechnology, pharmaceutical development and similar fields. The directory is a service of Cato Research Ltd.

Biotechnology Resources:
BioWorld Online

Address1: 3525 Piedmont Rd.
Address2: Bldg. 6, Ste. 400
City: Atlanta
State: GA
Zip Code:30305
Country:USA
Toll-Free: 800-477-6307
Phone: 404-262-5476
Fax:
Web: www.bioworld.com
BioWorld Online is a news and information site that offers in-depth resources about the biotech industry and leading companies.

Biotechnology Resources:
Centre for Cellular and Molecular Biology (CCMB)

Address1: Habsiguda, Uppal Rd.
Address2:
City: Hyderabad
State: Telangana
Zip Code:500007
Country:India
Toll-Free:
Phone: 91-40-2716-0222-31
Fax: 91-040-2716-0591
Web: www.ccmb.res.in
Centre for Cellular and Molecular Biology (CCMB) is one of the constituent Indian national laboratories of the Council of Scientific and Industrial Research (CSIR), a multidisciplinary research and development organization of the Government of India. CCMB's research is focused on seven areas: Biomedicine and Biotechnology; Genetics, Evolution and Genomics; Cell Biology and Development; Molecular and Structural Biology; Biochemistry and Biophysics; Infectious Diseases; and Computational Biology and Bioinformatics.

Biotechnology Resources:
Deloitte Recap LLC

Address1: 555 Mission St.
Address2:
City: San Francisco
State: CA
Zip Code:94105
Country:USA
Toll-Free: 855-381-4748
Phone: 415-205-2859
Fax:
Web: www.recap.com
Deloitte Recap LLC, formerly Recombinant Capital, provides consulting and analysis regarding corporate and product developments and alliance formations in the biopharmaceutical industry. Its clients include biotechnology and pharmaceutical companies, as well as universities, investment banks and venture capital firms operating in the biotechnology field.

Biotechnology Resources:
Electronic Journal of Biotechnology

Address1: Av. Brasil 2950
Address2:
City: Valparaiso
State:
Zip Code:
Country:Chile

Toll-Free:
Phone: 56-32-227-3267
Fax:
Web: www.ejbiotechnology.info
The Electronic Journal of Biotechnology is an international online journal that publishes information about the biotech industry.

Biotechnology Resources:
Genetic Engineering & Biotechnology News

Address1: 140 Huguenot St.
Address2: Fl. 3
City: New Rochelle
State: NY
Zip Code:10801-5215
Country:USA
Toll-Free: 800-799-9436
Phone: 914-740-2200
Fax: 914-740-2201
Web: www.genengnews.com
Genetic Engineering News is a widely read magazine that offers weekly news on topics in biotechnology, bioregulation, bioprocess, bioresearch and technology transfer. It is published by Mary Ann Liebert, Inc.

Biotechnology Resources:
GrantsNet

Address1: 1200 New York Ave. NW
Address2:
City: Washington
State: DC
Zip Code:20005
Country:USA
Toll-Free:
Phone: 202-326-6430
Fax:
Web: sciencecareers.sciencemag.org/funding
GrantsNet is a free online service to locate funding for training in the biomedical science industry and undergraduate science education, provided through ScienceCareers.org and the American Association for the Advancement of Science (AAAS).

Biotechnology Resources:
Institute for Cellular and Molecular Biology (ICMB)

Address1: Moffett Molecular Biology Bldg.
Address2: 2500 Speedway, A4800
City: Austin
State: TX
Zip Code:78712
Country:USA
Toll-Free:
Phone: 512-471-1156
Fax: 512-471-2149
Web: www.icmb.utexas.edu
The Institute for Cellular and Molecular Biology (ICMB) web site offers a comprehensive dictionary of biotech terms, plus extensive research data regarding biotechnology. ICMB is located in The Louise and James Robert Moffett Molecular Biology Building at the University of Texas at Austin.

Biotechnology Resources:
Institute of Bioinformatics and Applied Biotechnology (IBAB)

Address1: Biotech Park
Address2: Electronics City Phase I
City: Bangalore
State:
Zip Code:560 100
Country:India
Toll-Free:
Phone: 91-80-2852-8900
Fax: 91-80-2852-8904
Web: www.ibab.ac.in
Institute of Bioinformatics and Applied Biotechnology's (IBAB) is a joint venture of the corporate sector and the Karnataka State Government in India. Its serves as the advisory body to Karnataka and provides educational programs in related bioinformatics and biotechnology industries.

Biotechnology Resources:
Journal of Commercial Biotechnology

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.commercialbiotechnology.com
The Journal of Commercial Biotechnology is an international quarterly publication for bioscience business professionals. The journal is designed specifically for those professionals who need to enhance their knowledge of biotechnology business strategy and management, improve and advance their product development or want to keep up-to-date with the current issues and industry trends.

Biotechnology Resources:
Korea Research Institute of Bioscience & Biotechnology (KRIBB)

Address1: Gwahak-ro 125
Address2: Yuseong-gu
City: Daejeon
State:
Zip Code:305-806
Country:Korea
Toll-Free:
Phone: 82-42-860-4114
Fax: 82-42-861-1759
Web: www.kribb.re.kr
The Korea Research Institute of Bioscience & Biotechnology (KRIBB) is a Korean government research institute dedicated to biotechnology research across a broad span of expertise; from basic studies for the fundamental understanding of life phenomena to applied studies such as new drug discovery, novel biomaterials, integrated biotechnology and bioinformation.

Biotechnology Resources:
LifeSciences World

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.lifesciencesworld.com
LifeSciences World is a directory of life science news, jobs, events, articles, reports and links to information on biotechnology, pharmaceuticals and medical devices.

Biotechnology Resources:
Medical Biochemistry Subject List

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: themedicalbiochemistrypage.org
The Medical Biochemistry Subject List, produced by Indiana State University, is a text-based introduction to biochemistry.

Biotechnology Resources:
Microbiology Network (The)

Address1: 150 Parkway Dr.
Address2:
City: N. Chili
State: NY
Zip Code:14514
Country:USA
Toll-Free:
Phone: 585-594-8273
Fax: 585-594-3338
Web: www.microbiol.org
The Microbiology Network is a virtual library containing lists of organizations and associations in the fields of microbiology, biology and general science.

Biotechnology Resources:
Molecular Farming

Address1: Prof. Kirsi-Marja Oksman-Caldentey
Address2: P.O. Box 1000
City: Esposo
State: VTT
Zip Code:Fl-02044
Country:Finland
Toll-Free:
Phone: 358-40-552 2082
Fax: 358-20-722 7071
Web: www.molecularfarming.org
This website offers resources and describes the activities of a group of professors conducting research into molecular farming as a method of producing pharmaceuticals from plants. The group's end goal is to create a strategic vision for molecular farming within the EU.

Biotechnology Resources:
University of California at Davis Biotechnology Program

Address1: 1 Shields Ave.
Address2: 301 Life Sciences
City: Davis
State: CA
Zip Code:95616
Country:USA
Toll-Free:
Phone: 530-752-3260
Fax: 530-752-4125
Web: www.biotech.ucdavis.edu
The University of California at Davis Biotechnology Program provides useful biotech information and links, as well as the administrative home for UC Davis' Biotechnology Program.

Biotechnology Resources:
University of Pennsylvania's Center for Bioethics

Address1: 3401 Market St.
Address2: Ste. 320
City: Philadelphia
State: PA
Zip Code:19104-3308
Country:USA
Toll-Free:
Phone: 215-898-7136
Fax: 215-573-3036
Web: www.bioethics.upenn.edu
The University of Pennsylvania's Center for Bioethics is a world-renowned resource. It incorporates the work of more than twenty people from the university's schools of law, medicine, business, philosophy, public policy and religious studies, as well as other departments. Resources include the PennBioethics newsletter.

Brazilian Government Agencies-Scientific:
National Council for Scientific & Technological Development

Address1: SHIS QI 1 Conjunto B - Blocos A, B, C & D
Address2: Edificio Santos Dumont
City: Brasilia
State: DF
Zip Code:71605-001
Country:Brazil
Toll-Free: 800-61-96-97
Phone:
Fax:
Web: www.cnpq.br
The National Council for Scientific & Technological Development (Conselho Nacional de Desenvolvimento Cientifico e Tecnologico, or CNPq) is a Brazilian government agency affiliated with the country's Ministry of Science and Technology. CNPq works to promote scientific and technological research in Brazil through grants and other support services. The organization also seeks to encourage the development of Brazilian scientists and researchers through the awarding of scholarships and fellowships to students in the sciences.

Canadian Government Agencies-Health Care:
Canadian Institutes of Health Research (CIHR)

Address1: 160 Elgin St.
Address2: Fl. 9
City: Ottawa
State: ON
Zip Code:K1A 0W9
Country:Canada

Toll-Free: 888-603-4178
Phone: 613-941-2672
Fax: 613-954-1800
Web: www.cihr-irsc.gc.ca
The Canadian Institutes of Health Research (CIHR) is the government of Canada's agency for health research. CIHR's mission is to create new scientific knowledge and to catalyze its translation into improved health, more effective health services and products, and a strengthened Canadian health-care system. Composed of 13 Institutes, CIHR provides leadership and support to health researchers and trainees across Canada. The agency provides grants for research in the fields of biomedical, clinical, health systems and environmental health.

Canadian Government Agencies-Health Care:
Health Canada (Health Portfolio, Canadian Minister of Health)

Address1: Health Canada
Address2: Address Locator: 0900C2
City: Ottawa
State: ON
Zip Code:K1A 0K9
Country:Canada
Toll-Free: 866-225-0709
Phone: 613-957-2991
Fax: 613-941-5366
Web: www.hc-sc.gc.ca
The Minister of Health is responsible for maintaining and improving the health of Canadians. This objective is supported by the Health Portfolio, which comprises Health Canada, the Public Health Agency of Canada, the Canadian Institutes of Health Research, the Hazardous Materials Information Review Commission, the Patented Medicine Prices Review Board and Assisted Human Reproduction Canada.

Canadian Government Agencies-Health Care:
Patented Medicine Prices Review Board (PMPRB)

Address1: 333 Laurier Ave. W, Ste. 1400
Address2: Box L40, Standard Life Ctr.
City: Ottawa
State: ON
Zip Code:K1P 1C1
Country:Canada
Toll-Free: 877-861-2350
Phone: 613-954-8299
Fax: 613-952-7626
Web: www.pmprb-cepmb.gc.ca
The Patented Medicine Prices Review Board (PMPRB) is an independent quasi-judicial body established by Parliament of Canada in 1987 under the Patent Act. Its role includes the regulation of drug prices. It also publishes a wealth of information about the Canadian drug industry and drug development.

Careers-Biotech:
BiotechEmployment.com

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.biotechemployment.com
BiotechEmployment.com is an online resource for job seekers in biotechnology. The site's features include resume posting, job search agents and employer profiles. It is part of the eJobstores.com, Inc., which includes the Health Care Job Store sites.

Careers-Biotech:
Chase Group (The)

Address1: 10975 Grandview Dr.
Address2: Ste. 100
City: Overland Park
State: KS
Zip Code:66210
Country:USA
Toll-Free:
Phone: 913-663-3100
Fax: 913-663-3131
Web: www.chasegroup.com
The Chase Group is an executive search firm specializing in biomedical and pharmaceutical placement.

Careers-First Time Jobs/New Grads:

CollegeGrad.com, Inc.

Address1: 950 Tower Ln., Fl. 6
Address2:
City: Foster City
State: CA
Zip Code:94404
Country:USA
Toll-Free:
Phone:
Fax:
Web: www.collegegrad.com
CollegeGrad.com, Inc. offers in-depth resources for college students and recent grads seeking entry-level jobs.

Careers-First Time Jobs/New Grads:

MonsterCollege

Address1: 444 N. Michigan Ave.
Address2: Ste. 600
City: Chicago
State: IL
Zip Code:60611
Country:USA
Toll-Free:
Phone:
Fax:
Web: www.college.monster.com
MonsterCollege provides information about internships and entry-level jobs, as well as career advice and resume tips, to recent college graduates.

Careers-First Time Jobs/New Grads:

National Association of Colleges and Employers (NACE)

Address1: 62 Highland Ave.
Address2:
City: Bethlehem
State: PA
Zip Code:18017-9085
Country:USA
Toll-Free:
Phone: 610-868-1421
Fax:
Web: www.naceweb.org
The National Association of Colleges and Employers (NACE) is a premier U.S. organization representing college placement offices and corporate recruiters who focus on hiring new grads.

Careers-General Job Listings:

CareerBuilder, Inc.

Address1: 200 N La Salle St.
Address2: Ste. 1100
City: Chicago
State: IL
Zip Code:60601
Country:USA
Toll-Free: 800-891-8880
Phone: 773-527-3600
Fax: 773-353-2452
Web: www.careerbuilder.com
CareerBuilder, Inc. focuses on the needs of companies and also provides a database of job openings. The site has over 1 million jobs posted by 300,000 employers, and receives an average 23 million unique visitors monthly. The company also operates online career centers for 140 newspapers and 9,000 online partners. Resumes are sent directly to the company, and applicants can set up a special e-mail account for job-seeking purposes. CareerBuilder is primarily a joint venture between three newspaper giants: The McClatchy Company, Gannett Co., Inc. and Tribune Company.

Careers-General Job Listings:

CareerOneStop

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free: 877-872-5627
Phone:
Fax:

Web: www.careeronestop.org
CareerOneStop is operated by the employment commissions of various state agencies. It contains job listings in both the private and government sectors, as well as a wide variety of useful career resources and workforce information. CareerOneStop is sponsored by the U.S. Department of Labor.

