CALIFORNIA

California's employment exceeded 10 percent of the 2006 national total in three of the four bioscience subsectors, each of which also shows employment specialization: drugs and pharmaceuticals (location quotient of 1.21); medical devices and equipment (1.47); and research, testing, and medical laboratories (1.45). In drugs and pharmaceuticals, employment also grew faster than the national rate. Academic research expenditures in the biosciences grew at 41 percent over 5 years, reaching a total of just over $4 billion in 2006. Over the 2002–2007 period, California received four out of every 10 U.S. venture capital dollars in the biosciences. The State's $20 billion in VC investments were across a diverse portfolio; however, the largest two segments—human biotechnology and medical therapeutics—account for over half of all investments. The State's 24,293 patents also span a wide range of fields.

Major Industry Developments and Recent Successes

- Genetech completed a $1 billion manufacturing expansion in Vacaville.
- Takeda Pharmaceuticals established a major U.S. research and development headquarters in South San Francisco in 2007.
- Southern California's medical device community saw large, billion-dollar acquisitions at both Biosite and DJO, while smaller firms such as NuVasive and Illumina were able to expand to much larger facilities.
- Genoptix and Optimer Pharmaceuticals had successful initial public offerings of stock.

Recent State Initiatives

The BIO conference returned to San Diego in 2008 (second time in 7 years). Since the last BIO report in 2006, the **California Institute of Regenerative Medicine** has funded 156 grants totaling $260 million for investigator-initiated research and training in human embryonic stem cell science at 22 California nonprofit and academic institutions.

Some of these awards, issued under an Independent Citizens Oversight Committee, were funded by a $150 million loan provided by the State pending outcome of litigation over the $3 billion bond issue authorized in 2004. Award categories included fellowships (169 totaling $37.5 million), seed grants for new ideas (74 awards totaling $45 million), shared-laboratory grants (17 awards totaling $50 million), comprehensive research grants for mature projects (29 awards totaling $74 million), and new faculty awards (22 awards totaling $54 million).

Since the last BIO report, the University of California (UC) System's California Institute for Quantitative Biosciences at Mission Bay opened Stanley Hall, a 285,000-square-foot interdisciplinary research building with space for collaboration among researchers with faculty appointments at UC San Francisco (UCSF) and UC Berkeley.

In biofuels, it was announced that UC Berkeley and Lawrence Berkeley National Laboratory will take leading roles in two major initiatives—a $125 million **Joint BioEnergy Institute** funded by the U.S. Department of Energy and also involving UC Davis, the Carnegie Institution for Science at Stanford University, and Sandia and Lawrence Livermore National Laboratories; and a $500 million **Energy Biosciences Institute** awarded by BP, shared with the University of Illinois at Urbana-Champaign.

California also continued to support existing programs relevant to bioscience companies, such as the industry-university matching grant programs at UC (the **Discovery Grants** in biotechnology and information technology for the life sciences) and California State University (the **CSUPERB** grants) and the Employment Training Panel programs offered through the Labor and Workforce Development Agency.

For additional information on California's bioscience policies and programs, please see http://www.bth.ca.gov, http://www.labor.ca.gov, http://www.baybio.org, http://www.biocom.org, http://www.chi.org, and http://www.socalbio.org.

