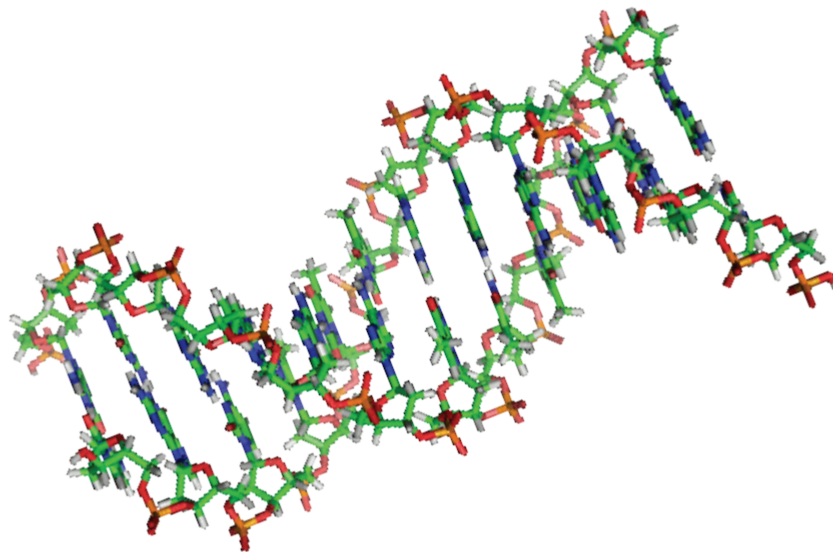


# Biotechnology

## Sector Report

March 2009



Bourne Capital Partners, LLC

**Healthcare Merchant Banking & Financial Advisory**

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**Bourne Partners**

# Biotechnology Overview

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- Can be defined as the use of living organisms to develop products or run a process
- Subdisciplines of biotechnology are:
  - Red (medical applications)
  - White (industrial applications)
  - Blue (marine and aquatic applications)
  - Green (agricultural applications)
- Red biotechnology is the focus of this report and will be referred to as “biotechnology”
- Biologicals are typically large molecules - proteins, peptides, nucleic acids or inactivated viruses or bacteria

# Market Landscape

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- In 1982, the first biotechnology drug, human insulin, was approved by the FDA
- Space greatly dominated by multinational pharmaceutical companies
- Collaborations, partnerships and/or mergers with multinational pharmaceutical companies are common practice for specialized biotechnology companies
- Blockbuster model of traditional specialty pharma is on the decline and biotechnology companies are poised to excel due to their targeted focus on highly unmet needs
- Emergence of competition ex-U.S. from biogenerics
- In the U.S., legal frameworks for biogenerics is unlikely until 2010, but legislation is in front of Congress now
- Reimbursement and cost containment are the largest barriers to growth
- Growing competition among biotech products

Source:

1. *The Fastest Growing Biotechnology Companies, Business Insights. 2008*



# Biotechnology Sectors Forecast

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## DNA Sequencing

- Encompasses biochemical methods for determining the order of the nucleotide bases, adenine, guanine, cytosine, and thymine, in a DNA oligonucleotide
- Market anticipated to grow more than 10% annually, reaching a market size of ~\$1 billion by 2013
- New applications will promote growth within the space

## RNA Interference (“RNAi”)

- RNAi is a mechanism that inhibits gene expression at the stage of translation or by hindering the transcription of specific genes
- RNAi is set for explosive growth
- Market was \$145.2 million in 2007 and projected to reach \$3.6 billion by 2013, representing a compounded annual growth rate (“CAGR”) of 83.4%
- Research and development tools market is estimated to grow to \$424.5 million by 2013 with a 19.5% annual growth rate

*Source:*

1. *The Market for Bioengineered Protein Drugs. Report ID: BIO009E, Published: January 2007, Analyst: Gargi Talukder*
2. *DNA Diagnostics: Technologies and Global Markets. Report ID: BIO063A, Published: June 2008, Analyst: Amy Brock*
3. *Facts and Trends Analysis. Italian Biotechnology Directory, Report 2008*

# Biotechnology Sectors Forecast

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## Bioengineered Protein Drugs