Careers-General Job Listings:
LaborMarketInfo (LMI)

Address1: Employment Development Dept.
Address2: P.O. Box 826880, MIC 57
City: Sacramento
State: CA
Zip Code:94280-0001
Country:USA
Toll-Free:
Phone: 916-262-2162
Fax: 916-262-2352
Web: www.labormarketinfo.edd.ca.gov
LaborMarketInfo (LMI) provides job seekers and employers a wide range of resources, namely the ability to find, access and use labor market information and services. It provides statistics for employment demographics on both a local and regional level, as well as career searching tools for California residents. The web site is sponsored by California's Employment Development Office.

Careers-General Job Listings:
Recruiters Online Network

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.recruitersonline.com
The Recruiters Online Network provides job postings from thousands of recruiters, Careers Online Magazine, a resume database, as well as other career resources.

Careers-General Job Listings:
USAJOBS

Address1: USAJOBS Program Office
Address2: 1900 E St. NW, Ste. 6500
City: Washington
State: DC
Zip Code:20415-0001
Country:USA
Toll-Free:
Phone: 818-934-6600
Fax:
Web: www.usajobs.gov
USAJOBS, a program of the U.S. Office of Personnel Management, is the official job site for the U.S. Federal Government. It provides a comprehensive list of U.S. government jobs, allowing users to search for employment by location; agency; type of work; or by senior executive positions. It also has special employment sections for individuals with disabilities, veterans and recent college graduates; an information center, offering resume and interview tips and other information; and allows users to create a profile and post a resume.

Careers-Health Care:
Health Care Source

Address1: 100 Sylvan Rd.
Address2: Ste. 100
City: Woburn
State: MA
Zip Code:01801
Country:USA
Toll-Free: 800-869-5200
Phone: 781-368-1033
Fax: 800-829-6600
Web: www.healthcaresource.com
Health Care Source is a leading provider of talent management, recruitment and employment services for healthcare providers. It offers a comprehensive suite of solutions, which includes features, such as applicant tracking and onboarding, recruitment optimization, reference checking, behavioral assessments, merit planning, employee performance and eLearning courseware among others.

Careers-Health Care:
Medzilla, Inc.

Address1: P.O. Box 1710
Address2:
City: Marysville
State: WA
Zip Code:98270
Country:USA
Toll-Free:
Phone: 360-657-5681
Fax: 425-279-5427
Web: www.medzilla.com
Medzilla, Inc.'s web site offers job searches, salary surveys, a search agent and information on employment in the biotech, pharmaceuticals, healthcare and science sectors.

Careers-Health Care:
Monster Career Advice-Healthcare

Address1: 133 Boston Post Rd.
Address2:
City: Weston
State: MA
Zip Code:02493
Country:USA
Toll-Free: 800-666-7837
Phone: 978-461-8000
Fax: 978-461-8100
Web: career-advice.monster.com/Healthcare/job-category-3975.aspx
Monster Career Advice-Healthcare, a service of Monster Worldwide, Inc., provides industry-related articles, job listings, job searches and search agents for the medical field.

Careers-Health Care:
PracticeLink

Address1: 415 2nd Ave.
Address2:
City: Hinton
State: WV
Zip Code:25951
Country:USA
Toll-Free: 800-776-8383
Phone:
Fax:
Web: www.practicelink.com
PracticeLink, one of the largest physician employment web sites, is a free service with over 1.7 million page views each month. There are more than 5,000 hospitals, medical groups, private practices and health systems, posting over 20,000 physician job opportunities on the web site.

Careers-Health Care:
RPh on the Go USA, Inc.

Address1: 8001 N. Lincoln Ave.
Address2: Ste. 800
City: Skokie
State: IL
Zip Code:60077
Country:USA
Toll-Free: 800-553-7359
Phone: 847-588-7170
Fax: 847-588-7060
Web: www.rphonthego.com
RPh on the Go USA, Inc. places temporary and permanent qualified professionals in the pharmacy community. This pharmacy staffing firm offers access to more than 160,000 pharmacy professionals and matches the right pharmacy personnel to help meet clients' needs.

Careers-Job Reference Tools:
Vault.com, Inc.

Address1: 132 W. 31st St.
Address2: Fl. 17
City: New York
State: NY
Zip Code:10001
Country:USA
Toll-Free: 800-535-2074
Phone:
Fax: 212-366-6117
Web: www.vault.com
Vault.com, Inc. is a comprehensive career web site for employers and employees, with job postings and valuable information on a wide variety of industries. Its features and content are largely geared toward MBA degree holders.

Careers-Science:
Chem Jobs

Address1: 730 E. Cypress Ave.
Address2:
City: Monrovia
State: CA
Zip Code:91016
Country:USA
Toll-Free:
Phone: 626-930-0808
Fax: 626-930-0102
Web: www.chemjobs.net
Chem Jobs is a leading Internet site for job seekers in chemistry and related fields, with a particular focus on chemists, biochemists, pharmaceutical scientists and chemical engineers. The web site is powered by Chemindustry.com.

Careers-Science:
New Scientist Jobs

Address1: Quadrant House
Address2: Sutton
City: Surrey
State:
Zip Code:SM2 5AS
Country:UK
Toll-Free:
Phone: 781-734-8770
Fax:
Web: jobs.newscientist.com
New Scientist Jobs is a web site produced by the publishers of New Scientist Magazine that connects jobseekers and employers in the bioscience fields. The site includes a job search engine and a free-of-charge e-mail job alert service.

Careers-Science:
Science Careers

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone: 202-312-6375
Fax:
Web: jobs.sciencecareers.org
Science Careers is a web site that contains many useful categories of links, including employment newsgroups, scientific journals, hob postings and placement agencies. It also links to sites containing information regarding internship and fellowship opportunities for high school students, undergrads, graduates, doctoral and post-doctoral students.

Chinese Government Agencies-Science & Technology:
China Ministry of Science and Technology (MOST)

Address1: 15B Fuxing Rd.
Address2:
City: Beijing
State:
Zip Code:100862
Country:China
Toll-Free:
Phone:
Fax:
Web: www.most.gov.cn
The China Ministry of Science and Technology (MOST) is the PRC's official body for science and technology related activities. It drafts laws, policies and regulations regarding science and technology; oversees budgeting and accounting for funds; and supervises research institutes operating in China, among other duties.

Clinical Trials:
Clinical Trials

Address1: U.S. National Library of Medicine
Address2: 8600 Rockville Pike
City: Bethesda
State: MD
Zip Code:20894
Country:USA

Toll-Free: 888-346-3656
Phone: 301-594-5983
Fax:
Web: www.clinicaltrials.gov
Clinical Trials, a service of the National Library of Medicine (NLM), offers up-to-date information for locating federally and privately supported clinical trials for a wide range of diseases and conditions, both within the U.S. and internationally.

Clinical Trials:

Institute of Clinical Research (ICR)

Address1: 10 Cedar Ct., Grove Park
Address2: White Waltham Rd.
City: Maidenhead
State:
Zip Code:SL6 3LW
Country:UK
Toll-Free:
Phone: 44-1628-501700
Fax: 44-1628-501709
Web: www.icr-global.org
The Institute of Clinical Research (ICR) is a nonprofit professional organization for clinical researchers in the pharmaceutical industry in the U.K. It has over 3,000 members in 49 countries worldwide, which primarily include professionals involved in the design, management and conduct of human clinical trials.

Clinical Trials:

Office of Biotechnology Activities, NIH

Address1: 6705 Rockledge Dr.
Address2: Ste. 750, MSC 7985
City: Bethesda
State: MD
Zip Code:20892-7985
Country:USA
Toll-Free:
Phone: 301-496-9838
Fax: 301-496-9839
Web: oba.od.nih.gov/oba/index.html
This unit of the U.S. National Institutes of Health operates a web site with links to clinical research in recombinant DNA and gene transfer, along with information on the National Science Advisory Board for Biosecurity.

Communications Professional Associations:

Health and Science Communications Association (HeSCA)

Address1: P.O. Box 31323
Address2:
City: Omaha
State: NE
Zip Code:68132
Country:USA
Toll-Free:
Phone: 402-915-5373
Fax:
Web: hesca.net
The Health and Science Communications Association (HeSCA) is an organization of communications professionals committed to sharing knowledge and resources in the health sciences arena.

Consulting Industry Associations:

Chemical & Industrial Consultants Association (CICA)

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone: 44-1933-356-422
Fax:
Web: www.chemical-consultants.co.uk
The Chemical & Industrial Consultants Association (CICA) is a U.K.-based network of independent consultants specializing in the application of chemistry in industry.

Corporate Information Resources:

bizjournals.com

Address1: 120 W. Morehead St.
Address2: Ste. 400
City: Charlotte
State: NC
Zip Code:28202
Country:USA
Toll-Free: 866-853-3661
Phone:
Fax:
Web: www.bizjournals.com
Bizjournals.com is the online media division of American City Business Journals, the publisher of dozens of leading city business journals nationwide. It provides access to research into the latest news regarding companies both small and large. The organization maintains 42 websites and 64 print publications and sponsors over 700 annual industry events.

Corporate Information Resources:
Business Wire

Address1: 101 California St.
Address2: Fl. 20
City: San Francisco
State: CA
Zip Code:94111
Country:USA
Toll-Free: 800-227-0845
Phone: 415-986-4422
Fax: 415-788-5335
Web: www.businesswire.com
Business Wire offers news releases, industry- and company-specific news, top headlines, conference calls, IPOs on the Internet, media services and access to tradeshownews.com and BW Connect On-line through its informative and continuously updated web site.

Corporate Information Resources:
Edgar Online, Inc.

Address1: 11200 Rockville Pike
Address2: Ste. 310
City: Rockville
State: MD
Zip Code:20852
Country:USA
Toll-Free: 888-870-2316
Phone: 301-287-0300
Fax: 301-287-0390
Web: www.edgar-online.com
Edgar Online, Inc. is a gateway and search tool for viewing corporate documents, such as annual reports on Form 10-K, filed with the U.S. Securities and Exchange Commission.

Corporate Information Resources:
PR Newswire Association LLC

Address1: 350 Hudson St.
Address2: Ste. 300
City: New York
State: NY
Zip Code:10014-4504
Country:USA
Toll-Free: 800-776-8090
Phone:
Fax: 800-793-9313
Web: www.prnewswire.com
PR Newswire Association LLC provides comprehensive communications services for public relations and investor relations professionals, ranging from information distribution and market intelligence to the creation of online multimedia content and investor relations web sites. Users can also view recent corporate press releases from companies across the globe. The Association is owned by United Business Media plc.

Corporate Information Resources:
Silicon Investor

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.siliconinvestor.com
Silicon Investor is focused on providing information about technology companies. Its web site serves as a financial discussion forum and offers quotes, profiles and charts.

Economic Data & Research:
Centre for European Economic Research (The, ZEW)

Address1: L 7, 1
Address2:
City: Mannheim
State:
Zip Code:68161
Country:Germany
Toll-Free:
Phone: 49-621-1235-01
Fax: 49-621-1235-224
Web: www.zew.de/en
Zentrum fur Europaische Wirtschaftsforschung, The Centre for European Economic Research (ZEW), distinguishes itself in the analysis of internationally comparative data in a European context and in the creation of databases that serve as a basis for scientific research. The institute maintains a special library relevant to economic research and provides external parties with selected data for the purpose of scientific research. ZEW also offers public events and seminars concentrating on banking, business and other economic-political topics.

Economic Data & Research:
Economic and Social Research Council (ESRC)

Address1: Polaris House
Address2: North Star Ave.
City: Swindon
State:
Zip Code:SN2 1UJ
Country:UK
Toll-Free:
Phone: 44-01793 413000
Fax:
Web: www.esrc.ac.uk
The Economic and Social Research Council (ESRC) funds research and training in social and economic issues. It is an independent organization, established by Royal Charter. Current research areas include the global economy; social diversity; environment and energy; human behavior; and health and well-being.

Economic Data & Research:
Eurostat

Address1: 5 Rue Alphonse Weicker
Address2: Joseph Bech Bldg.
City: Luxembourg
State:
Zip Code:L-2721
Country:Luxembourg
Toll-Free:
Phone: 352-4301-1
Fax:
Web: ec.europa.eu/eurostat
Eurostat is the European Union's service that publishes a wide variety of comprehensive statistics on European industries, populations, trade, agriculture, technology, environment and other matters.

Economic Data & Research:
Federal Statistical Office of Germany

Address1: Gustav-Stresemann-Ring 11
Address2:
City: Wiesbaden
State:
Zip Code: D-65189
Country:Germany
Toll-Free:
Phone: 49-611-75-2405
Fax: 49-611-72-4000
Web: www.destatis.de
Federal Statistical Office of Germany publishes a wide variety of nation and regional economic data of interest to anyone who is studying Germany, one of the world's leading economies. Data available includes population, consumer prices, labor markets, health care, industries and output.

Economic Data & Research:
India Brand Equity Foundation (IBEF)

Address1: Fl. 20, Jawahar Vyapar Bhawan
Address2: Tolstoy Marg
City: New Deli

State:
Zip Code:110001
Country:India
Toll-Free:
Phone: 91-11-43845500
Fax: 91-11-23701235
Web: www.ibef.org
India Brand Equity Foundation (IBEF) is a public-private partnership between the Ministry of Commerce and Industry, the Government of India and the Confederation of Indian Industry. The foundation's primary objective is to build positive economic perceptions of India globally. It aims to effectively present the India business perspective and leverage business partnerships in a globalizing marketplace.

