



World-class training programs

BIOMANUFACTURING

Top-ranked biotechnology industry

IN NORTH CAROLINA

Ideal climate for business and life



A HOME FOR BIOMANUFACTURING

Companies invest hundreds of millions of dollars in biomanufacturing plants, which require physical infrastructure as well as human resources for support. North Carolina meets those needs with a unique combination of assets: a skilled workforce, a top-ranked biotech industry, a low cost of doing business and a high quality of life.

The state ranks highly in external surveys as well.

- *Site Selection* magazine recognized North Carolina's business climate as **best in the country** for six of the last seven years, including 2007.

“We appreciate the support we have received from state and local officials and the Durham community since we located here four years ago. We are proud to be a part of North Carolina's expanding biopharma sector.”

—JOHN WAGNER,
MANAGER OF MERCK'S DURHAM PLANT

- Seven scientists with ties to North Carolina have been honored with **Nobel Prizes**.

Some of the world's largest pharmaceutical companies make their products in North Carolina. **Novartis Vaccines and Diagnostics** recognized the state's advantages and chose Holly Springs over several other locations for a \$267 million plant to produce flu vaccine. **Merck**, looking for a place to produce vaccines for measles, mumps, rubella, chicken pox and shingles, built a \$300 million facility in Durham. Both companies have since announced growth plans and additional jobs at these plants.



Novo Nordisk Pharmaceutical Industries and **United Therapeutics**, two companies with a long-term North Carolina presence, are also expanding their efforts in the state. **Pfizer Poultry Health** purchased North Carolina-based **Embrex** and now operates a poultry vaccine plant near Laurinburg. **GlaxoSmithKline**, **Diosynth** and many other multinational companies operate facilities in North Carolina. Some are among the largest of their type in the world, including **Wyeth**, **Talecris**, **Biogen Idec** and **Novozymes**.

To add to this impressive roster, the Biotechnology Center is growing new companies from university research in plant science, vaccines and other technologies. The Biotechnology Center is also working with the Department of Commerce and statewide partners to bring in new biomanufacturing operations as well as to expand existing ones.

These companies, plus those offering development, analytical, production and engineering services have created a community that ranks among the best locations for biomanufacturing in the world.

“North Carolina's business climate, low tax burden and high-skill workforce make this region an attractive place for industries like biotechnology and biomanufacturing.”

—NORTH CAROLINA GOVERNOR MIKE EASLEY



JOBS FOR NORTH CAROLINA

Biomufacturing is a clean manufacturing process that uses living cells as miniature factories. It's how a child's measles vaccine and the supplement in an athlete's protein shake are produced.



Making these and other products through both biomufacturing and traditional processes creates jobs, contributes to the state's economy, and improves lives here and around the globe. Approximately 18,000 North Carolina residents are employed by a broad range of companies including *biomanufacturers, manufacturers of traditional pharmaceuticals and diagnostics*, as well as *pharmaceutical service providers*, which offer analytical and production services. (tables below, right)

Although they won't replace all of the lost furniture and textile manufacturing jobs, these companies offer higher-paying jobs than traditional manufacturing:

- Entry-level technicians typically earn \$25,000 to \$30,000 with basic training and often earn more than \$50,000 after five years of experience.
- The average salary for all jobs in the pharmaceutical manufacturing industry—including those requiring more education—exceeds \$82,000 in the state.

Also, biomufacturing plants are located around the state, which distributes these jobs throughout North Carolina.

PHARMACEUTICAL SERVICE PROVIDERS

COMPANY	LOCATION	PRODUCTS
aaiPharma	Wilmington	Analytical and manufacturing services
Catalent Pharma Solutions	Morrisville	Analytical services
DSM Pharmaceuticals	Greenville	Bulk chemical synthesis, fill and finish, aseptic filling services
Gorbec Pharmaceutical Services	Durham	Contract analysis and production services
Harmony Labs	Landis	Development and manufacture of topical pharmaceuticals and cosmeceuticals
Hospira	Clayton	Sterile solutions and emulsions for infusion and nutrition therapy
Laboratory Corporation of America	Burlington, RTP	Clinical laboratory services
Metrics	Greenville	Analytical services
PharmAgra Labs	Brevard	Custom organic compounds
PharmaCore	High Point	Organic chemical synthesis
Pisgah Labs	Pisgah Forest	Organic chemical synthesis

MANUFACTURING LOCATIONS



- Pharmaceutical Service Providers
- Biomanufacturers
- Manufacturers of Traditional Pharmaceuticals and Diagnostics