- Modified and engineered antibodies present the largest share of the market
- Global market worth \$47.4 billion in 2006 and projected to reach \$55.7 billion by 2011
- Hormone protein drugs are expected to grow at an average of 5.1% annually and reach \$11.9 billion by 2011

## DNA Diagnostics

- DNA Microarrays, in situ hybridization (“ISH”) Diagnostics and lab-on-a-chip (“LOAC”) Diagnostics combined were estimated to be worth \$4.3 billion in 2008
- DNA Microarrays, ISH Diagnostics and LOAC Diagnostics are expected to experience annual growth through 2013 of 13.9%, 15.7% and 15.4%, respectively

*Source:*

1. *The Market for Bioengineered Protein Drugs. Report ID: BIO009E, Published: January 2007, Analyst: Gargi Talukder*
2. *DNA Diagnostics: Technologies and Global Markets. Report ID: BIO063A, Published: June 2008, Analyst: Amy Brock*
3. *Facts and Trends Analysis. Italian Biotechnology Directory, Report 2008*

# Biotechnology Sectors Forecast

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## Monoclonal Therapeutics (“mAb or moAb”) and Companion Diagnostics Products

- mAb are monospecific antibodies that are identical because they are produced by one type of immune cell that are all clones of a single parent cell
- Market was worth \$26 billion in 2006 and an estimated \$31 billion by the end of 2007
- Projected to reach \$56 billion by 2012, with a CAGR of 13.0%

*Source:*

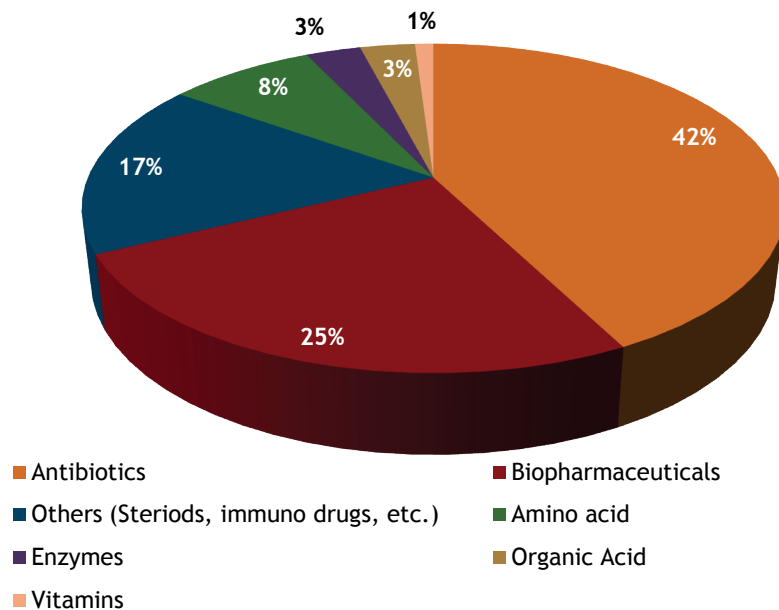
1. *The Market for Bioengineered Protein Drugs. Report ID: BIO009E, Published: January 2007, Analyst: Gargi Talukder*
2. *DNA Diagnostics: Technologies and Global Markets. Report ID: BIO063A, Published: June 2008, Analyst: Amy Brock*
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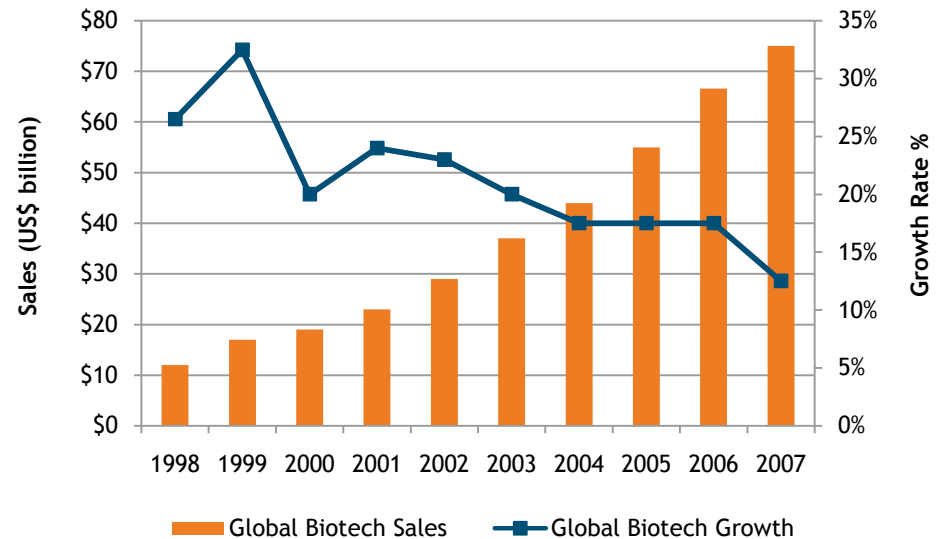
# Sales Trends