Economic Data & Research:
National Bureau of Statistics (China)

Address1: 57, Yuetan Nanjie, Sanlihe
Address2: Xicheng District
City: Beijing
State:
Zip Code:100826
Country:China
Toll-Free:
Phone:
Fax: 86-10-6878-2000
Web: www.stats.gov.cn/english
The National Bureau of Statistics (China) provides statistics and economic data regarding China's economy and society.

Economic Data & Research:
Organization for Economic Co-operation and Development (OECD)

Address1: 2 rue Andre Pascal
Address2: Cedex 16
City: Paris
State:
Zip Code:75775
Country:France
Toll-Free:
Phone: 33-1-45-24-82-00
Fax: 33-1-45-24-85-00
Web: www.oecd.org
The Organization for Economic Co-operation and Development (OECD) publishes detailed economic, government, population, social and trade statistics on a country-by-country basis for over 30 nations representing the world's largest economies. Sectors covered range from industry, labor, technology and patents, to health care, environment and globalization.

Economic Data & Research:
Statistics Bureau, Director-General for Policy Planning (Japan)

Address1: 19-1 Wakamatsu-cho
Address2: Shinjuku-ku
City: Tokyo
State:
Zip Code:162-8668
Country:Japan
Toll-Free:
Phone: 81-3-5273-2020
Fax:
Web: www.stat.go.jp/english
The Statistics Bureau, Director-General for Policy Planning (Japan) and Statistical Research and Training Institute, a part of the Japanese Ministry of Internal Affairs and Communications, plays the central role of producing and disseminating basic official statistics and coordinating statistical work under the Statistics Act and other legislation.

Economic Data & Research:
Statistics Canada

Address1: 150 Tunney's Pasture Driveway
Address2:
City: Ottawa
State: ON
Zip Code:K1A 0T6
Country:Canada
Toll-Free: 800-263-1136
Phone: 514-283-8300
Fax: 514-283-9350
Web: www.statcan.gc.ca
Statistics Canada provides a complete portal to Canadian economic data and statistics. Its conducts Canada's official census every five years, as well as hundreds of surveys covering numerous aspects of Canadian life.

Engineering, Research & Scientific Associations:
Agency For Science, Technology And Research (A*STAR)

Address1: 1 Fusionopolis Way
Address2: 20-10 Connexis N. Twr.
City: Singapore
State:
Zip Code:138632
Country:Singapore
Toll-Free:
Phone: 65-6826-6111
Fax: 65-6777-1711
Web: www.a-star.edu.sg
The Agency For Science, Technology And Research (A*STAR) of Singapore comprises the Biomedical Research Council (BMRC), the Science and Engineering Research Council (SERC), A*STAR Joint Council (A*JC), the A*STAR Graduate Academy (A*GA) and the Corporate Group. Both Councils fund the A*STAR public research institutes which conducts research in specific niche areas in science, engineering and biomedical science.

Engineering, Research & Scientific Associations:
American Association for the Advancement of Science (AAAS)

Address1: 1200 New York Ave. NW
Address2:
City: Washington
State: DC
Zip Code:20005
Country:USA
Toll-Free:
Phone: 202-326-6400
Fax:
Web: www.aaas.org
The American Association for the Advancement of Science (AAAS) is the world's largest scientific society and the publisher of Science magazine. It is an international nonprofit organization dedicated to advancing science around the globe.

Engineering, Research & Scientific Associations:
American Society for Healthcare Engineering (ASHE)

Address1: 155 N. Wacker Dr.
Address2: Ste. 400
City: Chicago
State: IL
Zip Code:60606
Country:USA
Toll-Free:
Phone: 312-422-3800
Fax: 312-422-4571
Web: www.ashe.org
The American Society for Healthcare Engineering (ASHE) is the advocate and resource for continuous improvement in the health care engineering and facilities management professions. It is devoted to professionals who design, build, maintain and operate hospitals and other healthcare facilities.

Engineering, Research & Scientific Associations:
American Society of Agricultural and Biological Engineers (ASABE)

Address1: 2950 Niles Rd.
Address2:
City: St. Joseph
State: MI
Zip Code:49085
Country:USA
Toll-Free: 800-371-2723
Phone: 269-429-0300
Fax: 269-429-3852
Web: www.asabe.org
The American Society of Agricultural and Biological Engineers (ASABE) is a nonprofit professional and technical organization interested in engineering knowledge and technology for food and agriculture and associated industries.

Engineering, Research & Scientific Associations:
Association of Official Analytical Chemists (AOAC)

Address1: 2275 Research Blvd.
Address2: Ste. 300
City: Rockville
State: MD
Zip Code:20850-3250
Country:USA

Toll-Free: 800-379-2622
Phone: 301-924-7077
Fax: 301-924-7089
Web: www.aoac.org
The Association of Official Analytical Chemists (AOAC) is a nonprofit scientific association committed to worldwide standards in analytical results. It develops analytical methods with focus on public health and safety in areas, including fertilizers, veterinary drugs, feeds, foods and beverages, soil and water, infant formula, pharmaceuticals and dietary supplements.

Engineering, Research & Scientific Associations:
China Association for Science and Technology (CAST)

Address1: 3 Fuxing Rd.
Address2:
City: Beijing
State:
Zip Code:100863
Country:China
Toll-Free:
Phone: 8610-6857-1898
Fax: 8610-6857-1897
Web: english.cast.org.cn
The China Association for Science and Technology (CAST) is the largest national non-governmental organization of scientific and technological workers in China. The association has nearly 207 member organizations in the fields of engineering, science and technology.

Engineering, Research & Scientific Associations:
Chinese Academy of Sciences (CAS)

Address1: 52 Sanlihe Rd.
Address2:
City: Beijing
State:
Zip Code:100864
Country:China
Toll-Free:
Phone: 86-10-6859-7521
Fax: 86-10-6851-1095
Web: english.cas.ac.cn
The Chinese Academy of Sciences (CAS) is an academic institution and research center active within the fields of natural and technological sciences. It brings together the operations of 124 science institutions, including five universities and supporting entities and over 104 research institutes throughout China.

Engineering, Research & Scientific Associations:
DECHEMA (Society for Chemical Engineering and Biotechnology)

Address1: Theodor-Heuss-Allee 25
Address2:
City: Frankfurt am Main
State:
Zip Code:60486
Country:Germany
Toll-Free:
Phone: 49-69-75-64-0
Fax: 49-69-75-64-201
Web: dechema.de
The DECHEMA (Society for Chemical Engineering and Biotechnology) is a nonprofit scientific and technical society based in Germany. It was founded in 1926 to promote research and technical advances in the areas of chemical engineering, biotechnology and environmental protection.

Engineering, Research & Scientific Associations:
Federation of Technology Industries (FHI)

Address1: Leusderend 12
Address2:
City: Leusden
State:
Zip Code:3832 RC
Country:The Netherlands
Toll-Free:
Phone: 31-33-465-7507
Fax: 31-33-461-6638
Web: federatie.fhi.nl
The Federation of Technology Industries (FHI) is the Dutch trade organization representing the industrial electronics, automation, laboratory technology and medical technology sectors in the Netherlands.

Engineering, Research & Scientific Associations:
German Association of High-Tech Industries (SPECTARIS)

Address1: Werderscher Markt 15
Address2:
City: Berlin
State:
Zip Code:10117
Country:Germany
Toll-Free:
Phone: 49-30-4140-210
Fax: 49-30-4140-2133
Web: www.spectaris.de
The German Association of High-Tech Industries (SPECTARIS) is the trade association for technology and research in the consumer optics, photonics, biotech, laboratory technology and medical technology sectors.

Engineering, Research & Scientific Associations:
Institute of Bioengineering and Nanotechnology, Singapore

Address1: 31 Biopolis Way
Address2: The Nanos 04-01
City: Singapore
State:
Zip Code:138669
Country:Singapore
Toll-Free:
Phone: 65-6824-7000
Fax: 65-6478-9080
Web: www.ibn.a-star.edu.sg
As a scientific research institute, Institute of Bioengineering and Nanotechnology (IBN) focuses its activities on the following key areas; developing a critical knowledge base in bioengineering and nanotechnology; generating new biomaterials, devices and processes; and producing and publishing high-quality scientific research.

Engineering, Research & Scientific Associations:
Institute of Biological Engineering (IBE)

Address1: 446 East High St.
Address2: Ste. 10
City: Lexington
State: KY
Zip Code:40507
Country:USA
Toll-Free:
Phone: 859-977-7450
Fax: 859-271-0607
Web: www.ibe.org
The Institute of Biological Engineering (IBE) is a professional organization encouraging inquiry and interest in biological engineering and professional development for its members.

Engineering, Research & Scientific Associations:
Institute of Electrical and Electronics Engineers (IEEE)

Address1: 3 Park Ave.
Address2: Fl. 17
City: New York
State: NY
Zip Code:10016-5997
Country:USA
Toll-Free: 800-678-4333
Phone: 212-419-7900
Fax: 212-752-4929
Web: www.ieee.org
The Institute of Electrical and Electronics Engineers (IEEE) is a nonprofit, technical professional association of more than 430,000 individual members in approximately 160 countries. The IEEE sets global technical standards and acts as an authority in technical areas ranging from computer engineering, biomedical technology and telecommunications, to electric power, aerospace and consumer electronics.

Engineering, Research & Scientific Associations:
Institute of Physics and Engineering in Medicine (IPEM)

Address1: 230 Tadcaster Rd.
Address2: Fairmount House
City: York
State:
Zip Code:YO24 1ES
Country:UK
Toll-Free:
Phone: 44-1904-610-821
Fax: 44-1904-612-279
Web: www.ipem.ac.uk

The Institute of Physics and Engineering in Medicine (IPEM) is an organization of scientists applying physics and engineering in medical and biological applications.

Engineering, Research & Scientific Associations:
International Commission of Agricultural and Biosystems Engineering (CIGR)

Address1: 100-73 Kitanokuchi Mozumecho Mukoshi
Address2:
City: Kyoto
State:
Zip Code:617 0001
Country:Japan
Toll-Free:
Phone: 81-90-9888-4050
Fax: 81-75-922-3683
Web: www.cigr.org
International Commission of Agricultural and Biosystems Engineering (CIGR) encourages and facilitates interregional exchange and the development of sciences and technologies in the field of agricultural engineering.

Engineering, Research & Scientific Associations:
International Society of Pharmaceutical Engineers (ISPE)

Address1: 600 N. Westshore Blvd.
Address2: Ste. 900
City: Tampa
State: FL
Zip Code:33609
Country:USA
Toll-Free:
Phone: 813-960-2105
Fax: 813-264-2816
Web: www.ispe.org
The International Society of Pharmaceutical Engineers (ISPE) is a worldwide nonprofit society dedicated to educating and advancing pharmaceutical manufacturing professionals and the biopharmaceutical industry.

Engineering, Research & Scientific Associations:
International Union of Microbiological Societies (IUMS)

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.iums.org
The International Union of Microbiological Societies (IUMS) works to promote the study of microbiological sciences around the world through its three divisions: Bacteriology & Applied Microbiology (BAM); Mycology; and Virology. The association is one of the 31 Scientific Unions of the International Council of Science (ICSU).

Engineering, Research & Scientific Associations:
Japan Science and Technology Agency (JST)

Address1: Kawaguchi Ctr. Bldg.
Address2: 4-1-8 Honcho, Kawaguchi-shi
City: Saitama
State:
Zip Code:332-0012
Country:Japan
Toll-Free:
Phone: 81-48-226-5601
Fax: 81-48-226-5651
Web: www.jst.go.jp/EN
The Japan Science and Technology Agency (JST) acts as a core organization for implementation of the nation's science and technology policies by conducting research and development, with particular emphasis on new technological needs.

Engineering, Research & Scientific Associations:
National Academy of Science (NAS)

Address1: 500 5th St. NW
Address2:
City: Washington
State: DC

Zip Code:20001
Country:USA
Toll-Free:
Phone: 202-334-2000
Fax:
Web: www.nationalacademies.org
The National Academy of Science (NAS) is a private, nonprofit, self-perpetuating society of scholars engaged in scientific and engineering research. Three organizations comprise the NAS: The National Academy of Engineering, the National Academy of Sciences and the National Academy of Medicine.

Engineering, Research & Scientific Associations:
National Medical Research Council (NMRC)

Address1: 11 Biopolis Way
Address2: Helios 09-10/11
City: Singapore
State:
Zip Code:138667
Country:Singapore
Toll-Free:
Phone: 65-6325-8130
Fax: 65-6324-3735
Web: www.nmrc.gov.sg
National Medical Research Council (NMRC) oversees the development and advancement of medical research in Singapore.

Engineering, Research & Scientific Associations:
Netherlands Organization for Applied Scientific Research (TNO)

Address1: Anna van Buerenplein 1
Address2:
City: The Hague
State:
Zip Code:NL-2595 DA
Country:The Netherlands
Toll-Free:
Phone: 31-88-866-0000
Fax:
Web: www.tno.nl
The Netherlands Organization for Applied Scientific Research (TNO) is a contract research organization that provides a link between fundamental research and practical application.

Engineering, Research & Scientific Associations:
Research in Germany, German Academic Exchange Service (DAAD)

Address1: Kennedyallee 50
Address2:
City: Bonn
State:
Zip Code:53175
Country:Germany
Toll-Free:
Phone: 49-228-882-743
Fax:
Web: www.research-in-germany.de
The Research in Germany portal, German Academic Exchange Service (DAAD), is an information platform and contact point for those looking to find out more about Germany's research landscape and its latest research achievements. The portal is an initiative of the Federal Ministry of Education and Research.

