



Small-size
R&D Activities in Korea
for BioIndustry

Jan. 16, 2002

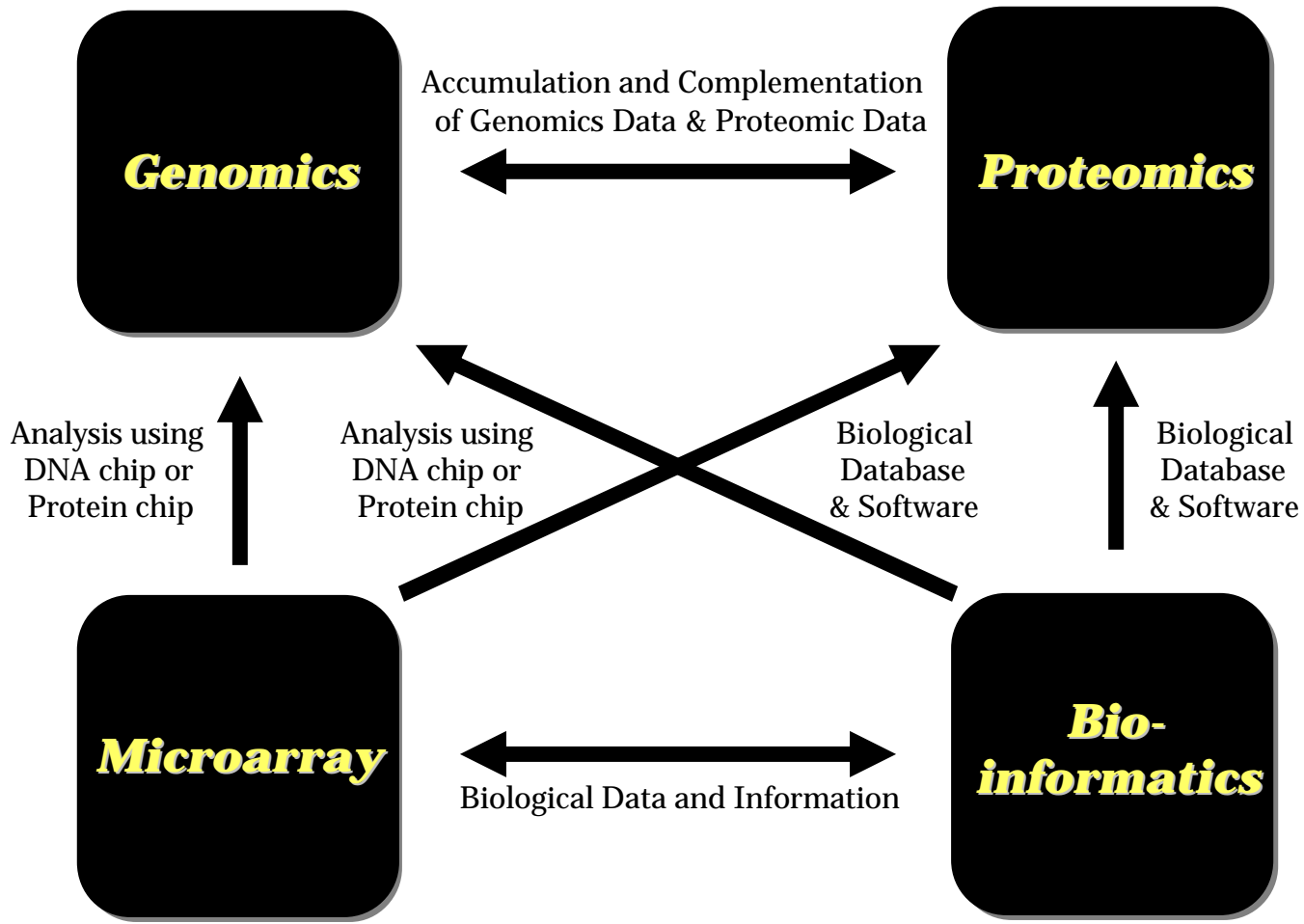
Sung-Yong H. Yoon, Ph.D.