- Global sales of Biotech drugs reached \$75 billion in 2007 with a growth rate of 12.5%
- In 2007, the U.S. was the largest market with sales of \$44 billion comprising 56% of overall sales
- European market represented 24% in 2007
- Market is expected to grow to a \$90 billion market by 2010 with a CAGR of 6.3%

2007 % of Global Sales of Biotech Products by Class



2007 Biotech Market Size & Growth Trend



Source:  
1. [www.visiongain.com](http://www.visiongain.com)

# Market Share

- Biotech drug sales have grown at an 18.8% CAGR from 2002 - 2006
- Erythropoietins represent the largest therapy class with sales of \$12.9 billion in 2007
- Autoimmune agents garnered the highest CAGR from 2002 - 2006 with growth of 59.0%

Top 10 Therapy Classes	Sales (Bil of \$)	Market Share 2007	Growth Constant US\$	Const US\$ CAGR 02'-06'
Global Biotech Market	\$75,120	100%	12.5%	18.8%
Erythropoietins	12,872	17.1%	-9.0%	11.9%
Oncologics	11,365	15.1%	24.2%	45.9%
Antidiabetics	10,231	13.6%	14.6%	15.4%
Autoimmune agents	8,537	11.1%	24.5%	59.0%
Interferons	6,679	8.9%	2.3%	9.8%
Immunostim Ag Ex Intfron	6,005	8%	5.0%	17.3%
Immunosuppressive Agents	4,520	6%	19.6%	21.7%
Growth Hormones	2,627	3.5%	12.0%	9.7%
Blood Coagulation	2,433	3.2%	9.6%	17.4%
Pure Vaccines	2,099	2.8%	172.4%	2.8%
<b>Total top 10</b>	<b>\$67,189</b>	<b>89.4%</b>	<b>11.4%</b>	<b>19.2%</b>

Source:  
1. IMS Health, MIDAS, MAT Dec 2007



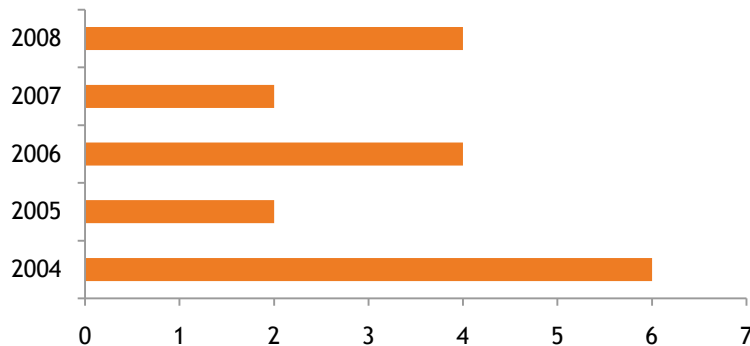
# Top 10 Biotechnology Blockbuster Drugs