Bioscience Industry Base, 2006

Industry Subsector	California		United States	
	2006	2001–06 Change	2006	2001–06 Change
Agricultural Feedstock & Chemicals				
Establishments	183	-14.8%	2,183	3.8%
Employment	5,190	9.0%	105,846	-6.1%
Location Quotient	0.42		n.a.	
Direct-Effect Employment Multiplier	5.37		11.22	
Total Employment Impact	27,866		1,214,709	
Average Annual Wage	$50,941		$67,870	
Drugs & Pharmaceuticals				
Establishments	405	-6.3%	2,654	1.9%
Employment	44,475	13.6%	317,149	4.0%
Location Quotient	1.21		n.a.	
Direct-Effect Employment Multiplier	7.08		9.92	
Total Employment Impact	315,092		2,880,242	
Average Annual Wage	$101,733		$86,892	
Medical Devices & Equipment				
Establishments	2,214	-6.5%	15,215	0.3%
Employment	72,073	-6.8%	422,993	-0.9%
Location Quotient	1.47		n.a.	
Direct-Effect Employment Multiplier	3.57		4.85	
Total Employment Impact	257,623		1,980,128	
Average Annual Wage	$77,433		$59,441	
Research, Testing, & Medical Laboratories				
Establishments	3,294	34.7%	22,857	32.7%
Employment	75,616	13.4%	449,991	17.8%
Location Quotient	1.45		n.a.	
Direct-Effect Employment Multiplier	2.67		3.25	
Total Employment Impact	201,828		1,440,500	
Average Annual Wage	$85,903		$71,284	
Total Private Sector				
Establishments	1,235,508	19.2%	8,575,730	10.2%
Employment	13,130,630	3.7%	113,463,842	3.1%
Average Annual Wage	$47,796		$42,272	

Note: n.a. = metric is not applicable.

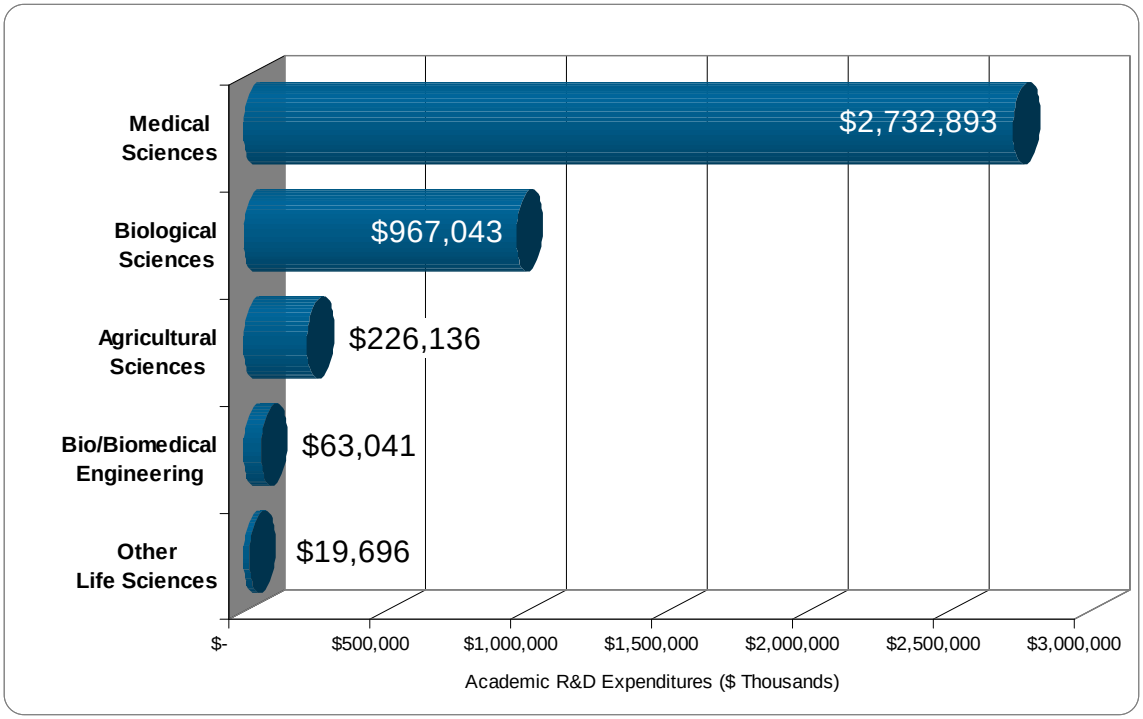
Additional Bioscience Performance Metrics