MANUFACTURERS OF TRADITIONAL PHARMACEUTICALS AND DIAGNOSTICS

COMPANY	LOCATION	PRODUCTS
Actavis U.S.	Lincolnton	Ointments, creams, nasal sprays and other products
Banner	High Point	Pharmaceutical gel caps
BASF Corp.	Wilmington	Vitamins and nutrition products
Baxter Healthcare	Marion	Intravenous solutions
BD Diagnostics, TriPath	Burlington	Cervical cancer screening kits
bioMerieux	Durham	Diagnostic kits
Carolina Medical Products	Farmville	Ointments, powders, non-injectable solutions
Covidien Mallinckrodt	Raleigh	Acetaminophen
Eisai	RTP	Alzheimer's drug
GBF Medical Group	Greensboro	Diagnostic kits
GlaxoSmithKline	Zebulon	Drug formulation and packaging
Hospira	Rocky Mount	Injectable solutions and drugs
MEDTOX Diagnostics	Burlington	Drug testing kits
Merck & Company	Wilson	Pharmaceuticals
Microban International	Huntersville	Antimicrobial polymeric additives
Nitta Gelatin USA	Fayetteville	Gelatin powder for pharmaceuticals and food
Novo Nordisk Pharmaceutical Industries	Clayton	Human insulin formulation and sterile filling
Purdue Pharmaceuticals LP	Wilson	Pain relief and asthma drugs
Qualicaps	Whitsett	Pharmaceutical gel caps
Sandoz	Wilson	Oral-dosage pharmaceuticals
United Therapeutics	RTP	Cardiovascular, cancer and infectious disease treatments
Vintage Pharmaceuticals	Charlotte	Pharmaceuticals

BIOMANUFACTURERS

COMPANY	LOCATION	PRODUCTS
Ajinomoto USA	Raleigh	Amino Acids
Alphavax	Durham	Vaccines
Archer Daniels Midland	Southport	Citric acid
Argos Therapeutics	Durham	Vaccines
Biogen Idec	RTP	Multiple sclerosis, psoriasis and Crohn's disease treatments
Biolex Therapeutics	Pittsboro	Therapeutic proteins
Catalent Pharma Solutions	Raleigh	Development, manufacture and packaging services for bio-based products
CellzDirect	RTP	Specialized cells and their products.
Diosynth Biotechnology	RTP	Contract biopharmaceutical manufacturing
Greer Laboratories	Lenoir	Allergenic extracts, vaccines
KBI BioPharma	Durham	Contract biopharmaceutical manufacturing
Merck & Company	Durham	Vaccines
Molecular Toxicology	Boone	Research and testing products; contract manufacturing
Novartis Vaccines and Diagnostics	Holly Springs	Vaccines
Novozymes North America	Franklinton	Industrial enzymes
Pfizer Poultry Health	Maxton	Poultry vaccines
Talecris Biotherapeutics	Clayton	Blood and plasma-related therapeutics
Wyeth Pharmaceuticals	Sanford	Vaccines

HIGH-QUALITY WORKFORCE

Wherever the location or whatever the product, biomufacturing plants are complex operations that typically run 24 hours a day, seven days a week, under stringent regulation by the U.S. Food and Drug Administration. Biomufacturing companies require trained technicians to operate these plants efficiently and in compliance with FDA rules.

The NCBioImpact partnership was formed to meet those rigorous demands. North Carolina's universities and community colleges collaborated with industry, the North Carolina Biosciences Organization and the Biotechnology Center to produce and deliver workforce-training programs across the state. The **Golden LEAF Foundation** has committed nearly \$70 million of North Carolina's tobacco-settlement money to support this initiative. Industry partners have allocated millions of dollars of in-kind services and equipment. And the state's General Assembly supplies ongoing funding for operations.



This broad partnership has yielded a three-pronged approach:

- The Golden LEAF **Biomufacturing Training and Education Center** on Centennial Campus at North Carolina State University. BTEC is the world's largest hands-on training location dedicated to learning the ins and outs of biomufacturing. (www.btec.ncsu.edu)
- The **Biomufacturing Research Institute and Technology Enterprise** at North Carolina Central University. BRITE is dedicated to research and higher-level training in the life sciences, and to also uncovering ways to improve biomufacturing processes. (brite.nccu.edu)
- **NCBioNetwork** is a collection of more than 20 community colleges across the state connected by their biotechnology program offerings. The effort includes seven specialized centers that meet specific needs of life-science industry sectors. (www.ncbionetwork.org)

“North Carolina understands the bioscience manufacturing sector needs an abundant supply of specially trained workers, so we work hard to develop a job-ready workforce that can help make businesses more productive and profitable.”

—NORRIS TOLSON, PRESIDENT AND CEO, NORTH CAROLINA BIOTECHNOLOGY CENTER

From certificate to Ph.D., NCBioImpact trains and helps retain job-ready employees at all levels. This comprehensive strategy creates a continuum of education in scientific, technical and engineering disciplines. (www.ncbioimpact.com)

A COMMUNITY LIKE NOWHERE ELSE IN THE WORLD

North Carolina's thriving biotechnology industry, top-notch science, unbeatable climate for business and great quality of life create the ideal place for a biomanufacturing facility.

The state ups the ante with a workforce-development system that is second to none and the largest dedicated training facility in the world for biomanufacturing. In fact, the Milken Institute's Biotech Index report has ranked the Research Triangle area No. 1 in human capital and biotechnology workforce.



Supporting that community are a number of architecture, construction, engineering, instrumentation and consulting firms that design, build and validate bioprocessing plants in compliance with FDA requirements. Rounding out the mix are the state affiliate of **BIO**, chapters of **ISPE**, **PDA** and **ASQ**, plus the Biotechnology Center's **Bioprocessing and Process Development Group**, where process-development scientists and engineers discuss issues, challenges and developments in biomanufacturing.

Find out what makes North Carolina like nowhere else in the world for biomanufacturing. Contact Bill Bullock at 919-541-9366 or bill_bullock@ncbiotech.org.



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