Product Name	Target/Mechanism of Action	Class of Compounds	Company	Product Category	Indication	2007/ 2006 (\$ Mil)
Epoetin alfa; Epogen/Espo/Procrit/Eprex	EPO-R	Rhu protein	Amgen / Kirin / Johnson & Johnson	Protein	Renal and Cancer anemia	5,764 / 6,024
Etanercept; Enbrel/Embrel	TNF-alpha	Rec fusion protein of Fc + sol TNF-R	Amgen / Wyeth / Takeda	Antibody	Rheumatoid arthritis; psoriasis etc	5,453 / 4,474
Rituximab; Rituxan/MabThera	CD20	Rec chimeric mab	Genentech/ Roche/ Chugai / Biogen IDEC / Zenyaku Kogyu	Antibody	1st line treatment of diffuse large B-cell, CD20 + NHL Pluschemotherapy	5,392 / 3,912
Trastuzumab Herceptin	HER2	Rec humanized mab	Roche / Genentech	Antibody	Metastatic breast cancer	4,743 / 3,175
Infliximab Emicade	TNF-alpha	Rec chimeric mab	Centocor (J&J) / Schering-Plough / Tanabe Seiyaku	Antibody	Rheumatoid arthritis etc	4,465 / 3764
Hevacizumab Avastin	VEGF	Rec humanized mab	Roche / Genentech	Antibody	Metastatic Colorectal cancer	4,014 / 2,395
Darbepoetin Aranesp / NESP	EPO-R	Rhu glycol Engineered protein	Amgen / Kirin	Protein	Renal and Cancer anemia	4,004 / 4,121
Insulin analog glargine; Lantus	insulin receptor	Rhu insulin analog	Sanofi-Aventis	Protein	Diabetes mellitus	3,167 / 2,188
Adalimumab; Humira	TNF-alpha	Rec fully human mab	Abbott / Eisai	Antibody	Rheumatoid arthritis, psoriasis etc	3,064 / 2,044
Neulasta; peg filgrastim	G-CSF-receptor	pegylated rhu protein	Amgen	Protein	Neutropenia	3,000 / 2,710

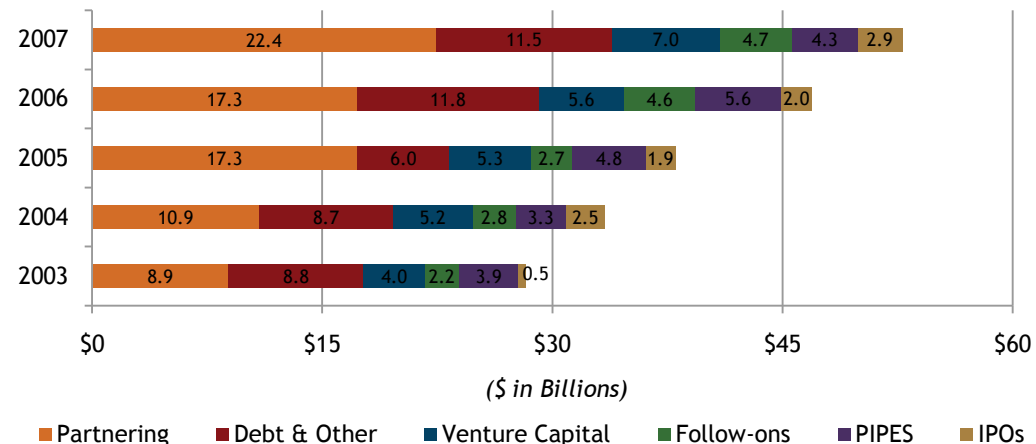
# Biotechnology Growth Drivers

- Large investments by Big Pharma looking to fill their pipelines
- Global investment firms willing to risk their funds on biotech research and development
- Venture capital has contributed a significant amount of capital in biotechnology companies
  - \$3.7 billion in 2005 and estimated to reach \$4.6 billion in 2010
- Collaborations between large and small companies
  - These collaborations were worth \$14.4 billion in 2006 and are projected to reach \$22.0 billion in 2010
- In 2008, the FDA approved 4 biological drugs