Engineering, Research & Scientific Associations:
Royal Society (The)

Address1: 6-9 Carlton House Ter.
Address2:
City: London
State:
Zip Code:SW1Y 5AG
Country:UK
Toll-Free:
Phone: 44-20-7451-2500
Fax:
Web: royalsociety.org
The Royal Society, originally founded in 1660, is the UK's leading scientific organization and the oldest scientific community in continuous existence. It operates as a national academy of science, supporting scientists, engineers, technologists and researchers. Its web site contains a wealth of data about the research and development initiatives of its fellows and foreign members.

Engineering, Research & Scientific Associations:

Royal Society of Chemistry (RSC)

Address1: Burlington House, Piccadilly
Address2:
City: London
State:
Zip Code:W1J 0BA
Country:UK
Toll-Free:
Phone: 44-20-7437-8656
Fax:
Web: www.rsc.org
The Royal Society of Chemistry (RSC) is U.K.'s professional body for advancing the chemical sciences. The organization has 50,000 members.

Genetics & Genomics Industry Associations:

American College of Medical Genetics and Genomics (ACMG)

Address1: 7220 Wisconsin Ave.
Address2: Ste. 300
City: Bethesda
State: MD
Zip Code:20814
Country:USA
Toll-Free:
Phone: 301-718-9603
Fax: 301-718-9604
Web: www.acmg.net
The American College of Medical Genetics and Genomics (ACMG) provides education, resources and a voice for the medical genetics profession. The ACMG promotes the development and implementation of methods to diagnose, treat and prevent genetic disease.

Genetics & Genomics Industry Associations:

European Society of Human Genetics (ESHG)

Address1: Vienna Medical Academy
Address2: Alser Strasse 4
City: Vienna
State:
Zip Code:1090
Country:Austria
Toll-Free:
Phone: 43-1-40513-8320
Fax: 43-1-407-8274
Web: www.eshg.org
The European Society of Human Genetics (ESHG) is a membership organization of researchers, clinicians, laboratory scientists, psychologists and other social scientists and bioethicists that promotes the development of genetics research in Europe.

Genetics & Genomics Industry Associations:

Genetics Society of America (GSA)

Address1: 9650 Rockville Pike
Address2:
City: Bethesda
State: MD
Zip Code:20814-3998
Country:USA
Toll-Free: 866-486-4343
Phone: 301-634-7300
Fax: 301-634-7079
Web: www.genetics-gsa.org
The Genetics Society of America (GSA) includes over 4,000 scientists and educators interested in the field of genetics. The society promotes the communication of advances in genetics through publication of the journal GENETICS, and by sponsoring scientific meetings focused on key organisms widely used in genetic research.

Genetics & Genomics Industry Associations:

International Cancer Genome Consortium (ICGC)

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.icgc.org

The International Cancer Genome Consortium (ICGC) plans to decode the genomes from 25,000 cancer samples and create a resource of freely available data that will help cancer researchers around the world. Funded projects in several participating nations will examine more than 10,000 tumors for cancer types that affect a diversity of organs including blood, brain, breast, colon, kidney, liver, lung, pancreas, stomach, oral cavity and ovary.

Genetics & Genomics Industry Resources:
Bioinformatics Institute (A*STAR Singapore)

Address1: 30 Biopolis St.
Address2: 07-01 Matrix
City: Singapore
State:
Zip Code:138671
Country:Singapore
Toll-Free:
Phone: 65-6478-8298
Fax:
Web: www.bii.a-star.edu.sg
The Bioinformatics Institute has developed and deployed analytical tools and computational techniques for biology research both in-house and through close collaboration with experimental and clinical groups within and outside the Biopolis and Singapore. Its web site includes information on current research as well as links, databases, and events.

Genetics & Genomics Industry Resources:
Genetic Literacy Project (GLP)

Address1: 1608 Rhode Island Ave.
Address2: University of California Washington Center, Room 213e
City: Washington
State: DC
Zip Code:20036
Country:USA
Toll-Free:
Phone: 410-941-9374
Fax:
Web: www.geneticliteracyproject.org
The Genetic Literacy Project (GLP), affiliated with the Statistical Assessment Service based out of George Mason University in Virginia, is a non-profit organization which acts as an educational resource for those who would like to learn about genetics or genetic research/engineering. Genetics and genetics engineering, as intricate sciences, have a tendency to be misunderstood which often can lead to the stirring of fear. The goal of the GLP is to serve as a resource to those interested in disentangling ideology from science.

Genetics & Genomics Industry Resources:
Genetics Education Center (The)

Address1: 3901 Rainbow Blvd.
Address2:
City: Kansas City
State: KS
Zip Code:66160
Country:USA
Toll-Free:
Phone: 913-588-5000
Fax:
Web: www.kumc.edu/gec/
The Genetics Education Center, supported by the University of Kansas Medical Center, provides abundant resources, including links, information and news articles, for users interested in learning more about genetics and the Human Genome Project.

Genetics & Genomics Industry Resources:
Genome Institute of Singapore

Address1: 60 Biopolis St.
Address2: 02-01 Genome
City: Singapore
State:
Zip Code:138672
Country:Singapore
Toll-Free:
Phone: 65-6808-8000
Fax: 65-6808-8292
Web: www.gis.a-star.edu.sg
The Genome Institute of Singapore (GIS) pursues the integration of technology, genetics and biology towards the goal of individualized medicine.

Genetics & Genomics Industry Resources:
International Communication Forum in Human Molecular Genetics

Address1:
Address2:

City:
State:
Zip Code:
Country:
Toll-Free:
Phone: 49-179-53-20-978
Fax:
Web: www.hum-molgen.de
The International Communication Forum in Human Molecular Genetics contains news articles, a bulletin board and a variety of other services related to human molecular genetics.

Genetics & Genomics Industry Resources:

National Human Genome Research Institute (NHGRI)

Address1: National Institute of Health Bldg. 31, Rm. 4B09
Address2: 31 Ctr. Dr., MSC 2152, 9000 Rockville Pike
City: Bethesda
State: MD
Zip Code:20892-2152
Country:USA
Toll-Free:
Phone: 301-402-0911
Fax: 301-402-2218
Web: www.genome.gov
The National Human Genome Research Institute (NHGRI) led the human genome project until its completion in April 2003. The agency, a division of the National Institutes of Health, now provides research news and information about the field of human genetics.

Health Care Business & Professional Associations:

American Association of Immunologists

Address1: 1451 Rockville Pike
Address2: Ste. 650
City: Rockville
State: MD
Zip Code:20852
Country:USA
Toll-Free:
Phone: 301-634-7178
Fax: 301-634-7887
Web: www.aai.org
The American Association of Immunologists is a nonprofit organization that represents professionals in the immunology field. Its membership consists of professionally trained scientists, who work to advance the knowledge of immunology and its related disciplines, foster the interchange of ideas and information among investigators and address the potential integration of immunologic principles into clinical practice.

Health Care Business & Professional Associations:

American Society of Clinical Oncology (ASCO)

Address1: 2318 Mill Rd.
Address2: Ste. 800
City: Alexandria
State: VA
Zip Code:22314
Country:USA
Toll-Free:
Phone: 571-483-1300
Fax:
Web: www.asco.org
The American Society of Clinical Oncology (ASCO) is a nonprofit organization, founded in 1964, with overarching goals of improving cancer care and prevention and ensuring that all patients with cancer receive care of the highest quality. Nearly 30,000 oncology practitioners belong to ASCO, representing all oncology disciplines.

Health Care Business & Professional Associations:

Association of Clinical Research Professionals (ACRP)

Address1: 99 Canal Ctr. Plaza
Address2: Ste. 200
City: Alexandria
State: VA
Zip Code:22314
Country:USA
Toll-Free:
Phone: 703-254-8100
Fax: 703-254-8101
Web: www.acrpnet.org
The Association of Clinical Research Professionals (ACRP) is an organization for professionals in the pharmaceutical, biotechnology and medical device industries, as well as those in hospital, academic medical centers and physician office settings.

Health Care Business & Professional Associations:
Association of Food and Drug Officials (AFDO)

Address1: 2550 Kingston Rd.
Address2: Ste. 311
City: York
State: PA
Zip Code:17402
Country:USA
Toll-Free:
Phone: 717-757-2888
Fax: 717-650-3650
Web: www.afdo.org
The Association of Food and Drug Officials (AFDO) is a trusted resource for building consensus and promoting uniformity on public health and consumer protection issues related to the regulation of foods, drugs, devices, cosmetics and consumer products.

Health Care Business & Professional Associations:
Health Industry Distributors Association (HIDA)

Address1: 310 Montgomery St.
Address2:
City: Alexandria
State: VA
Zip Code:22314-1516
Country:USA
Toll-Free:
Phone: 703-549-4432
Fax: 703-549-6495
Web: www.hida.org
The Health Industry Distributors Association (HIDA) is the international trade association representing medical products distributors.

Health Care Business & Professional Associations:
Hong Kong Medical Association

Address1: 15 Hennessy Rd.
Address2: 5/F Duke of Windsor Social Service Bldg.
City: Wanchai
State: Hong Kong
Zip Code:
Country:Hong Kong
Toll-Free:
Phone: 852-2527-8285
Fax: 852-2865-0943
Web: www.hkma.org
The Hong Kong Medical Association's objective is to promote the welfare of the medical profession and the health of the public of Hong Kong. Its members include over 8,000 professionals across all healthcare sectors in Hong Kong.

Health Care Business & Professional Associations:
Society for Pharmaceutical and Medical Device Professionals (ISPE)

Address1: 600 N. Westshore Blvd.
Address2: Ste. 900
City: Tampa
State: FL
Zip Code:33609
Country:USA
Toll-Free:
Phone: 813-960-2105
Fax: 813-264-2816
Web: www.ispe.org
The Society for Pharmaceutical and Medical Device Professionals (ISPE) works with its members by providing extensive education, training, technical publications, conferences and networking opportunities.

Health Care Business & Professional Associations:
Society of Clinical Research Associates (SOCRA)

Address1: 530 W. Butler Ave.
Address2: Ste. 109
City: Chalfont
State: PA
Zip Code:18914
Country:USA
Toll-Free: 800-762-7292

Phone: 215-822-8644
Fax:
Web: www.socra.org
The Society of Clinical Research Associates (SOCRA) works to provide training and continuing education and to establish and maintain an international certification program for clinical research professionals.

Health Care Business & Professional Associations:

Society of Toxicology (SOT)

Address1: 1821 Michael Faraday Dr.
Address2: Ste. 300
City: Reston
State: VA
Zip Code:20190
Country:USA
Toll-Free:
Phone: 703-438-3115
Fax: 703-438-3113
Web: www.toxicology.org
The Society of Toxicology (SOT) is an association that works to advance the science of enhancing human, animal and environmental health through the understanding of toxicology.

Health Care Resources:

Access Excellence

Address1: 171 17th St. NW
Address2: Ste. 1200
City: Atlanta
State: GA
Zip Code:30363-1032
Country:USA
Toll-Free:
Phone: 404-888-3242
Fax:
Web: www.accessexcellence.org
Access Excellence provides information for high school biology and life science teachers. It is produced by the National Health Museum.

Health Care Resources:

Singapore Medical Council (SMC)

Address1: 16 College Rd.
Address2: 01-01 College of Medicine Bldg.
City: Singapore
State:
Zip Code:169854
Country:Singapore
Toll-Free:
Phone: 65-6506-2102
Fax: 65-6258-2134
Web: www.healthprofessionals.gov.sg/content/hprof/smc/en.html
The Singapore Medical Council (SMC), a statutory board under the Ministry of Health, maintains the Register of Medical Practitioners in Singapore, administers the compulsory continuing medical education program and also governs and regulates the professional conduct and ethics of registered medical practitioners.

Health Facts-Global:

Organisation for Economic Co-Operation and Development (OECD) - Health Statistics

Address1: 2 rue Andre Pascal
Address2:
City: Paris
State:
Zip Code:75775
Country:France
Toll-Free:
Phone: 33-1-4524-8200
Fax: 33-1-4524-8500
Web: www.oecd.org
The Organisation for Economic Co-Operation and Development (OECD) offers extensive health statistics on a country-by-country basis. Data ranges from health expenditures per capita to health expenditures as percent of GDP for over 34 nations with the world's largest economies.

Immunization Resources:

CDC National Immunization Program (NIP)

Address1: 1600 Clifton Rd.
Address2:

City: Atlanta
State: GA
Zip Code:30333
Country:USA
Toll-Free: 800-232-4636
Phone:
Fax:
Web: www.cdc.gov/vaccines/
The CDC National Immunization Program (NIP) offers up-to-date immunization information, including vaccine schedules, side effects, contraindications, recommendations and more.

Industry Research/Market Research:
Forrester Research

Address1: 60 Acorn Park Dr.
Address2:
City: Cambridge
State: MA
Zip Code:02140
Country:USA
Toll-Free: 866-367-7378
Phone: 617-613-5730
Fax:
Web: www.forrester.com
Forrester Research is a publicly traded company that identifies and analyzes emerging trends in technology and their impact on business. Among the firm's specialties are the financial services, retail, health care, entertainment, automotive and information technology industries.

Industry Research/Market Research:
Gartner, Inc.

Address1: 56 Top Gallant Rd.
Address2:
City: Stamford
State: CT
Zip Code:06902
Country:USA
Toll-Free:
Phone: 203-964-0096
Fax:
Web: www.gartner.com
Gartner, Inc. is a publicly traded IT company that provides competitive intelligence and strategic consulting and advisory services to numerous clients worldwide.

