

Profile of Biomedical Research and Biotechnology Commercialization

Raleigh–Durham–Chapel Hill Metropolitan Statistical Area

Overview and History of Biotechnology in Raleigh-Durham

The Raleigh-Durham metropolitan area is the leading center for biotechnology in the South. The area's strong educational resources (including Duke University and the University of North Carolina) and the Research Triangle Park formed in the 1950s paved the way for the transformation of the region's traditional economy. Raleigh-Durham attracted major investment from the federal government and from multinational pharmaceutical firms including Glaxo-Smith Kline and Burroughs Wellcome. A list of pharmaceutical and biotech companies in the Research Triangle Park area today reads like a *Who's Who* of the industry: Aventis, BASF, Bayer, Biogen, and the like.

The region is a center not only for major pharmaceutical research and manufacturing but also for a number of biotechnology start-ups and for companies specializing in contract research and testing services that assist with clinical trials of new tests and therapies.

North Carolina was one of the leaders in designing public policy to support the development of biotechnology. The state established the North Carolina Biotechnology Center in 1981 to promote biotechnology as a source of indigenous development. The center supports start-ups and growing companies by providing grants and seed monies for biotechnology research, helping to recruit faculty to the state's university system, and encouraging informal collaboration among university and industry researchers. The center also has a \$26 million Bioscience Investment Fund, created in 1998, to provide early-stage capital for promising biotech companies.

The Raleigh–Durham–Chapel Hill Metropolitan Statistical Area had a year 2000 population of 1.1 million, ranking it number 41 in the list of the largest U.S. metropolitan areas. During the 1990s population in the region grew dramatically, by nearly 39 percent.

Biomedical Research Activity in Raleigh-Durham

The Raleigh–Durham–Chapel Hill metropolitan area is also widely known as the Research Triangle because of the presence of Research Triangle Park. The area has a considerable amount of biomedical research activity. More than 900 life scientists work in this area, and there are three biological institutions granting life science PhDs, one of them ranking among the top 20 institutions nationally in life sciences research. Total NIH financial support flowing to the Research Triangle area is more than \$469 million annually.

Table 1. Raleigh-Durham: Indicators of Biomedical Research

Biomedical Research Indicators	Year	Raleigh-Durham-Chapel Hill, NC MSA
Life Scientists Employed	1998	910
Institutions Granting Life Science PhD Degrees	1999	3
Life Science PhDs Granted	1999	166
Universities Ranked among the Top 20 Nationally in Life Sciences Research	1982	1
Total NIH Financial Support	2000	\$469,119,754
NIH Funding for Medical Schools	1985	\$120,889
	1990	\$205,615
	1995	\$302,689
	2000	\$440,954
Biotechnology Patents	1975–79	27
	1980–89	204
	1990–99	796

Two research institutions in the Research Triangle area are among the top 100 institutions that receive funding from the National Institutes of Health. The University of North Carolina at Chapel Hill and Duke University received almost \$400 million in NIH research support in 2000.

Table 2. Raleigh-Durham: Principal NIH–Funded Research Institutions, 2000

Rank	Institution	Research Grants	Grant Amount (in millions)	Total NIH Support (in millions)
13	University of North Carolina Chapel Hill	484	\$176.4	\$207.0
15	Duke University	489	\$175.5	\$197.1

Source: National Institutes of Health

The Research Triangle area is not as innovative as some of the other regions studied. The top two patent holders here are Duke University and Becton, Dickinson and Company. A mix of private firms and public institutions accounted for a majority of the increase in biotechnology patenting in the region during the 1990s, but none held more than 100 patents during the decade.

Table 3. Raleigh-Durham: Top Biotechnology-related-Patent Holders, by Decade, 1975–1999

Rank	Company Name*	1970s	1980s	1990s
1	Duke University	1	8	87
2	Becton, Dickinson and Company	1	16	79
3	University of North Carolina		4	76
4	Burroughs Wellcome Co.	20	85	68
5	Individually Owned Patent	2	16	49
6	Glaxo Wellcome, Inc.			46
7	Novartis Finance Corporation			39
8	North Carolina State University		9	37
9	Research Triangle Institute	1	7	19
10	Rhone-Poulenc Inc.			27
11	Ciba-Geigy Corporation			18
12	Glaxo Inc.			18
13	Chiron Corporation			12
14	Novartis Corporation			11
15	Akzo Nobel NV			9
16	Boron Biologicals, Inc.			8
17	Inspire Pharmaceuticals, Inc.			8
18	Rhone Poulenc AG Company Inc.			8
19	Sphinx Pharmaceuticals Corporation			8
20	United States of America, Health and Human Services		2	8
21	Delta Pharmaceuticals, Inc.			6

Source: U.S. Patent & Trademark Office, 2001

* Patents registered under the legal name of the company at the time the patent was issued—in some cases joint ventures or mergers may lead to the apparent duplication of company names.