Number of Biotech Drugs Approved by FDA



Global Biotech Industry Financing over the Period 2003 - 2007



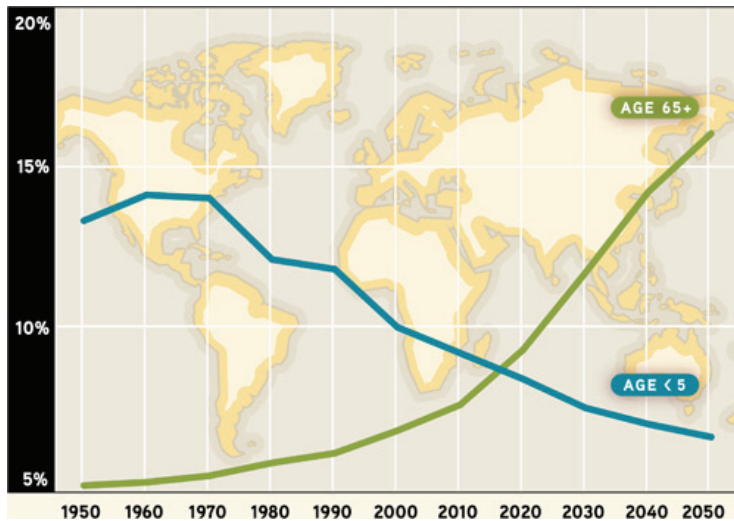
Source:  
 1. IMS Health, MIDAS, MAT Dec 2007  
 2. www.fda.gov  
 3. BCIQ online intelligence



# Biotechnology Growth Drivers – Aging Population

## Aging World Population

- Nearly 500 million, or 8% of people worldwide, are over the age of 65
- Expected to grow to 1 billion by 2030, accounting for 13% of the population
- Most rapid increases in elderly occurring in developing countries



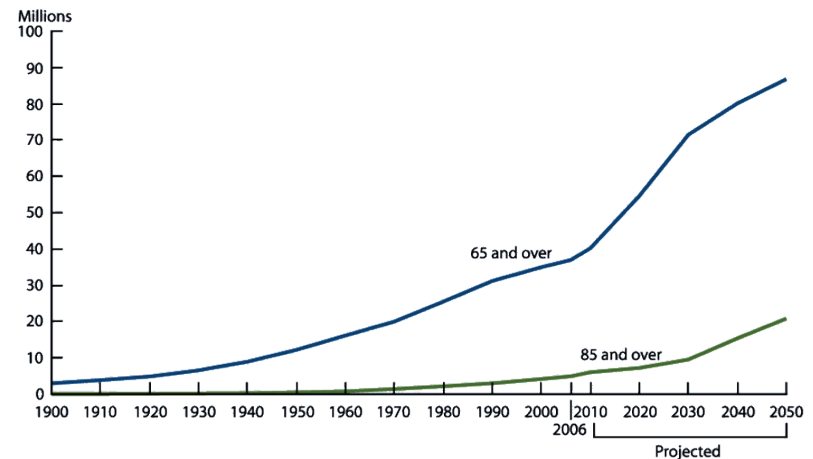
World Graph Source: United Nations Department of Economic and Social Affairs, Population Division. World Population Prospects. The 2004 Revision. New York : United Nations, 2005.

Source:

1. U.S. State Department, 2008. <http://www.state.gov/g/oes/rls/or/81537.htm#1>
2. <http://agingstats.gov/agingstatsdotnet/>

## Aging U.S. Population

- 37.1 million, or 12% of people nationwide, are over the age of 65
- Expected to grow to 71.5 million by 2030
- Over-85 population predicted to grow from 5.3 million in 2006 to 21.0 million in 2050
- Americans over 65 take an average of 2 - 7 medicines each day



Note: Data for 2010-2050 are projections of the population.

Reference population: These data refer to the resident population.

Source: U.S. Census Bureau, Decennial Census, Population Estimates and Projections

# Recent Transactions

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- **Roche acquires remaining stake of Genentech - March 2009**
  - Enterprise value of \$99.2 billion, or 7.4x revenue and 17.5x EBITDA
  - Roche agreed to pay \$95 per share to acquire the remaining 44.2% stake of Genentech, up from their original bid of \$89 per share back in July of 2008
  - The two companies hope to achieve substantial scale benefits, operational synergies and cost avoidance with this merger
  - Roche's pharmaceutical commercial operations in the United States will be moved to Genentech's site in San Francisco and the units will keep the Genentech name
  
- **Gilead Sciences to acquire CV Therapeutics - March 2009**
  - Enterprise value of \$1.3 billion, or 8.5x revenue
  - CV Therapeutics develops advances in molecular biology and genetics to identify mechanisms of cardiovascular diseases and targets for drug discovery
  - CV Therapeutics' pipeline includes multiple product candidates currently being evaluated for the treatment of atrial fibrillation, pulmonary diseases and diabetes, which will help strengthen Gilead's cardiovascular portfolio
  