Industry Research/Market Research:
MarketResearch.com

Address1: 11200 Rockville Pike
Address2: Ste. 504
City: Rockville
State: MD
Zip Code:20852
Country:USA
Toll-Free: 800-298-5699
Phone: 240-747-3093
Fax: 240-747-3004
Web: www.marketresearch.com
MarketResearch.com is a leading broker for professional market research and industry analysis. Users are able to search the company's database of research publications including data on global industries, companies, products and trends.

Industry Research/Market Research:
Plunkett Research, Ltd.

Address1: P.O. Drawer 541737
Address2:
City: Houston
State: TX
Zip Code:77254-1737
Country:USA
Toll-Free:
Phone: 713-932-0000
Fax: 713-932-7080
Web: www.plunkettresearch.com
Plunkett Research, Ltd. is a leading provider of market research, industry trends analysis and business statistics. Since 1985, it has served clients worldwide, including corporations, universities, libraries, consultants and government agencies. At the firm's web site, visitors can view product information and pricing and access a large amount of basic market information on industries such as financial services, InfoTech, e-commerce, health care and biotech.

Libraries-Medical Data:

Weill Cornell Medical Library

Address1: 1300 York Ave.
Address2:
City: New York
State: NY
Zip Code:10021-4896
Country:USA
Toll-Free:
Phone: 646-962-2468
Fax: 212-746-8375
Web: library.weill.cornell.edu/
The Weill Cornell Medical Library houses information on the biomedical sciences, as well as performs data retrieval, management and evaluation.

Nanotechnology Associations:

Nano Science and Technology Institute (NSTI)

Address1: 3925 W. Braker Ln.
Address2:
City: Austin
State: TX
Zip Code:78759
Country:USA
Toll-Free:
Phone: 512-697-8849
Fax: 925-886-8461
Web: www.nsti.org
The Nano Science and Technology Institute (NSTI) is engaged in the promotion and integration of nano and other advanced technologies through education, technology and business development. NSTI offers consulting services, continuing education programs, scientific and business publishing and community outreach.

Nanotechnology Associations:

NCI Alliance for Nanotechnology in Cancer

Address1: 31 Ctr. Dr., Bldg. 31, Rm. 10A52, MSC 2580
Address2: Attn. NCI Office of Cancer Nanotechnology Research
City: Bethesda
State: MD
Zip Code:20892-2580
Country:USA
Toll-Free: 888-422-6237
Phone: 301-451-8983
Fax: 301-451-7440
Web: nano.cancer.gov
The NCI Alliance for Nanotechnology in Cancer, a service of the National Cancer Institute, is dedicated to using nanotechnology to advance the prevention, treatment and diagnosis of cancer. It especially seeks to lower the barriers preventing commercial development of advanced oncology therapeutics that use nanotechnology.

Online Health Data, General:

Medscape

Address1: 825 Eighth Ave.
Address2: Fl. 11
City: New York
State: NY
Zip Code:10019
Country:USA
Toll-Free:
Phone: 212-301-6700
Fax:
Web: www.medscape.com
Medscape, an online resource for better patient care, provides links to journal articles, health care-related sites and health care information. The site is owned by WebMD.

Online Health Data, General:

PubMed

Address1: 8600 Rockville Pike
Address2:
City: Bethesda
State: MD
Zip Code:20894
Country:USA
Toll-Free: 888-346-3656
Phone:
Fax:

Web: www.ncbi.nlm.nih.gov/sites/entrez
PubMed provides access to over 26 million citations dating back to the mid-1960s from MEDLINE, online books and life science journals. PubMed includes links to open access full text articles.

Patent Organizations:

European Patent Office

Address1: Bob-van-Benthem-Platz 1
Address2:
City: Munich
State:
Zip Code:80469
Country:Germany
Toll-Free:
Phone: 49 89 2399-0
Fax:
Web: www.epo.org
The European Patent Office (EPO) provides a uniform application procedure for individual inventors and companies seeking patent protection in up to 38 European countries. It is the executive arm of the European Patent Organization and is supervised by the Administrative Council.

Patent Organizations:

World Intellectual Property Organization (WIPO)

Address1: 34 chemin des Colombettes
Address2:
City: Geneva
State:
Zip Code:CH-1211
Country:Switzerland
Toll-Free:
Phone: 41-22-338-9111
Fax: 41-22-733-5428
Web: www.wipo.int
The World Intellectual Property Organization (WIPO) has a United Nations mandate to assist organizations and companies in filing patents and other intellectual property data on a global basis. At its web site, users can download free copies of its WIPO magazine and search its international patent applications.

Patent Resources:

Biotech U

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.biotechu.com
Biotech U is an informative site providing a comprehensive overview of the field of biotechnology. The site is maintained by ThinkBiotech.com.

Patent Resources:

Patent Docs

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: patentdocs.typepad.com/patent_docs/
Patent Docs is an excellent blog about patent law and patent news in the fields of biotechnology and pharmaceuticals.

Pharmaceutical Industry Associations (Drug Industry):

Academy of Physicians in Clinical Research (APCR)

Address1: 6816 Southpoint Pkwy.
Address2: Ste. 1000
City: Jacksonville
State: FL

Zip Code:32216
Country:USA
Toll-Free:
Phone: 904-309-6271
Fax: 904-998-0855
Web: www.apcrnet.org
The Academy of Physicians in Clinical Research (APCR), formerly the Academy of Pharmaceutical Physicians and Investigators (APPI), is an association that arose when the American Academy of Pharmaceutical Physicians and the Association of Clinical Research Professionals merged. It is a nonprofit, membership organization that provides scientific and educational activities on issues concerning pharmaceutical medicine.

Pharmaceutical Industry Associations (Drug Industry):
Accreditation Council for Pharmacy Education (ACPE)

Address1: 135 S. LaSalle St.
Address2: Ste. 4100
City: Chicago
State: IL
Zip Code:60603-4810
Country:USA
Toll-Free:
Phone: 312-664-3575
Fax: 312-664-4652
Web: www.acpe-accredit.org
The Accreditation Council for Pharmacy Education (ACPE) provides accreditation for pharmaceutical programs. It is the national agency for accreditation of professional degree programs as well as providers of continuing pharmacy education.

Pharmaceutical Industry Associations (Drug Industry):
American Association of Pharmaceutical Sciences (AAPS)

Address1: 2107 Wilson Blvd.
Address2: Ste. 700
City: Arlington
State: VA
Zip Code:22201-3042
Country:USA
Toll-Free:
Phone: 703-243-2800
Fax: 703-243-2800
Web: www.aaps.org
The American Association of Pharmaceutical Scientists (AAPS) represents scientists in the pharmaceutical field. Members are given access to international forum, scientific programs, ongoing education, opportunities for networking and professional development.

Pharmaceutical Industry Associations (Drug Industry):
American Association of Pharmacy Technicians (AAPT)

Address1: P.O. Box 1447
Address2:
City: Greensboro
State: NC
Zip Code:27402
Country:USA
Toll-Free: 877-368-4771
Phone: 336-333-9356
Fax: 336-333-9068
Web: www.pharmacytechnician.com
The American Association of Pharmacy Technicians (AAPT) provides leadership and represents the interests of pharmacy technicians in the United States. The group also offers continuing education programs and services to its members.

Pharmaceutical Industry Associations (Drug Industry):
American Pharmacists Association (AphA)

Address1: 2215 Constitution Ave. NW
Address2:
City: Washington
State: DC
Zip Code:20037
Country:USA
Toll-Free: 800-237-4410
Phone: 202-628-4410
Fax: 202-783-2351
Web: www.pharmacist.com
American Pharmaceutical Association (APhA), formerly American Pharmaceutical Association is a national professional society that provides news and information to pharmacists. Its membership includes over 62,000 practicing pharmacists, pharmaceutical scientists, student pharmacists and pharmacy technicians.

Pharmaceutical Industry Associations (Drug Industry):
American Society for Clinical Pharmacology and Therapeutics (ASCPT)

Address1: 528 N. Washington St.
Address2:
City: Alexandria
State: VA
Zip Code:22314
Country:USA
Toll-Free:
Phone: 703-836-6981
Fax:
Web: www.ascpt.org
The American Society for Clinical Pharmacology and Therapeutics (ASCPT) is a nonprofit organization that is devoted to the discovery, development, regulation and use of safe and effective medications necessary for the prevention and treatment of illness.

Pharmaceutical Industry Associations (Drug Industry):
American Society for Pharmacology and Experimental Therapeutics (ASPET)

Address1: 9650 Rockville Pike
Address2:
City: Bethesda
State: MD
Zip Code:20814-3995
Country:USA
Toll-Free:
Phone: 301-634-7060
Fax: 301-634-7061
Web: www.aspet.org
The American Society for Pharmacology and Experimental Therapeutics (ASPET) is a scientific society, with members from academia, industry and the government, conducting research in basic and clinical pharmacology.

Pharmaceutical Industry Associations (Drug Industry):
American Society of Consultant Pharmacists (ASCP)

Address1: 1321 Duke St.
Address2:
City: Alexandria
State: VA
Zip Code:22314-3563
Country:USA
Toll-Free: 800-355-2727
Phone: 703-739-1300
Fax: 703-739-1321
Web: www.ascp.com
The American Society of Consultant Pharmacists (ASCP) is an international professional association that provides leadership, education, advocacy and resources to advance the practice of consultant and senior care pharmacy.

Pharmaceutical Industry Associations (Drug Industry):
American Society of Pharmacognosy (ASP)

Address1: 3149 Dundee Rd.
Address2: Ste. 260
City: Northbrook
State: IL
Zip Code:60062
Country:USA
Toll-Free:
Phone:
Fax:
Web: www.pharmacognosy.us
The American Society of Pharmacognosy (ASP) is a volunteer organization that promotes the growth and development of pharmacognosy, the study of the physical, chemical, biochemical and biological properties of drugs of natural origin and drugs from natural sources.

Pharmaceutical Industry Associations (Drug Industry):
Association of the British Pharmaceutical Industry (ABPI)

Address1: 105 Victoria St., Southside
Address2: Fl. 7
City: London
State:
Zip Code:SW1E 6QT
Country:UK
Toll-Free:

Phone: 44-20-7930-3477
Fax: 44-20-7747-1447
Web: www.abpi.org.uk
The Association of the British Pharmaceutical Industry (ABPI) is a trade association that provides research and information for the British pharmaceuticals industry.

Pharmaceutical Industry Associations (Drug Industry):
Canadian Pharmacists Association (CPhA)

Address1: 1785 Alta Vista Dr.
Address2:
City: Ottawa
State: ON
Zip Code:K1G 3Y6
Country:Canada
Toll-Free: 800-917-9489
Phone: 613-523-7877
Fax: 613-523-0445
Web: www.pharmacists.ca
The Canadian Pharmacists Association (CPhA) is a professional organization providing drug information, pharmacy practice support material, patient information and news about the pharmacy industry.

Pharmaceutical Industry Associations (Drug Industry):
Canadian Society for Pharmaceutical Sciences (CSPS)

Address1: 11361-87 Ave., Katz Group Ctr., Rm.2-020L
Address2: University of Alberta Campus
City: Edmonton
State: Alberta
Zip Code:T6G 2E1
Country:Canada
Toll-Free:
Phone: 780-492-0950
Fax: 780-492-0951
Web: www.cspscanada.org
The Canadian Society for Pharmaceutical Sciences (CSPS) is a nonprofit organization that works to advance pharmaceutical research. CSPS maintains the Journal of Pharmacy and Pharmaceutical Sciences, an international online publication.

Pharmaceutical Industry Associations (Drug Industry):
Controlled Release Society (CRS)

Address1: 3340 Pilot Knob Rd.
Address2:
City: St. Paul
State: MN
Zip Code:55421
Country:USA
Toll-Free:
Phone: 651-454-7250
Fax: 651-454-0766
Web: www.controlledrelease.org
The Controlled Release Society (CRS) is an organization that promotes the science of the controlled delivery of bioactive substances.

Pharmaceutical Industry Associations (Drug Industry):
Drug, Chemical & Associated Technologies Association (DCAT)

Address1: One Washington Blvd.
Address2: Ste. 7
City: Robbinsville
State: NJ
Zip Code:08691
Country:USA
Toll-Free: 800-640-3228
Phone: 609-448-1000
Fax: 609-448-1944
Web: www.dcat.org
The Drug, Chemical & Associated Technologies Association (DCAT) is a business development association whose membership is made up of companies that manufacture, distribute or provide services to the pharmaceutical, chemical, nutritional and related industries.

Pharmaceutical Industry Associations (Drug Industry):
Generic Pharmaceutical Association (GPhA)

Address1: 777 6th St. NW
Address2: Ste. 510

City: Washington
State: DC
Zip Code:20001
Country:USA
Toll-Free:
Phone: 202-249-7100
Fax: 202-249-7105
Web: www.gphaonline.org
The Generic Pharmaceutical Association (GPhA) represents the manufacturers and distributors of finished generic pharmaceutical products, manufacturers and distributors of bulk active pharmaceutical chemicals and suppliers of other goods and services to the generic pharmaceutical industry.

Pharmaceutical Industry Associations (Drug Industry):
Innovative Medicines Canada

Address1: 55 Metcalfe St.
Address2: Ste. 1220
City: Ottawa
State: ON
Zip Code:K1P 6L5
Country:Canada
Toll-Free:
Phone: 613-236-0455
Fax:
Web: innovativemedicines.ca
Innovative Medicines Canada is dedicated to the discovery and development of new medicines and vaccines. Its 50 member companies are guided by strict code of ethical practices ensuring valued partnership in the Canadian healthcare system.