Biotechnology Commercialization in Raleigh-Durham

The Research Triangle Park area has attracted more than \$379 million in venture capital investment in biopharmaceutical firms since 1995. Investments have been made in 54 new firms. Only two venture capital companies are present in the region. The region has had one initial public offering by a biotech company since 1998 and has attracted \$192 million in pharmaceutical-biotech research alliances since 1996. The area has ten publicly traded biotech companies with an aggregate market capitalization of nearly \$9.9 billion. The industry includes 13 firms with more than 100 employees, and 35 firms are members of the national Biotechnology Industry Association.

Table 4. Raleigh-Durham: Indicators of Biotechnology Commercialization

Indicator		Raleigh-Durham- Chapel Hill, NC MSA
Venture Capital Investment, 1995–2001	Number	54
	Amount	\$379,687,000
	Share	4%
Venture Capital Firms among the 50 Most Active in Biopharmaceutical Investment	1995–2001	2
Number of Initial Public Offerings by Biotech Companies	1998–2001	1
Value (in millions) of Research Alliances between Pharmaceutical Companies and Local Biotechnology Companies	Prior to 1990	-
	1990–1995	\$33
	1996–2001	\$192
Number of Publicly Traded Biotechnology Companies	2001	10
Market Capitalization (in millions) of Local Biotechnology Companies, 2001	2001	\$ 9,949
Local Biotechnology Firms Established	through 1980	7
	1981–1990	18
	1991–2001	46
	Not Available	1
	All Firms	72
Local Biotechnology Firms with More than 100 Employees	2001	13
NAICS 3254: Pharmaceuticals	Establishments	19
	Employment	3,679
NAICS 5413: Life Sciences R&D	Establishments	90
	Employment	3,356
Number of Members of the Biotechnology Industry Organization (BIO)	2001	35

Quintiles Transnational Corporation and Bayer's Pharmaceutical Division are the two largest biotechnology employers in the area. The region is also home to Glaxo Wellcome, which has 4,885 employees but is classified by IBI as a pharmaceutical firm.

Table 5. Raleigh-Durham: Principal Biotechnology Firms

Company	City	Employment	Segment
Quintiles Transnational Corporation	Durham	1,200*	Therapeutics
Bayer Corporation / Pharmaceutical Division	Clayton	900	Therapeutics and Bioseparations
Novo Nordisk Biochem North America Inc.	Franklinton	350	Production/fermentation, specialty chemicals
Covance Biotechnology Services Inc.	Research Triangle Park	350	Production/Fermentation, Bioseparations, General Cell Culture, Therapeutics and Testing/Analytical Services
Charles River Laboratories Inc.	Raleigh	175	Specialty Chemicals, Animal Agriculture and Immunological Products
Triangle Pharmaceuticals Inc.	Durham	173	Therapeutics
Sphinx Pharmaceuticals	Research Triangle Park	170	Therapeutics, Biotechnology Reagents, Specialty Chemicals and Research
Ajinomoto USA Inc.	Raleigh	135	Production/Fermentation
Biogen Inc./ North Carolina	Research Triangle Park	125	Therapeutics, Clinical Diagnostics, Reagents and Vaccines
Fresenius Kabi Clayton R&D Inc.	Clayton	125	Drug Delivery Systems

Source: Institute for Biotechnology Information, 2001

* Local employment listed; Quintiles total employment worldwide is 20,453.

Table 6. Raleigh-Durham: Venture Capital Investment in Biopharmaceutical Firms, 1995–2001

Year	Venture Capital
1995	\$26,647,000
1996	\$37,600,000
1997	\$50,730,000
1998	\$34,850,000
1999	\$86,650,000
2000	\$117,335,000
2001*	\$25,875,000

Source: PriceWaterhouseCoopers, 2001 (* Six Months)