- **BTG acquires Protherics, plc - December 2008**
  - Enterprise value of £177 million, or 6.3x revenue
  - Protherics offers various products for application in medical emergencies, such as overdose, poisoning, and life-threatening infections
  - The merger would give BTG a promising drug-development pipeline as well as a portfolio of licensed and commercialized products

# Select Comparable Transactions

(\$ in millions)							Enterprise Value /	
Target	Acquiror	Date	Enterprise Value	Revenue	EBITDA	Sales (a)	EBITDA	
CV Therapeutics, Inc. (NasdaqGM:CVTX)	Gilead Sciences Inc. (NasdaqGS:GILD)	Mar-09	1313.6	154.5	-71.4	8.5 x	NM	
Genentech Inc. (NYSE:DNA)	Roche Holdings, Inc.	Mar-09	99,217.7	13,418.0	5,661.0	7.4 x	17.5 x	
Arana Therapeutics Limited (ASX:AAH)	Cephalon International Holdings, Inc.	Feb-09	95.6	27.7	5.4	3.5 x	17.6 x	
Sygnis Pharma AG (XTRA:LIO)	dievini Hopp BioTech holding GmbH & Co. KG	Jan-09	77.0	0.9	-9.9	81.6 x	NM	
Ibis Biosciences, Inc.	Abbott Molecular Inc.	Jan-09	215.0	NA	NA	NA	NA	
Genelabs Technologies Inc.	SmithKline Beecham Corporation	Jan-09	32.7	11.4	-11.4	2.9 x	NM	
Memory Pharmaceuticals Corp.	Hoffmann-La Roche Inc.	Dec-08	48.8	7.1	-40.6	6.9 x	NM	
Omirix Biopharmaceuticals, Inc.	Johnson & Johnson (NYSE:JNJ)	Dec-08	352.2	78.7	10.3	4.5 x	34.2 x	
Protherics plc	BTG plc (LSE:BGCG)	Dec-08	321.1	50.6	-26.3	6.3 x	NM	
Aly Participacoes Ltda.	Monsanto Co. (NYSE:MON)	Dec-08	290.0	NA	NA	NA	NA	
Imclone Systems Inc.	Eli Lilly & Co. (NYSE:LLY)	Nov-08	6,198.0	628.1	193.2	9.9 x	32.1 x	
Innogenetics NV	Solvay Pharmaceuticals S.A.	Nov-08	347.5	79.4	15.0	4.4 x	23.2 x	
Life Therapeutics Ltd., US Plasma Operations	Octapharma AG	Nov-08	46.1	NA	NA	NA	NA	
Pharmacopeia	Ligand Pharmaceuticals, Inc.	Sep-08	28.1	22.2	-59.8	1.3 x	NM	
Certain Neose Technologies	Biogenex AG	Sep-08	22.0	NA	NA	NA	NA	
Certain Neose Technologies	Novo Nordisk A/S	Sep-08	21.0	NA	NA	NA	NA	
Protherics Plc	BTG Plc	Sep-08	321.1	49.5	-28.6	6.5 x	NM	
Direvo Biotech AG	Bayer Schering Pharma AG	Sep-08	297.4	NA	NA	NA	NA	
Amgen Drug Portfolio	Biovitrum, AB	Sep-08	151.3	70.0	NA	2.2 x	NA	
GeneSystems, SA	Pall Corporation	Sep-08	36.3	NA	NA	NA	NA	
Talecris Biotherapeutics Holdings Corp.	CSL, Ltd.	Aug-08	3,210.5	1,221.3	176.5	2.6 x	18.2 x	
Adenosine Therapeutics, LLC	Clinical Data, Inc.	Aug-08	66.2	NA	NA	NA	NA	
Curacyte Discovery GmbH	The Medicines Company	Aug-08	39.0	NA	NA	NA	NA	
Acambis plc	Sanofi-aventis	Jul-08	466.3	29.6	-40.8	15.7 x	NM	
Arius Research, Inc.	Roche Holding AG	Jul-08	135.2	2.5	-11.6	54.3 x	NM	
Mirus Bio Corp.	Roche Holding AG	Jul-08	125.0	NA	NA	NA	NA	
Speedel Holding Ltd	Novartis AG	Jul-08	956.5	7.6	-50.2	126.4 x	NM	
Olerup SSP AB	LinkMed AB	Jul-08	36.1	11.5	6.1	3.1 x	5.9 x	
SGX Pharmaceuticals	Eli Lilly and Co.	Jul-08	42.6	36.5	-12.9	1.2 x	NM	
Jerini AG	Shire, plc	Jul-08	488.0	26.8	-59.1	18.2 x	NM	