Pharmaceutical Industry Associations (Drug Industry):
International Academy of Compounding Pharmacists (IACP)

Address1: 4638 Riverstone Blvd.
Address2:
City: Missouri City
State: TX
Zip Code:77459
Country:USA
Toll-Free: 800-927-4227
Phone: 281-933-8400
Fax: 281-495-0602
Web: www.iacprx.org
The International Academy of Compounding Pharmacists (IACP) is a nonprofit association that seeks to protect, promote and advance the art the customizing, compounding pharmacy profession.

Pharmaceutical Industry Associations (Drug Industry):
International Association for Pharmaceutical Technology (APV)

Address1: Kurfurstenstrasse 59
Address2:
City: Mainz
State:
Zip Code:55118
Country:Germany
Toll-Free:
Phone: 49-6131-9769
Fax: 49-6131-97-6969
Web: www.apv-mainz.de
The International Association for Pharmaceutical Technology (APV) is a nonprofit scientific association that publishes its a scientific journal and organizes various conferences and seminars concerning the pharmaceutical and biopharmaceutical industries.

Pharmaceutical Industry Associations (Drug Industry):
International Federation of Pharmaceutical Manufacturers & Associations (IFPMA)

Address1: Chemin des Mines 9
Address2: P.O. Box 195
City: Geneva 20
State:
Zip Code:1211
Country:Switzerland
Toll-Free:
Phone: 41-22-338-32-00
Fax: 41-22-338-32-99
Web: www.ifpma.org
The International Federation of Pharmaceutical Manufacturers & Associations (IFPMA) is a nonprofit organization that represents the world's research-based pharmaceutical and biotech companies.

Pharmaceutical Industry Associations (Drug Industry):
International Federation of Pharmaceutical Wholesalers (IFPW)

Address1: 10569 Crestwood Dr.
Address2:
City: Manassas
State: VA
Zip Code:20109
Country:USA
Toll-Free:
Phone: 703-331-3714
Fax: 703-331-3715
Web: www.ifpw.com
The International Federation of Pharmaceutical Wholesalers (IFPW) represents pharmaceutical wholesalers and wholesaler associations in 26 countries.

Pharmaceutical Industry Associations (Drug Industry):
International Pharmaceutical Excipients Council of the Americas (IPEC-Americas)

Address1: 3138 N. 10th St.
Address2: Ste. 500
City: Arlington
State: VA
Zip Code:22201
Country:USA
Toll-Free:
Phone: 571-814-3449
Fax:
Web: ipecamericas.org
The International Pharmaceutical Excipients Council of the Americas (IPEC-Americas) is a trade organization that promotes standardized approval criteria for drug inert ingredients, or excipients, among different nations. The organization also works to promote safe and useful excipients in the U.S.

Pharmaceutical Industry Associations (Drug Industry):
International Pharmaceutical Federation (FIP)

Address1: Andries Bickerweg 5
Address2:
City: The Hague
State: AE
Zip Code:2517 JP
Country:The Netherlands
Toll-Free:
Phone: 31-70-3021-970
Fax: 31-70-3021-999
Web: www.fip.org
The International Pharmaceutical Federation (FIP) is a global federation of national associations representing 3 million pharmacists and pharmaceutical scientists around the world.

Pharmaceutical Industry Associations (Drug Industry):
International Pharmaceutical Students Federation (IPSF)

Address1: P.O. Box 84200
Address2:
City: The Hauge
State: AE
Zip Code:2508
Country:The Netherlands
Toll-Free:
Phone: 31-70-302-1992
Fax: 31-70-302-1999
Web: www.ipsf.org
The International Pharmaceutical Students Federation (IPSF) is an organization that aims to promote the interests of pharmacy students and encourage international co-operation amongst them.

Pharmaceutical Industry Associations (Drug Industry):
International Society for Pharmacoepidemiology (ISPE)

Address1: 5272 River Rd.
Address2: Ste. 630
City: Bethesda
State: MD
Zip Code:20816
Country:USA
Toll-Free:
Phone: 301-718-6500

Fax: 301-656-0989
Web: www.pharmacoepi.org
The International Society for Pharmacoepidemiology (ISPE) is a nonprofit international organization dedicated to the health of the public by advancing the study of the effects and determinants of pharmacology on epidemic diseases and to help provide risk benefit assessments on drugs with large scale distributions.

Pharmaceutical Industry Associations (Drug Industry):
International Society of Regulatory Toxicology & Pharmacology (ISRTP)

Address1: 21517 Fox Field Circle
Address2:
City: Germantown
State: MD
Zip Code:20876
Country:USA
Toll-Free:
Phone:
Fax:
Web: www.isrtp.org
The International Society of Regulatory Toxicology & Pharmacology (ISRTP) is an association of professionals that mediates between policy makers and scientists in order to promote sound toxicologic and pharmacologic science as a basis for regulation affecting the environment and human safety and health.

Pharmaceutical Industry Associations (Drug Industry):
International Union of Basic and Clinical Pharmacology (IUPHAR)

Address1: University of Kansas Medical Center, 3901 Rainbow Blvd.
Address2: Mail Stop 4016
City: Kansas City
State: KS
Zip Code:66160
Country:USA
Toll-Free:
Phone: 913-588-7533
Fax: 913-588-7373
Web: www.iuphar.org
The International Union of Basic and Clinical Pharmacology (IUPHAR) is a nonprofit association representing the interests of pharmacologists around the world.

Pharmaceutical Industry Associations (Drug Industry):
Korean Research-based Pharmaceutical Industry Association (KRPIA)

Address1: 832-7 Yeoksam-Dong, Gangnam-Gu
Address2: Fl. 6, Hwanghwa Bldg.
City: Seoul
State:
Zip Code:143-200
Country:Korea
Toll-Free:
Phone: 82-2-456-8553
Fax: 82-2-456-8320
Web: www.krpia.or.kr
The Korean Research-based Pharmaceutical Industry Association (KRPIA) is an association of research-based pharmaceutical companies operating in Korea.

Pharmaceutical Industry Associations (Drug Industry):
LEEM (French Pharmaceutical Companies Association)

Address1: 58 Gouvion Blvd.
Address2:
City: Saint Cyr
State:
Zip Code:75017
Country:France
Toll-Free:
Phone: 33-1-45-03-88-88
Fax: 33-1-45-04-47-71
Web: www.leem.org
LEEM (Les Entreprises du Medicament or the French Pharmaceuticals Association) represents the 270 pharmaceutical companies operating in France engaged in the research and/or development of medicines for human use.

Pharmaceutical Industry Associations (Drug Industry):
National Association of Boards of Pharmacy (NABP)

Address1: 1600 Feehanville Dr.
Address2:
City: Mount Prospect

State: IL
Zip Code:60056
Country:USA
Toll-Free:
Phone: 847-391-4406
Fax: 847-391-4502
Web: www.nabp.net
The National Association of Boards of Pharmacy (NABP) is an association of the member boards and jurisdictions in the field of pharmacy that supports the development, implementation and enforcement of uniform standards for the protection of public health.

Pharmaceutical Industry Associations (Drug Industry):
National Association of Pharmaceutical Manufacturers (NAPM)

Address1: 1342 Waterfall Office Park
Address2: Bekker Rd.
City: Midrand
State:
Zip Code:
Country:South Africa
Toll-Free:
Phone: 27-11-312-6966
Fax: 27-86-529-4245
Web: www.napm.co.za
The National Association of Pharmaceutical Manufacturers (NAPM) is a nonprofit trade association consisting of South African generic-based pharmaceutical manufacturers and distributors.

Pharmaceutical Industry Associations (Drug Industry):
Parenteral Drug Association (PDA)

Address1: Bethesda Towers, 4350 E. W. Hwy.
Address2: Ste. 150
City: Bethesda
State: MD
Zip Code:20814
Country:USA
Toll-Free:
Phone: 301-656-5900
Fax: 301-986-0296
Web: www.pda.org
The Parenteral Drug Association (PDA) is a global provider of science, technology and regulatory information and education for the pharmaceutical and biopharmaceutical community.

Pharmaceutical Industry Associations (Drug Industry):
Pharmaceutical Information and Pharmacovigilance Association (PIPA)

Address1: P.O. Box 254
Address2:
City: Haslemere
State: Surrey
Zip Code:GU27 9AF
Country:UK
Toll-Free:
Phone: 44-7531-899-537
Fax:
Web: www.pipaonline.org
The Pharmaceutical Information and Pharmacovigilance Association (PIPA) is a professional organization that promotes the advancement of the pharmaceutical industry in the U.K.

Pharmaceutical Industry Associations (Drug Industry):
Pharmaceutical Research and Manufacturers of America (PhRMA)

Address1: 950 F St. NW
Address2: Ste. 300
City: Washington
State: DC
Zip Code:20004
Country:USA
Toll-Free:
Phone: 202-835-3400
Fax:
Web: www.phrma.org
Pharmaceutical Research and Manufacturers of America (PhRMA) represents the nation's leading research-based pharmaceutical and biotechnology companies.

Pharmaceutical Industry Associations (Drug Industry):
Pharmacy Council of India

Address1: Kotla Rd., Aiwan-E-Ghalib, Marg
Address2: Combined Councils' Bldg.
City: New Delhi
State:
Zip Code:110-002
Country:India
Toll-Free:
Phone: 91-11-2323-1348
Fax: 91-11-2323-9184
Web: www.pci.nic.in
The Pharmacy Council of India provides regulation of pharmacists under the Pharmacy Act and is a statutory body working under India's Ministry of Health and Family Welfare.

Pharmaceutical Industry Associations (Drug Industry):
PharmaSUG

Address1: 421 New Parkside Dr.
Address2:
City: Chapel Hill
State: NC
Zip Code:27516
Country:USA
Toll-Free:
Phone:
Fax:
Web: www.pharmasug.org
PharmaSUG is an organization for professional users of SAS software in the pharmaceuticals industry.

Pharmaceutical Industry Associations (Drug Industry):
Royal Pharmaceutical Society

Address1: 66-68 E. Smithfield
Address2:
City: London
State:
Zip Code:E1W 1AW
Country:UK
Toll-Free:
Phone: 44-20-7572-2737
Fax: 44-20-7735-7629
Web: www.rpharms.com
The Royal Pharmaceutical Society is the regulatory agency and professional membership organization for pharmacists in England, Wales and Scotland.

Pharmaceutical Industry Associations (Drug Industry):
Singapore Association of Pharmaceutical Industries (SAPI)

Address1: 151 Chin Swee Rd.
Address2: 02-13A/14 Manhattan House
City: Singapore
State:
Zip Code:169876
Country:Singapore
Toll-Free:
Phone: 65-6738-0966
Fax: 65-6738-0977
Web: www.sapi.org.sg
The Singapore Association of Pharmaceutical Industries (SAPI) represents a wide spectrum of pharmaceutical related businesses, namely the trading houses, manufacturers, representative offices and pharmacies in Singapore.

Pharmaceutical Industry Associations (Drug Industry):
Society of Infectious Diseases Pharmacists (SIDP)

Address1: 823 Congress Ave.
Address2: Ste. 230
City: Austin
State: TX
Zip Code:78701
Country:USA
Toll-Free:
Phone: 512-328-8632
Fax: 512-495-9031
Web: www.sidp.org
The Society of Infectious Diseases Pharmacists (SIDP) is an association of health professionals dedicated to promoting the appropriate use of antimicrobials. It offers members education, advocacy and leadership in all aspects of the treatment of infectious diseases.

Pharmaceutical Industry Resources (Drug Industry):
American Institute of the History of Pharmacy

Address1: 777 Highland Ave.
Address2:
City: Madison
State: WI
Zip Code:53705-2222
Country:USA
Toll-Free:
Phone: 608-262-5378
Fax:
Web: www.pharmacy.wisc.edu/aihp/
The American Institute of the History of Pharmacy is a nonprofit national organization that works to advance knowledge of the role of pharmacy in history through its programs and print publications.

Pharmaceutical Industry Resources (Drug Industry):
Board of Pharmaceutical Specialties (BPS)

Address1: 2215 Constitution Ave.
Address2:
City: Washington
State: DC
Zip Code:20037-2985
Country:USA
Toll-Free:
Phone: 202-429-7591
Fax: 202-429-6304
Web: www.bpsweb.org
The Board of Pharmaceutical Specialties (BPS) operates a certification program for specialized clinical pharmacists.

Pharmaceutical Industry Resources (Drug Industry):
European Medicines Agency (EMA)

Address1: 7 Westferry Circus
Address2: Canary Wharf
City: London
State:
Zip Code:E14 4HB
Country:UK
Toll-Free:
Phone: 44-20-7418-8400
Fax: 44-20-7418-8416
Web: www.ema.europa.eu
The European Medicines Agency (EMA) is the European agency charged with approving new drugs and monitoring the efficacy of existing drugs.

Pharmaceutical Industry Resources (Drug Industry):
Tufts Center for the Study of Drug Development

Address1: 75 Kneeland St.
Address2: Ste. 1100
City: Boston
State: MA
Zip Code:02111
Country:USA
Toll-Free:
Phone: 617-636-2170
Fax: 617-636-2425
Web: csdd.tufts.edu
The Tufts Center for the Study of Drug Development, an affiliate of Tuft's University, provides analyses and commentary on pharmaceutical issues. Its mission is to improve the quality and efficiency of pharmaceutical development, research and utilization. It is famous, among other things, for its analysis of the true total cost of developing and commercializing a new drug. Tuft's Center conducts research in areas of drug development, public policy and regulation and biotechnology.

