

Profile of Biomedical Research and Biotechnology Commercialization

Los Angeles-Riverside-Orange County Consolidated Metropolitan Statistical Area

Overview and History of Biotechnology in Los Angeles

Los Angeles has a large base of biomedical research activity, including its universities (UCLA, UCSB, USC, UC Irvine, and the California Institute of Technology) as well as private research institutions (such as Cedars Sinai Medical Center, the City of Hope National Medical Center, and Huntington Medical Research Institute).

Amgen—the largest U.S. biotech firm, with 7,000 employees worldwide and \$3 billion in annual revenues—is the cornerstone of the commercial biotechnology industry in the Los Angeles area. The company was founded in 1980 by a group of scientists and venture capitalists. Its first CEO was George Rathmann, recruited from pharmaceutical maker Abbott Laboratories. The firm was established in the Los Angeles suburb of Thousand Oaks, putting it near such major research centers as the University of California at Los Angeles, the University of California at Santa Barbara, and the California Institute of Technology.

Southern California has a number of other major manufacturers of pharmaceuticals and medical devices (including Allergan, Watson Pharmaceuticals, and Beckman Coulter), but it has not produced other strong biotech companies. The region falls well behind the San Francisco Bay area and the San Diego area in venture capital, initial public offerings, and fast-growing biotechnology companies.

The Los Angeles–Riverside–Orange County Consolidated Metropolitan Statistical Area had a population of 16.3 million in 2000, making it the second-largest metropolitan area in the United States. During the 1990s population in the Los Angeles area grew by nearly 13 percent.

Biomedical Research Activity in Los Angeles

The Los Angeles metropolitan area has a considerable amount of biomedical research activity. More than 2,450 life scientists work in this area, and there are seven biological institutions granting life science PhDs, two of them ranked among the top 20 nationally in life sciences research. Total NIH financial support flowing to the Los Angeles area is more than \$595 million annually.

Table 1. Los Angeles: Indicators of Biomedical Research

Biomedical Research Indicators	Year	Los Angeles-Riverside-Orange County, CA CMSA
Life Scientists Employed	1998	2,450
Institutions Granting Life Science PhD Degrees	1999	7
Life Science PhDs Granted	1999	218
Universities Ranked among the Top 20 Nationally in Life Sciences Research	1982	2
Total NIH Financial Support	2000	\$594,666,368
NIH Funding for Medical Schools	1985	\$124,553
	1990	\$194,901
	1995	\$241,715
	2000	\$433,093
Biotechnology Patents	1975–79	106
	1980–89	330
	1990–99	1,399

Three research institutions in the Los Angeles area are among the top 100 institutions that receive funding from the National Institutes of Health. The University of California at Los Angeles, the University of Southern California, and the University of California at Irvine received more than \$430 million in NIH research support in 2000.

Table 2. Los Angeles: Principal NIH–Funded Research Institutions, 2000

Rank	Institution	Research Grants	Grant Amount (in millions)	Total NIH Support (in millions)
8	University of California, Los Angeles	615	\$213.2	\$243.5
31	University of Southern California	256	\$112.8	\$120.5
64	University of California, Irvine	216	\$63.2	\$67.5

Source: National Institutes of Health

Individual inventors are very active in Los Angeles; most of the biotechnology patents are held individually. Allergan, Inc., and the University of California are among the top organizational patent holders in this region. A mix of private firms and public institutions accounted for a majority of the increase in biotechnology patenting in the region during the 1990s.