NA - Not Available

NM - Not Meaningful

a) Arius Research, Inc., Sygnis Pharma and Speedel Holding Ltd. transactions are excluded from the EV/Sales Mean and Median analysis

Mean	6.0 x	21.2 x
Median	4.4 x	18.2 x
Min	1.2 x	5.9 x
Max	126.4 x	34.2 x

# Biotechnology Trading Comparables

\$ in millions, except for per-share amounts

Company	Ticker	Share Price 3/11/09	Shares Out	Equity Value	Net Debt (Cash)	Enterprise Value	LTM				2009E		2009E EPS (a)	2010E EPS (a)	Book Value
							Sales	EBITDA	EBIT	EPS	Sales	EBITDA			
Amgen, Inc.	AMGN	\$47.27	1,021.8	\$48,300.5	\$624.0	\$48,924.5	\$15,003.0	\$6,713.0	\$5,640.0	\$3.9	\$15,059.8	\$6,906.3	\$4.6	\$5.0	\$20,386.0
Biocon Ltd.	532523	\$1.93	200.0	386.0	71.3	457.3	278.7	66.1	45.9	0.12	307.1	65.6	0.16	\$0.26	302.7
Biogen Idec Inc.	BIIB	\$46.09	297.3	13,702.6	(228.9)	13,473.7	4,097.5	1,691.4	1,229.4	2.65	4,415.1	2,055.5	4.07	4.32	5,806.1
Cubist Pharmaceuticals, Inc.	CBST	\$14.65	57.5	842.4	(109.0)	733.4	433.6	102.6	93.2	2.6	571.6	158.9	1.2	1.7	312.0
Genentech, Inc.	DNA	\$92.17	1,053.4	97,091.9	(3,369.0)	93,722.9	13,418.0	5,661.0	5,069.0	3.21	13,984.5	6,341.1	3.78	4.33	15,671.0
Genzyme Corp.	GENZ	\$52.82	271.4	14,335.3	(973.8)	13,361.5	4,605.0	951.6	583.5	1.50	5,273.0	1,983.0	4.64	5.59	7,335.2
Gilead Sciences Inc.	GILD	\$44.04	911.0	40,120.4	(463.1)	39,657.3	5,335.8	2,791.9	2,689.4	2.10	6,250.5	3,280.5	2.44	2.81	4,152.5
OSI Pharmaceuticals, Inc.	OSIP	\$35.44	57.9	2,052.0	(98.3)	1,953.7	379.4	143.4	137.3	7.19	433.0	176.2	1.60	1.84	571.5
Qiagen NV	QGEN	\$15.45	195.5	3,020.5	644.4	3,664.9	893.0	285.2	180.2	0.44	991.8	333.4	0.92	1.11	1,458.9