Summary of State Performance in Selected Bioscience-related Metrics

	California	United States	Rank
Academic R&D Expenditures, FY 2006			
Total ($ thousands)	$6,492,838	$47,760,402	1
Bioscience R&D ($ thousands)	$4,008,809	$29,307,628	1
Bioscience Share of Total R&D	61.7%	61.4%	
Bioscience R&D Per Capita	$110.59	$98.10	
Change in Bioscience R&D FY 2002–2006	41.2%	36.9%	
NIH Funding, FY 2007			
Total ($ thousands)	$3,163,252	$21,066,389	1
Per Capita Funding	$86.54	$69.84	
Change in Funding, FY 2002–2007	8.6%	11.2%	
Higher Education Degrees in Bioscience Fields, AY 2006	17,051	143,433	1
Employment in Bioscience-related Occupations, 2006	69,600	588,520	1
Bioscience Venture Capital Investments, 2002-2007 ($ millions)	$20,743.4	$51,260.9	1
Bioscience and Related Patents, 2002-2007	24,293	121,817	1

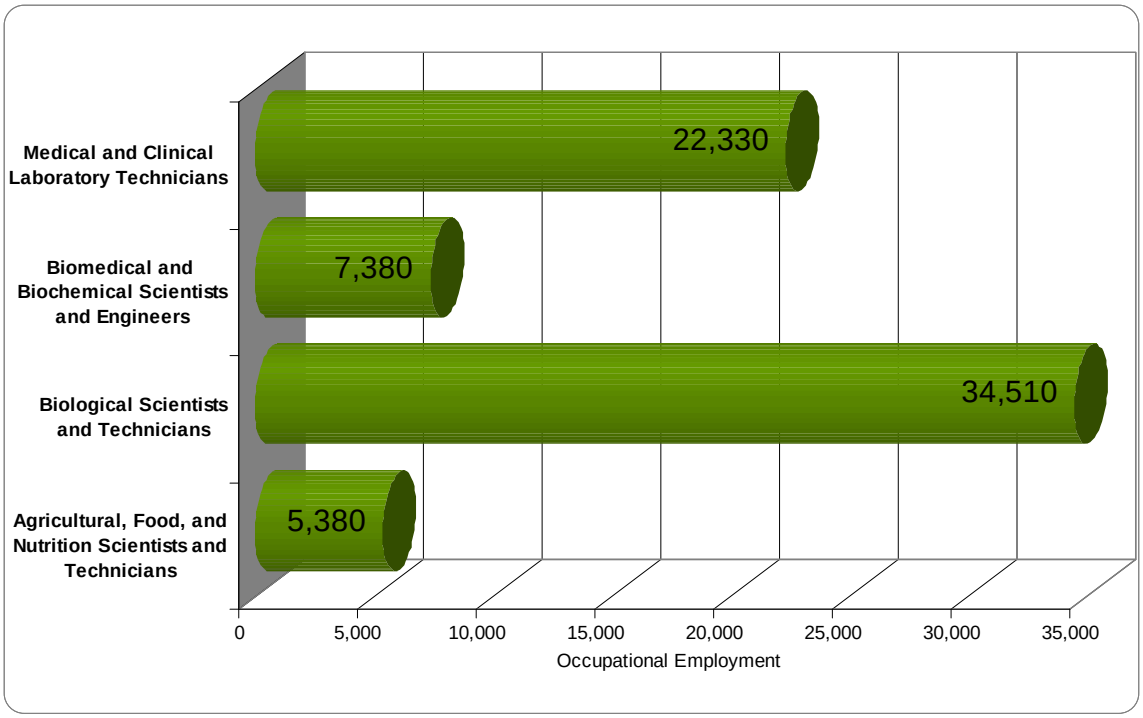
Bioscience R&D Base

Bioscience Academic R&D Expenditures in California, FY 2006

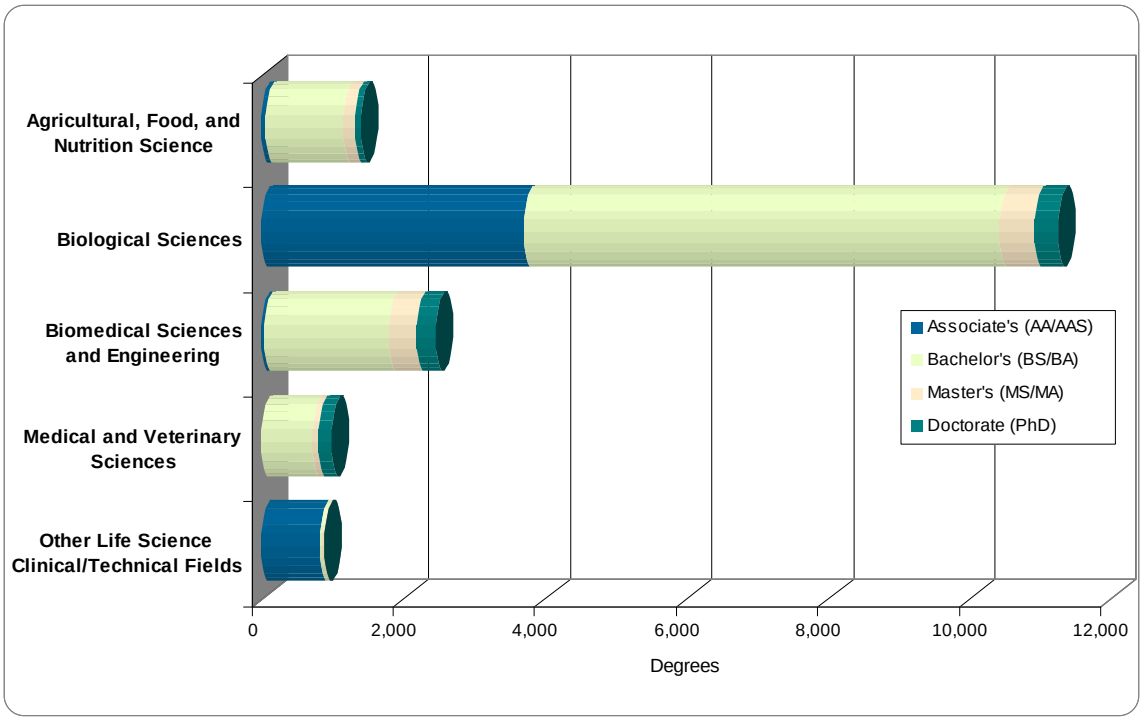


Bioscience Talent Base

Bioscience-related Occupational Employment in California, 2006

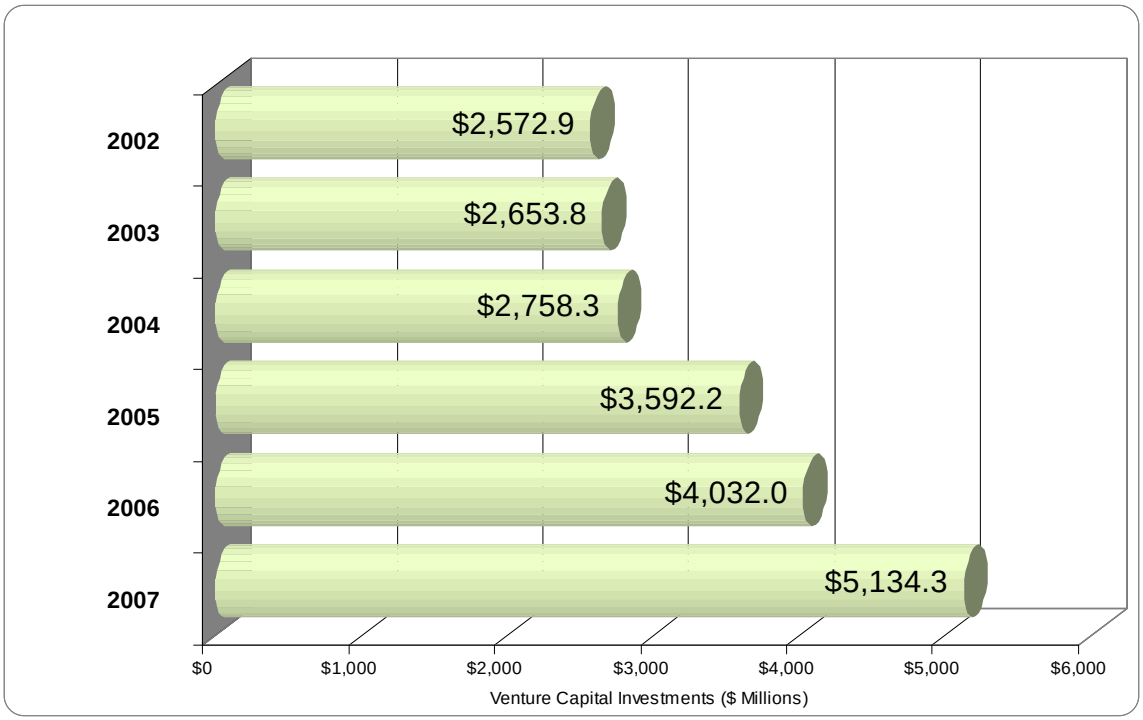


Bioscience-related Degrees in California, AY 2006

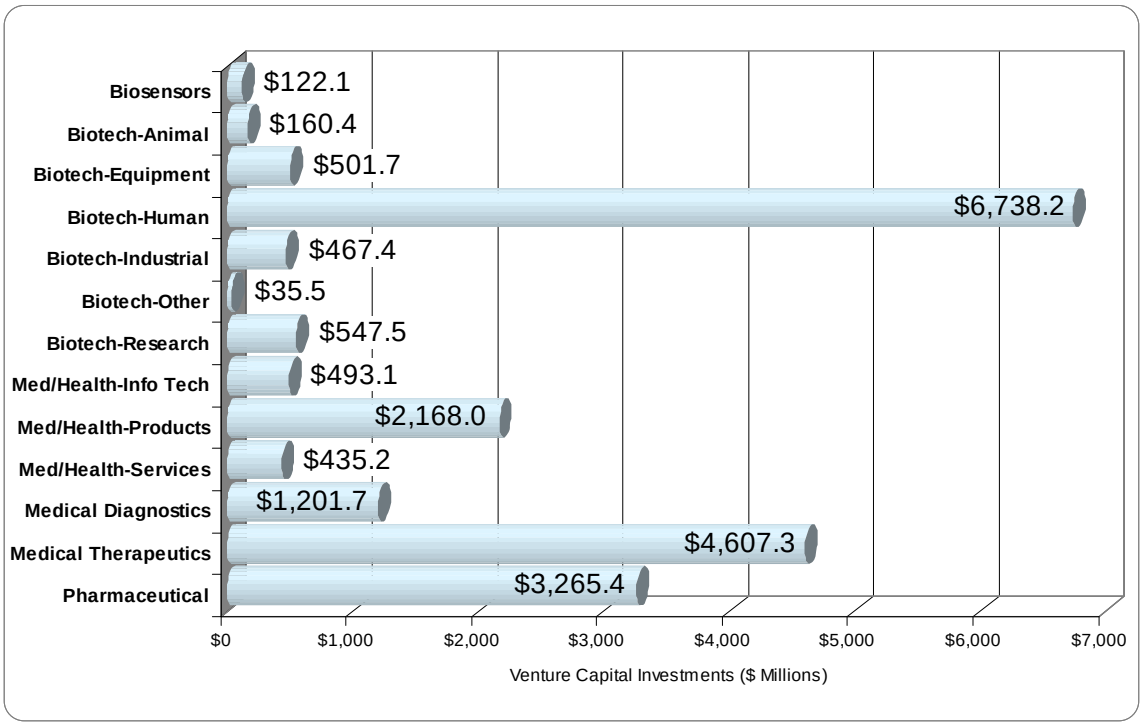


Bioscience Venture Capital

Bioscience-related Venture Capital Investments in California, 2002–2007

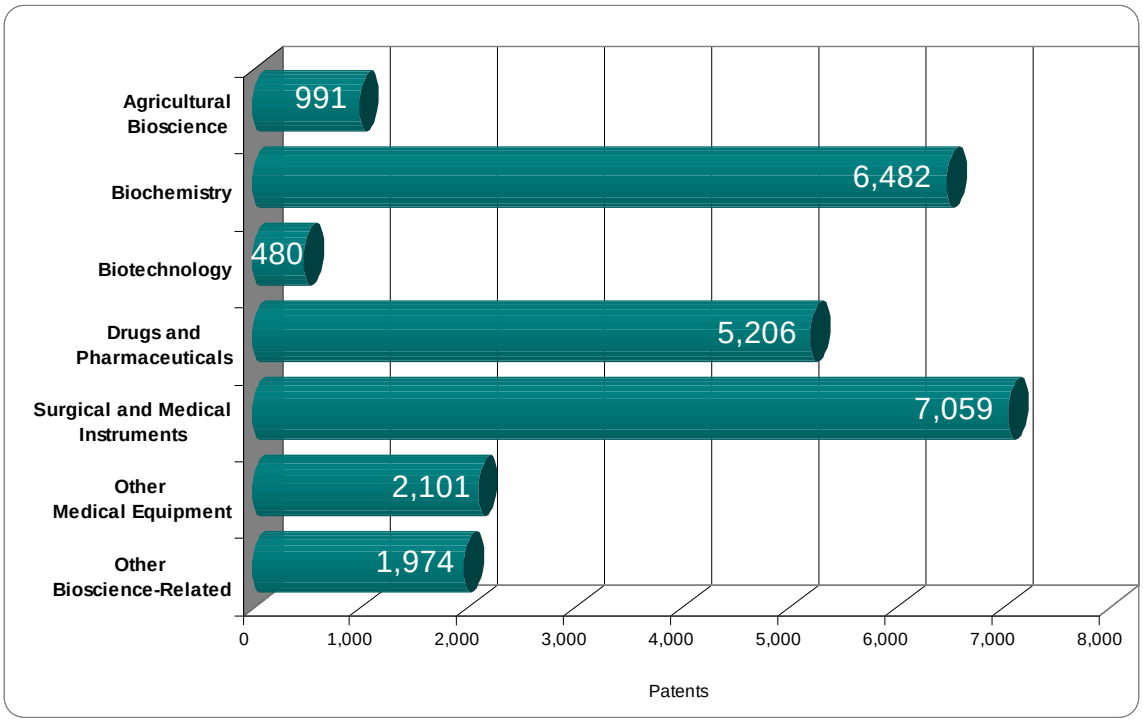


Bioscience-related Venture Capital Investments in California by Segment, 2002–2007



Bioscience Patents

Bioscience-related Patents by Classification Group in California, 2002–2007



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Source Notes:

Employment, Establishment, and Wage Data: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW) industry data provided by the Minnesota IMPLAN Group, 2001 and 2006.

Employment Multipliers: U.S. Bureau of Economic Analysis RIMS II Employment Multipliers, 2005 (most currently available).

Academic R&D Expenditures: National Science Foundation (NSF) Survey of Research and Development Expenditures at Universities and Colleges, 2002 and 2006.

NIH Funding: National Institutes of Health – Office of Extramural Research, Award Trends – Dollars Awarded by State, 2002 and 2007.

Higher Education Degrees: National Center for Educational Statistics, Integrated Postsecondary Education Data System (IPEDS), 2006.

Occupational Employment: U.S. Bureau of Labor Statistics, Occupational Employment Statistics (OES) survey data, 2006.

Venture Capital: Thomson Reuters VentureXpert Database, 2002-2007, as of May 1, 2008.

Patents: U.S. Patent & Trademark Office data as available from the Thomson Reuters' Delphion Patent Analysis Database, 2002–2007, as of May 1, 2008.

For a more detailed discussion of the data and methodology used please see the Appendix to the full national report.