Pharmaceutical Industry Resources (Drug Industry):
United States Pharmacopeia

Address1: 12601 Twinbrook Pkwy.
Address2:
City: Rockville
State: MD
Zip Code:20852-1790
Country:USA
Toll-Free: 800–227–8772
Phone: 301-881-0666

Fax:
Web: www.usp.org
The United States Pharmacopeia is the official public standards-setting authority for all over-the-counter and prescription medicines, dietary supplements and other healthcare products manufactured and sold in the United States.

Research & Development, Laboratories:
Battelle Memorial Institute

Address1: 505 King Ave.
Address2:
City: Columbus
State: OH
Zip Code:43201-2693
Country:USA
Toll-Free: 800-201-2011
Phone: 614-424-6424
Fax:
Web: www.battelle.org
Battelle Memorial Institute serves commercial and governmental customers in developing new technologies and products. The institute adds technology to systems and processes for manufacturers; pharmaceutical and agrochemical industries; trade associations; and government agencies supporting energy, the environment, health, national security and transportation.

Research & Development, Laboratories:
Commonwealth Scientific and Industrial Research Organization (CSRIO)

Address1: CSIRO Enquiries
Address2: Private Bag 10
City: Clayton South
State: Victoria
Zip Code:3169
Country:Australia
Toll-Free: 1300-363-400
Phone: 61-3-9545-2176
Fax:
Web: www.csiro.au
The Commonwealth Scientific and Industrial Research Organization (CSRIO) is Australia's national science agency and a leading international research agency. CSRIO performs research in Australia over a broad range of areas including agriculture, minerals and energy, manufacturing, communications, construction, health and the environment.

Research & Development, Laboratories:
Computational Neurobiology Laboratory

Address1: CNL-S c/o The Salk Institute
Address2: 10010 N. Torrey Pines Rd.
City: La Jolla
State: CA
Zip Code:92037
Country:USA
Toll-Free:
Phone: 858-453-4100
Fax: 858-587-0417
Web: www.cnl.salk.edu
The Computational Neurobiology Laboratory at The Salk Institute strives to understand the computational resources of the brain from the biophysical to the systems levels.

Research & Development, Laboratories:
Council of Scientific & Industrial Research (CSIR)

Address1: 2 Rafi Marg
Address2: Anusandhan Bhawan
City: New Delhi
State:
Zip Code:110 001
Country:India
Toll-Free:
Phone: 91-11-2373-7889
Fax: 91-11-2371-0618
Web: www.csir.res.in
The Council of Scientific & Industrial Research (CSIR) is a government-funded organization that promotes research and development initiatives in India. It operates in the fields of energy, biotechnology, space, science and technology.

Research & Development, Laboratories:
German Cancer Research Center

Address1: Im Neuenheimer Feld 280

Address2:
City: Heidelberg
State:
Zip Code:69120
Country:Germany
Toll-Free:
Phone: 49-6221-420
Fax: 49-6221-422-995
Web: www.dkfz.de
The German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) is the largest biomedical research institute in Germany and is a member of the Helmholtz Association of National Research Centers. More than 2,700 staff members, including 1,200 scientists, are investigating the mechanisms of cancer and are working to identify cancer risk factors. They provide the foundations for developing novel approaches in the prevention, diagnosis and treatment of cancer. In addition, the staff of the Cancer Information Service (KID) offers information about the widespread disease of cancer for patients, their families and the general public.

Research & Development, Laboratories:

Industrial Technology Research Institute (ITRI)

Address1: 195 Chung Hsing Rd.
Address2: Sec. 4 Chu Tung
City: Hsin Chu
State:
Zip Code:31040
Country:Taiwan
Toll-Free:
Phone: 886-3-582-0100
Fax: 886-3-582-0045
Web: www.itri.org.tw
The Industrial Technology Research Institute (ITRI) is a nonprofit R&D organization founded in 1973 by the Ministry of Economic Affairs (MOEA) of Taiwan. It engages in applied research and technical service for Taiwan's industrial development. ITRI focuses on six areas of development: Information and Communications; Electronics and Optoelectronics; Material, Chemical and Nanotechnology; Medical devices and biomedical; Mechanical Systems; and Green Energy and Environment.

Research & Development, Laboratories:

National Research Council Canada (NRC)

Address1: 1200 Montreal Rd.
Address2: Bldg. M-58
City: Ottawa
State: ON
Zip Code:K1A 0R6
Country:Canada
Toll-Free: 877-672-2672
Phone: 613-993-9101
Fax: 613-952-9907
Web: www.nrc-cnrc.gc.ca
National Research Council Canada (NRC) is comprised of 12 government organization, research institutes and programs that carry out multidisciplinary research. It maintains partnerships with industries and sectors key to Canada's economic development.

Research & Development, Laboratories:

SRI International

Address1: 333 Ravenswood Ave.
Address2:
City: Menlo Park
State: CA
Zip Code:94025-3493
Country:USA
Toll-Free:
Phone: 650-859-2000
Fax:
Web: www.sri.com
SRI International is a nonprofit research organization that offers contract research services to government agencies, as well as commercial enterprises and other private sector institutions. It is organized around broad divisions including biosciences, global partnerships, education, products and solutions division, advanced technology and systems and information and computing sciences division.

Robotics & Automation Industry Associations:

American Society for Automation in Pharmacy (ASAP)

Address1: 492 Norristown Rd.
Address2: Ste. 160
City: Blue Bell
State: PA
Zip Code:19422
Country:USA
Toll-Free:
Phone: 610-825-7783

Fax: 610-825-7641
Web: www.asapnet.org
The American Society for Automation in Pharmacy (ASAP) is a non-profit organization that seeks to advance the application of computer technology in assisting the pharmacists, as well as in the efficient operation and management of a pharmacy.

Robotics & Automation Industry Associations:
International Federation of Robotics (IFR)

Address1: Lyoner St. 18
Address2:
City: Frankfurt am Main
State:
Zip Code:60528
Country:Germany
Toll-Free:
Phone: 49-69-6603-1502
Fax: 49-69-6603-2502
Web: www.ifr.org
The International Federation of Robotics (IFR) promotes the robotics industry worldwide, including the fields of industrial robots for manufacturing and other purposes, service robots and robotics research. Among other things, it is focused on research, development, use and international co-operation in the entire field of robotics, and it seeks to act as a focal point for organizations and governmental representatives in activities related to robotics.

Robotics & Automation Industry Associations:
Laboratory Robotics Interest Group (LRIG)

Address1:
Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone:
Fax:
Web: www.lrig.org
Laboratory Robotics Interest Group (LRIG) is a membership group focused on the application of robotics in the laboratory. The organization currently has over 12,000 members, with individual chapters across the U.S. and in Europe.

Science & Technology Resources:
Life Science Tennessee

Address1: 217 5th Ave. N
Address2: Ste. 200
City: Nashville
State: TN
Zip Code:37219
Country:USA
Toll-Free:
Phone: 615-242-8856
Fax: 615-242-8857
Web: www.lifesciencetn.org
Life Science Tennessee is a statewide, nonprofit, member organization that supports the life science industries in Tennessee through advocacy, partnerships and alignment with economic and workforce development.

Science & Technology Resources:
Technology Review

Address1: 1 Main St.
Address2: Fl. 13
City: Cambridge
State: MA
Zip Code:02142
Country:USA
Toll-Free:
Phone: 617-475-8000
Fax: 617-475-8000
Web: www.technologyreview.com
Technology Review, an MIT enterprise, publishes tech industry news, covers innovation and writes in-depth articles about research, development and cutting-edge technologies.

Stocks & Financial Markets Data:
SiliconValley.com

Address1:

Address2:
City:
State:
Zip Code:
Country:
Toll-Free:
Phone: 408-920-5615
Fax:
Web: www.siliconvalley.com
SiliconValley.com, run by San Jose Mercury News and owned by MediaNews Group, offers a summary of current financial news and information regarding the field of technology.

Technology Transfer Associations:
Association of University Technology Managers (AUTM)

Address1: One Parkview Plaza
Address2: Ste. 880
City: Oakbrook Terrace
State: IL
Zip Code:60015
Country:USA
Toll-Free:
Phone: 847-686-2244
Fax: 847-686-2253
Web: www.autm.net
The Association of University Technology Managers (AUTM) is a nonprofit professional association whose members belong to over 300 research institutions, universities, teaching hospitals, government agencies and corporations. The association's mission is to advance the field of technology transfer and enhance members' ability to bring academic and nonprofit research to people around the world.

Technology Transfer Associations:
Federal Laboratory Consortium for Technology Transfer

Address1: 950 N. Kings Hwy.
Address2: Ste. 105
City: Cherry Hill
State: NJ
Zip Code:08304
Country:USA
Toll-Free:
Phone: 856-667-7727
Fax:
Web: www.federallabs.org
In keeping with the aims of the Federal Technology Transfer Act of 1986 and other related legislation, the Federal Laboratory Consortium (FLC) works to facilitate the sharing of research results and technology developments between federal laboratories and the mainstream U.S. economy. FLC affiliates include federal laboratories, large and small businesses, academic and research institutions, state and local governments and various federal agencies. The group has regional support offices and local contacts throughout the U.S.

Technology Transfer Associations:
Licensing Executives Society (USA and Canada), Inc.

Address1: 11130 Sunrise Valley Dr.
Address2: Ste. 350
City: Reston
State: VA
Zip Code:20191
Country:USA
Toll-Free:
Phone: 703-234-4058
Fax: 703-435-4390
Web: www.lesusacanada.org
Licensing Executives Society (USA and Canada), Inc., established in 1965, is a professional association composed of about 3,000 members who work in fields related to the development, use, transfer, manufacture and marketing of intellectual property. Members include executives, lawyers, licensing consultants, engineers, academic researchers, scientists and government officials. The society is part of the larger Licensing Executives Society International, Inc. (same headquarters address), with a worldwide membership of some 12,000 members from approximately 80 countries.

Technology Transfer Associations:
State Science and Technology Institute (SSTI)

Address1: 5015 Pine Creek Dr.
Address2:
City: Westerville
State: OH
Zip Code:43081
Country:USA
Toll-Free:
Phone: 614-901-1690
Fax:

Web: www.ssti.org
The State Science and Technology Institute (SSTI) is a national nonprofit group that serves as a resource for technology-based economic development. In addition to the information on its web site, the Institute publishes a free weekly digest of news and issues related to technology-based economic development efforts, as well as a members-only publication listing application information, eligibility criteria and submission deadlines for a variety of funding opportunities, federal and otherwise.

Trade Associations-General:
Associated Chambers of Commerce and Industry of India (ASSOCHAM)

Address1: 5, Sardar Patel Marg
Address2: Chanakyapuri
City: New Delhi
State:
Zip Code:110 021
Country:India
Toll-Free:
Phone: 91-11-4655-0555
Fax: 91-11-2301-7008
Web: www.assocham.org
The Associated Chambers of Commerce and Industry of India (ASSOCHAM) has a membership of more than 300 chambers and trade associations and serves members from all over India. It works with domestic and international government agencies to advocate for India's industry and trade activities.

Trade Associations-General:
BUSINESSEUROPE

Address1: 168 Ave. de Cortenbergh 168
Address2:
City: Brussels
State:
Zip Code:1000
Country:Belgium
Toll-Free:
Phone: 32-2-237-65-11
Fax: 32-2-231-14-45
Web: www.businesseurope.eu
BUSINESSEUROPE is a major European trade federation that operates in a manner similar to a chamber of commerce. Its members are the central national business federations of the 34 countries throughout Europe from which they come. Companies cannot become direct members of BUSINESSEUROPE, though there is a support group which offers the opportunity for firms to encourage BUSINESSEUROPE objectives in various ways.

Trade Associations-Global:
World Trade Organization (WTO)

Address1: Centre William Rappard
Address2: Rue de Lausanne 154
City: Geneva 21
State:
Zip Code:CH-1211
Country:Switzerland
Toll-Free:
Phone: 41-22-739-51-11
Fax: 41-22-731-42-06
Web: www.wto.org
The World Trade Organization (WTO) is a global organization dealing with the rules of trade between nations. To become a member, nations must agree to abide by certain guidelines. Membership increases a nation's ability to import and export efficiently.

U.S. Government Agencies:
Bureau of Economic Analysis (BEA)

Address1: 4600 Silver Hill Rd.
Address2:
City: Washington
State: DC
Zip Code:20233
Country:USA
Toll-Free:
Phone: 301-278-9004
Fax:
Web: www.bea.gov
The Bureau of Economic Analysis (BEA), an agency of the U.S. Department of Commerce, is the nation's economic accountant, preparing estimates that illuminate key national, international and regional aspects of the U.S. economy.

U.S. Government Agencies:
Bureau of Labor Statistics (BLS)

Address1: 2 Massachusetts Ave. NE
Address2:
City: Washington
State: DC
Zip Code:20212-0001
Country:USA
Toll-Free: 800-877-8339
Phone: 202-691-5200
Fax: 202-691-7890
Web: stats.bls.gov
The Bureau of Labor Statistics (BLS) is the principal fact-finding agency for the Federal Government in the field of labor economics and statistics. It is an independent national statistical agency that collects, processes, analyzes and disseminates statistical data to the American public, U.S. Congress, other federal agencies, state and local governments, business and labor. The BLS also serves as a statistical resource to the Department of Labor.