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

Rank	Company Name	1970s	1980s	1990s
1	Individually Owned Patent	30	95	270
2	Allergan, Inc.		3	198
3	University of California	3	40	128
4	Amgen, Inc.		5	94
5	California Institute of Technology	4	7	55
6	University of Southern California	2	10	46
7	Xoma Corporation			30
8	Cedars Sinai Medical Center		2	25
9	City of Hope		6	23
10	Baxter International Inc.	4	12	18
11	SmithKline Beckman Corporation	4	4	16
12	Nexstar Pharmaceuticals, Inc.			15
13	Oregon Health Sciences University *			13
14	Union Oil Company of California		3	13
15	Vivorex Pharmaceuticals, Inc.			21
16	Vestar, Inc.		3	12
17	Whitby Research, Inc.			12
18	Sonus Pharmaceuticals Inc.			10
19	Allergan Sales, Inc.			8
20	Cryopharm Corporation		1	8

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

* Note: Patents are geo-coded according to the residence of the first-named inventor, making it possible for a patent owned by an institution in one metropolitan area to be recorded in a different metropolitan area.

Biotechnology Commercialization in Los Angeles

The area around Los Angeles has attracted more than \$180 million in venture capital investment in biopharmaceutical firms since 1995. Investments have been made in 26 new firms. The region has had one initial public offering by a biotech company since 1998 and has attracted more than \$69 million in pharmaceutical-biotech research alliances since 1996. The area has 33 publicly traded biotech companies with an aggregate market capitalization of nearly \$82 billion. The industry includes 18 firms with more than 100 employees. Some 24 firms are members of the national Biotechnology Industry Association.

Table 4. Los Angeles: Indicators of Biotechnology Commercialization

Indicator	Los Angeles-Riverside-Orange County, CA CMSA	
Venture Capital Investment, 1995–2001	Number	26
	Amount	\$180,761,000
	Share	2%
Venture Capital Firms among the 50 Most Active in Biopharmaceutical Investment	1995–2001	1
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	0
	1990–1995	\$73
	1996–2001	\$69
Number of Publicly Traded Biotechnology Companies	2001	33
Market Capitalization (in millions) of Local Biotechnology Companies, 2001	2001	\$82,992
Local Biotechnology Firms Established	through 1980	13
	1981–1990	24
	1991–2001	10
	Not Available	-
	All Firms	47
Local Biotechnology Firms with More than 100 Employees	2001	18
NAICS 3254: Pharmaceuticals	Establishments	134
	Employment	11,885
NAICS 5413: Life Sciences R&D	Establishments	204
	Employment	4,522
Number of Members of the Biotechnology Industry Organization (BIO)	2001	24

The largest Los Angeles biotechnology firms are Amgen, Inc., Kirin Amgen, Inc., and Alpha Therapeutic Corporation, but none of the largest biotechnology companies is among the area's top 20 private employers.

Table 5. Los Angeles: Principal Biotechnology Firms

Company	City	Employment	Segment
Amgen Inc.	Thousand Oaks	4,400	Therapeutics; Fermentation/Production; Drug Delivery
Kirin-Amgen Inc.	Newbury Park	3,500	Therapeutics
Alpha Therapeutic Corporation	Los Angeles	2,000	Therapeutics; Drug Delivery
Edwards Lifesciences Corporation	Irvine	1,500	Equipment; Reagents
Sicor Inc.	Irvine	1,200	Therapeutics; Drug Delivery; Medical Devices
Nichols Institute Diagnostics	San Juan Capistrano	800	Reagents; Clinical Diagnostics; Testing/Analytical Services
Diagnostic Products Corporation	Los Angeles	600	Clinical Diagnostics; Reagents; Veterinary
Gensia Sicor Pharmaceuticals Inc.	Irvine	350	Therapeutics
Hycor Biomedical Inc.	Garden Grove	190	Clinical Diagnostics; Specialty Chemicals; Immunological Products
BioSource International Inc.	Camarillo	185	Immunological Products; Biotechnology Reagents; Therapeutics

Source: Institute for Biotechnology Information, 2001

Table 6. Los Angeles: Venture Capital Investment in Biopharmaceutical Firms, 1995–2001

Year	Venture Capital
1995	\$3,400,000
1996	\$ 7,850,000
1997	\$ 20,750,000
1998	\$ 111,600,000
1999	\$2,650,000
2000	\$11,211,000
2001*	\$23,300,000

Source: PriceWaterhouseCoopers, 2001 (* Six Months)