Company	Ticker	FYE	Data as of	Margin Analysis			Enterprise Value/			P/E			Price to Book	
				Gross Profit	EBITDA	EBIT	Sales	EBITDA	EBIT	Sales 09	LTM	2009E (a)		2010E (a)
Amgen, Inc.	AMGN	3/31	3/11/09	84.7%	44.7%	37.6%	3.3 x	7.3 x	8.7 x	3.2 x	12.1 x	10.2 x	9.4 x	2.4 x
Biocon Ltd.	532523	12/31	3/11/09	44.4%	23.7%	16.5%	1.6 x	6.9 x	10.0 x	1.5 x	16.0 x	12.4 x	7.5 x	1.3 x
Biogen Idec Inc.	BIIB	12/31	3/11/09	90.2%	41.3%	30.0%	3.3 x	8.0 x	11.0 x	3.1 x	17.4 x	11.3 x	10.7 x	2.4 x
Cubist Pharmaceuticals, Inc.	CBST	12/31	3/11/09	50.4%	23.7%	21.5%	1.7 x	7.1 x	7.9 x	NM	5.7 x	NM	NM	2.7 x
Genentech, Inc.	DNA	12/31	3/11/09	66.1%	42.2%	37.8%	7.0 x	16.6 x	18.5 x	6.7 x	28.7 x	24.4 x	21.3 x	6.2 x
Genzyme Corp.	GENZ	12/31	3/11/09	75.1%	20.7%	12.7%	2.9 x	14.0 x	22.9 x	2.5 x	35.2 x	11.4 x	9.4 x	2.0 x
Gilead Sciences Inc.	GILD	12/31	3/11/09	78.9%	52.3%	50.4%	7.4 x	14.2 x	14.7 x	6.3 x	21.0 x	18.0 x	15.7 x	9.7 x
OSI Pharmaceuticals, Inc.	OSIP	12/31	3/11/09	97.5%	37.8%	36.2%	5.1 x	13.6 x	14.2 x	4.5 x	4.9 x	22.2 x	19.3 x	3.6 x
Qiagen NV	QGEN	12/31	3/11/09	67.3%	31.9%	20.2%	4.1 x	12.9 x	20.3 x	3.7 x	35.4 x	16.7 x	14.0 x	2.1 x

Mean	72.7%	35.4%	29.2%	4.1 x	11.2 x	14.2 x	3.9 x	19.6 x	15.8 x	13.4 x	3.6 x
Median	75.1%	37.8%	30.0%	3.3 x	12.9 x	14.2 x	3.5 x	17.4 x	14.5 x	12.3 x	2.4 x
Min	44.4%	20.7%	12.7%	1.6 x	6.9 x	7.9 x	1.5 x	4.9 x	10.2 x	7.5 x	1.3 x
Max	97.5%	52.3%	50.4%	7.4 x	16.6 x	22.9 x	6.7 x	35.4 x	24.4 x	21.3 x	9.7 x

NA - not available

NM - not meaningful

(a) All estimates from Capital IQ

# Bourne Partners Overview

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- Investment banking and strategic business development support services
- Healthcare focus
- Client segmentation
  - Specialty Pharmaceuticals
  - OTC/Nutraceutical
  - Medical Device
  - Healthcare services
  - Distribution
  - Biotechnology
- Over \$2.5 billion in debt and equity capital raised in the healthcare sector
- Over \$2.5 billion executed in financial advisory (M&A) assignments in the healthcare sector
- Since 2004, Bourne Partners has advised on deals in 8 different countries:
  - U.S., Germany, Canada, Ireland, Sweden, Denmark, Brazil, and Italy

# Where Bourne Adds Value

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## M&A Specialist Group

- *Concentrate on acquisition, sale and going private assignments*
- *Focus on \$25-\$250 million transactions or licensing collaborations with product sales expectations of \$20 million and above*
- *Strong private equity and venture capital relationships*
- *Focus on serving middle market companies*
- *Company and product M&A*

## Depth of Resources and Relationships

- *Significant industry relationships; access to key decision makers*
- *Deal team depth and experience*
- *Extensive international coverage*
- *Bankers and healthcare executives within the firm*

## Experienced in Maximizing Value

- *Directly relevant experience*
- *Professionally structured process*
- *Deal team staffing a proper mix of junior and senior resources*
- *Memorandum and material preparation of the highest quality*
- *Sensitive to confidentiality issues*

## Healthcare Industry Expertise

- *Healthcare focus*
- *Relationships with over 500 healthcare companies worldwide*
- *Dedicated industry research coverage*
- *Dedicated internal analyst coverage*
- *Significant transaction record*

# Professionals to Contact

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- **Banks Bourne, Senior Managing Director**

[BBourne@bourne-partners.com](mailto:BBourne@bourne-partners.com)

704.315.6020

- Investment banking with Wachovia Securities, Inc.
- Founder and managing partner of Bourne Partners
- B.A. - Business Management with distinction, MBA - Wake Forest University

- **Jeremy Johnson, Director**

[JJohnson@bourne-partners.com](mailto:JJohnson@bourne-partners.com)

704.552.8407 x.230

- 8 years of life sciences M&A and licensing experience
- B.S. from Georgetown University