U.S. Government Agencies:
Center for Biologics Evaluation and Research (CBER)

Address1: 1401 Rockville Pike
Address2: Ste. 200N
City: Rockville
State: MD
Zip Code:20852-1448
Country:USA
Toll-Free: 800-835-4709
Phone: 301-827-1800
Fax:
Web: www.fda.gov/BiologicsBloodVaccines/default.htm
The Center for Biologics Evaluation and Research (CBER) regulates biologic products for use in humans. It is a source for a broad variety of data on drugs, including blood products, counterfeit drugs, exports, drug shortages, recalls and drug safety.

U.S. Government Agencies:
Center for Devices and Radiological Health (CDRH)

Address1: 10903 New Hampshire Ave.
Address2: WO66-5429
City: Silver Spring
State: MD
Zip Code:20993
Country:USA
Toll-Free: 800-638-2041
Phone: 301-796-7100
Fax: 301-847-8149
Web: www.fda.gov/MedicalDevices/default.htm
The Center for Devices and Radiological Health (CDRH) is a unit of the FDA that regulates medical devices and radiation-emitting products.

U.S. Government Agencies:
Center for Drug Evaluation and Research (CDER)

Address1: 10001 New Hampshire Ave.
Address2: Hillandale Bldg., Fl. 4
City: Silver Spring
State: MD
Zip Code:20993
Country:USA
Toll-Free: 855-543-3784
Phone: 301-796-3400
Fax:
Web: www.fda.gov/Drugs/default.htm
The Center for Drug Evaluation and Research (CDER) is a division of the FDA that offers a wealth of information on new drug approval statistics and the approval process.

U.S. Government Agencies:
Center for Food Safety and Applied Nutrition (CFSAN)

Address1: Center for Food Safety and Applied Nutrition
Address2: 5001 Campus Dr.
City: College Park
State: MD
Zip Code:20740
Country:USA
Toll-Free: 888-723-3366
Phone:
Fax:
Web: http://www.fda.gov/AboutFDA/CentersOffices/OfficeofFoods/CFSAN/
The Center for Food Safety and Applied Nutrition (CFSAN) is an FDA site that provides information about food safety, ensuring the food products are genuinely labeled and are safe for consumers.

U.S. Government Agencies:
Centers for Disease Control and Prevention (CDC)

Address1: 1600 Clifton Rd.
Address2:
City: Atlanta
State: GA
Zip Code:30333
Country:USA
Toll-Free: 800-232-4636
Phone:
Fax:
Web: www.cdc.gov
The Centers for Disease Control and Prevention (CDC), headquartered in Atlanta, is the federal agency charged with protecting the public health of the nation by providing leadership and direction in the prevention and control of diseases and other preventable conditions and responding to public health emergencies.

U.S. Government Agencies:
National Cancer Institute (NCI)

Address1: 9609 Medical Ctr. Dr.
Address2: BG 9609 MSC 9760
City: Bethesda
State: MD
Zip Code:20892-9760
Country:USA
Toll-Free: 800-422-6237
Phone:
Fax:
Web: www.cancer.gov
The National Cancer Institute (NCI) is the Federal Government's principal agency for cancer research and training.

U.S. Government Agencies:
National Center for Biotechnology Information (NCBI)

Address1: 8600 Rockville Pike, Bldg. 38A
Address2: c/o U.S. National Library of Medicine, National Institutes of Health
City: Bethesda
State: MD
Zip Code:20894
Country:USA
Toll-Free: 888-346-3656
Phone: 301-594-5983
Fax:
Web: www.ncbi.nlm.nih.gov
The National Center for Biotechnology Information (NCBI) creates public databases, conducts research in computational biology, develops software for analyzing genome data and disseminates biomedical information. It is part of the U.S. National Library of Medicine (NLM), which is located on the campus of the National Institutes of Health (NIH).

U.S. Government Agencies:
National Center for Toxicological Research

Address1: 3900 NCTR Rd.
Address2:
City: Jefferson
State: AR
Zip Code:72079
Country:USA
Toll-Free:
Phone: 870-543-7000
Fax:
Web: http://www.fda.gov/AboutFDA/CentersOffices/OC/OfficeofScientificandMedicalPrograms/NCTR/default.htm
The mission of the National Center for Toxicological Research is to conduct peer-reviewed scientific research that supports and anticipates the FDA's current and future regulatory needs.

U.S. Government Agencies:
National Heart, Lung and Blood Institute (NHLBI)

Address1: P.O. Box 30105
Address2:
City: Bethesda
State: MD
Zip Code:20824-0105
Country:USA

Toll-Free:
Phone: 301-592-8573
Fax: 301-592-8563
Web: www.nhlbi.nih.gov
The National Heart, Lung, and Blood Institute (NHLBI) provides leadership for a national program in diseases of the heart, blood vessels, lung and blood; blood resources; and sleep disorders.

U.S. Government Agencies:
National Institutes of Health (NIH)

Address1: 9000 Rockville Pike
Address2:
City: Bethesda
State: MD
Zip Code:20892
Country:USA
Toll-Free:
Phone: 301-496-4000
Fax:
Web: www.nih.gov
The National Institutes of Health (NIH) is the leader of medical and behavioral research in the U.S. and is comprised of 27 institutes and centers ranging from the National Cancer Institute to the National Institute of Mental Health.

U.S. Government Agencies:
National Science Foundation (NSF)

Address1: 4201 Wilson Blvd.
Address2:
City: Arlington
State: VA
Zip Code:22230
Country:USA
Toll-Free: 800-877-8339
Phone: 703-292-5111
Fax:
Web: www.nsf.gov
The National Science Foundation (NSF) is an independent U.S. government agency responsible for promoting science and engineering. The foundation provides colleges and universities with grants and funding for research into numerous scientific fields.

U.S. Government Agencies:
U.S. Census Bureau

Address1: 4600 Silver Hill Rd.
Address2:
City: Washington
State: DC
Zip Code:20233-8800
Country:USA
Toll-Free: 800-923-8282
Phone: 301-763-4636
Fax:
Web: www.census.gov
The U.S. Census Bureau is the official collector of data about the people and economy of the U.S. Founded in 1790, it provides official social, demographic and economic information. In addition to the Population & Housing Census, which it conducts every 10 years, the U.S. Census Bureau numerous other surveys annually.

U.S. Government Agencies:
U.S. Department of Commerce (DOC)

Address1: 1401 Constitution Ave. NW
Address2:
City: Washington
State: DC
Zip Code:20230
Country:USA
Toll-Free:
Phone: 202-482-2000
Fax:
Web: www.commerce.gov
The U.S. Department of Commerce (DOC) regulates trade and provides valuable economic analysis of the economy.

U.S. Government Agencies:
U.S. Department of Labor (DOL)

Address1: 200 Constitution Ave. NW
Address2:
City: Washington
State: DC
Zip Code:20210
Country:USA
Toll-Free: 866-487-2365
Phone: 202-693-4676
Fax:
Web: www.dol.gov
The U.S. Department of Labor (DOL) is the government agency responsible for labor regulations.

U.S. Government Agencies:
U.S. Food and Drug Administration (FDA)

Address1: 10903 New Hampshire Ave.
Address2: Room 5377, Bldg. 32
City: Silver Spring
State: MD
Zip Code:20993
Country:USA
Toll-Free: 888-463-6332
Phone:
Fax:
Web: www.fda.gov
The U.S. Food and Drug Administration (FDA) promotes and protects the public health by helping safe and effective products reach the market in a timely way and by monitoring products for continued safety after they are in use. It regulates both prescription and over-the-counter drugs as well as medical devices and food products.

U.S. Government Agencies:
U.S. Patent and Trademark Office (PTO)

Address1: 600 Dulany St.
Address2: Madison Bldg.
City: Alexandria
State: VA
Zip Code:22314
Country:USA
Toll-Free: 800-786-9199
Phone: 571-272-1000
Fax:
Web: www.uspto.gov
The U.S. Patent and Trademark Office (PTO) administers patent and trademark laws for the U.S. and enables registration of patents and trademarks.

U.S. Government Agencies:
U.S. Securities and Exchange Commission (SEC)

Address1: 100 F St. NE
Address2:
City: Washington
State: DC
Zip Code:20549
Country:USA
Toll-Free: 800-732-0330
Phone: 202-942-8088
Fax:
Web: www.sec.gov
The U.S. Securities and Exchange Commission (SEC) is a nonpartisan, quasi-judicial regulatory agency responsible for administering federal securities laws. These laws are designed to protect investors in securities markets and ensure that they have access to disclosure of all material information concerning publicly traded securities. Visitors to the web site can access the EDGAR database of corporate financial and business information.

Important, read carefully: This agreement is a legal agreement between you (whether as an individual or an organization) and Plunkett Research®, Ltd.

Plunkett Research®, Ltd. P. O. Drawer 541737 Houston, Texas 77254-1737 Phone: 713.932.0000, Fax: 713.932.7080
www.plunkettresearch.com

LIMITED RIGHTS TO INSTALL THE DATA ON ELECTRONIC DEVICES:

Plunkett Research, Ltd. grants you a non-exclusive license to use and and/or install the Data, including installation of an electronic file containing the Data on one individual desktop computer AND on one laptop computer AND one mobile device such as a cellular mobile telephone or an ebook reader. This is a limited license, which applies to a single user. Organizations desiring multi-user licenses may purchase additional rights at reasonable cost by contacting Plunkett Research, Ltd., 713.932.0000, **www.plunkettresearch.com**, email: **info@plunkettresearch.com**.

Academic institutions may post the Data in unaltered form to course management systems or course packs in platforms such as Blackboard, provided that such use is a part of the regular services offered by the institution and not a stand-alone product.

TERMS OF USE:

Users' publications in static electronic format containing any portion of the Data or Derived Data (that is, a set of data that is a derivation made by a User from the Data, resulting from the applications of formulas, analytics or any other method) may be resold by the User only for the purpose of providing third-party analysis within an established research platform under the following conditions: (However, Users may not extract or integrate any portion of the Data or Derived Data for any other purpose.)

a) Users may utilize the Data only as described herein. b) User may not export more than an insubstantial portion of the Data or Derived Data, c) Any Data exported by the User may only be distributed if the following conditions are met:

i) Data must be incorporated in added-value reports or presentations, either of which are part of the regular services offered by the User and not as stand-alone products.

ii) Data may not be used as part of a general mailing or included in external websites or other mass communication vehicles or formats, including, but not limited to, advertisements.

iii) Except as provided herein, Data may not be resold by User.

"Insubstantial Portions" shall mean an amount of the Data that (1) has no independent commercial value, (2) could not be used by User, its clients, Authorized Users and/or its agents as a substitute for the Data or any part of it, (3) is not separately marketed by the User, an affiliate of the User or any third-party source (either alone or with other data), and (4) is not retrieved by User, its clients, Authorized Users and/or its Agents via regularly scheduled, systematic batch jobs.

LIMITED WARRANTY; DISCLAIMER OF LIABILITY:

While Plunkett Research, Ltd. ("PRL") has made an effort to obtain the information presented in the Data from sources deemed reliable, PRL makes no warranties, expressed or implied, regarding the Data contained herein. The Data is provided to the End-User "AS IS" without warranty of any kind. No oral or written information or advice given by PRL, its employees, distributors or representatives will create a warranty or in any way increase the scope of this Limited Warranty, and the Customer or End-User may not rely on any such information or advice.

Customer Remedies: PRL's entire liability and your exclusive remedy shall be, at PRL's sole discretion, either (a) return of the price paid, if any, or (b) repair or replacement of the product that does not meet PRL's Limited Warranty and that is returned to PRL with sufficient evidence of or receipt for your original purchase.

NO OTHER WARRANTIES:

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, PRL, ITS CONTENT PROVIDERS AND ITS DISTRIBUTORS DISCLAIM ALL OTHER WARRANTIES AND CONDITIONS, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT WITH REGARD TO THE PRODUCT, AND THE PROVISION OF OR FAILURE TO PROVIDE SUPPORT SERVICES.

LIMITATION OF LIABILITY:

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL PRL, ITS CONTENT PROVIDERS OR ITS DISTRIBUTORS BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, ABILITY TO OBTAIN OR RETAIN EMPLOYMENT OR REMUNERATION, ABILITY TO PROFITABLY MAKE AN INVESTMENT, OR ANY OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF, OR RELIANCE UPON, THE DATA, OR THE INABILITY TO USE THIS DATA OR THE FAILURE OF PRL TO PROVIDE SUPPORT SERVICES, EVEN IF PRL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY CASE, PRL'S ENTIRE LIABILITY SHALL BE LIMITED TO THE AMOUNT ACTUALLY PAID BY YOU FOR THE PRODUCT.

Among other things, this Limited Warranty applies to your ability to install or download an electronic file or software or such an installation's effects on your computer or other electronic devices. Plunkett Research, Ltd. assumes no liability and does not guarantee that this Data will install or function correctly on your computer or other electronic devices and further does not guarantee or accept any liability for the results of your attempt to install this Data, including any fault or dysfunction (including, but not limited to: computer viruses and/or alterations to computer files, registries or setups) to your computer or electronic devices that may be caused by installation or use.

CAUTION:

When using the Data or any other source for business and industry information, the user should use caution and diligence by conducting further research. The user is

advised that business and industry conditions can change quickly and that there may be omissions or inaccuracies in the Data.

Market and industry statistics, company revenues, profits, debts and other details may be estimates. Financial information, company plans or status, employee benefits and other data can change quickly and may vary from those stated here. Past performance is no guarantee of future results.