Welcome

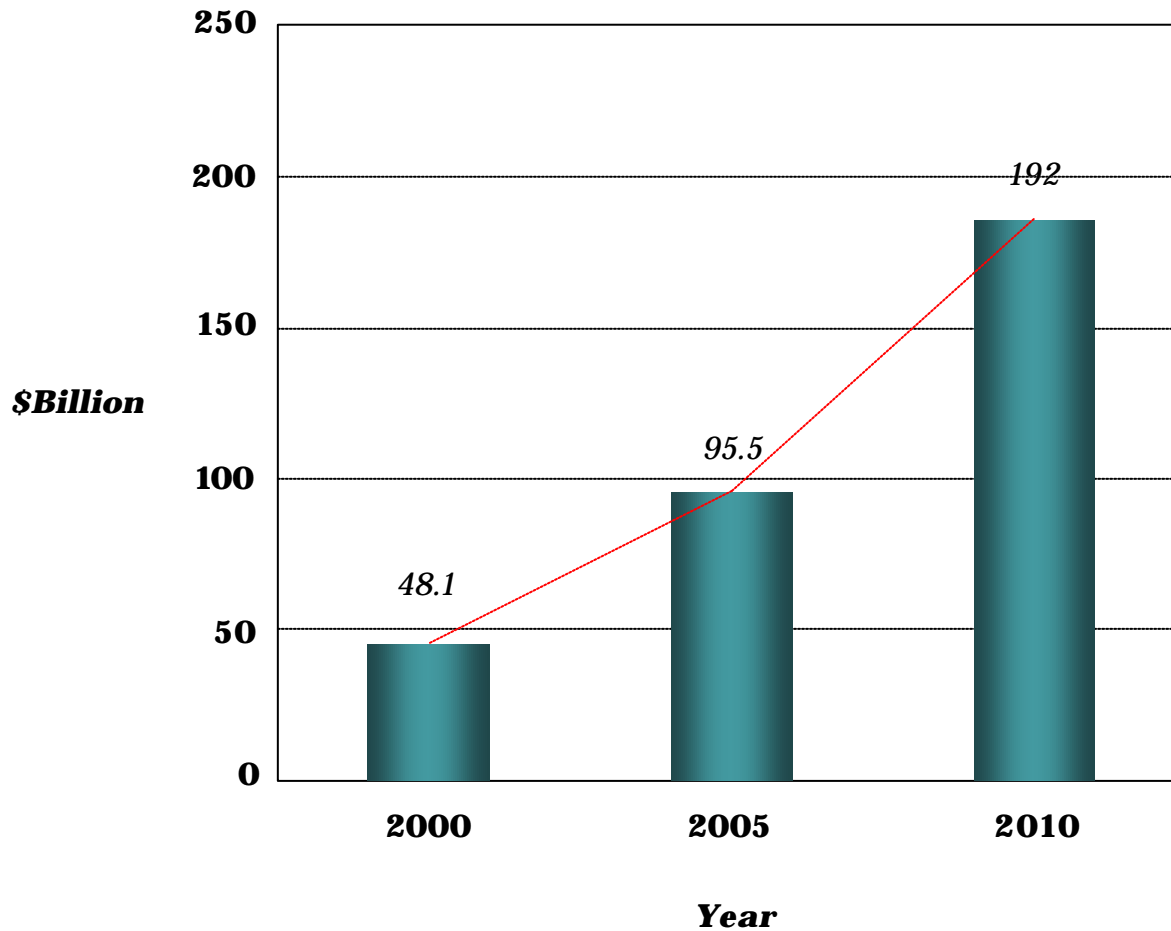


Sung-Yong Harrison Yoon





Various Modern Techniques of Genomics



World Market Size of Bioindustry I



	1997	2000	2005	2010
Drug/Therapy	18.8	28.9	52.6	105.5
Agriculture	1.6	2.4	5.7	11.5
Environment	1.8	2.9	6.6	13.4
Process	4.4	6.8	16.1	32.7
Marine	4.7	7.2	14.4	28.8
Total	31.3	48.2	95.4	191.9

Ernst&Young, Biotechnology Industry Annual Reports(1998~2000)

World Market Size of Bioindustry II



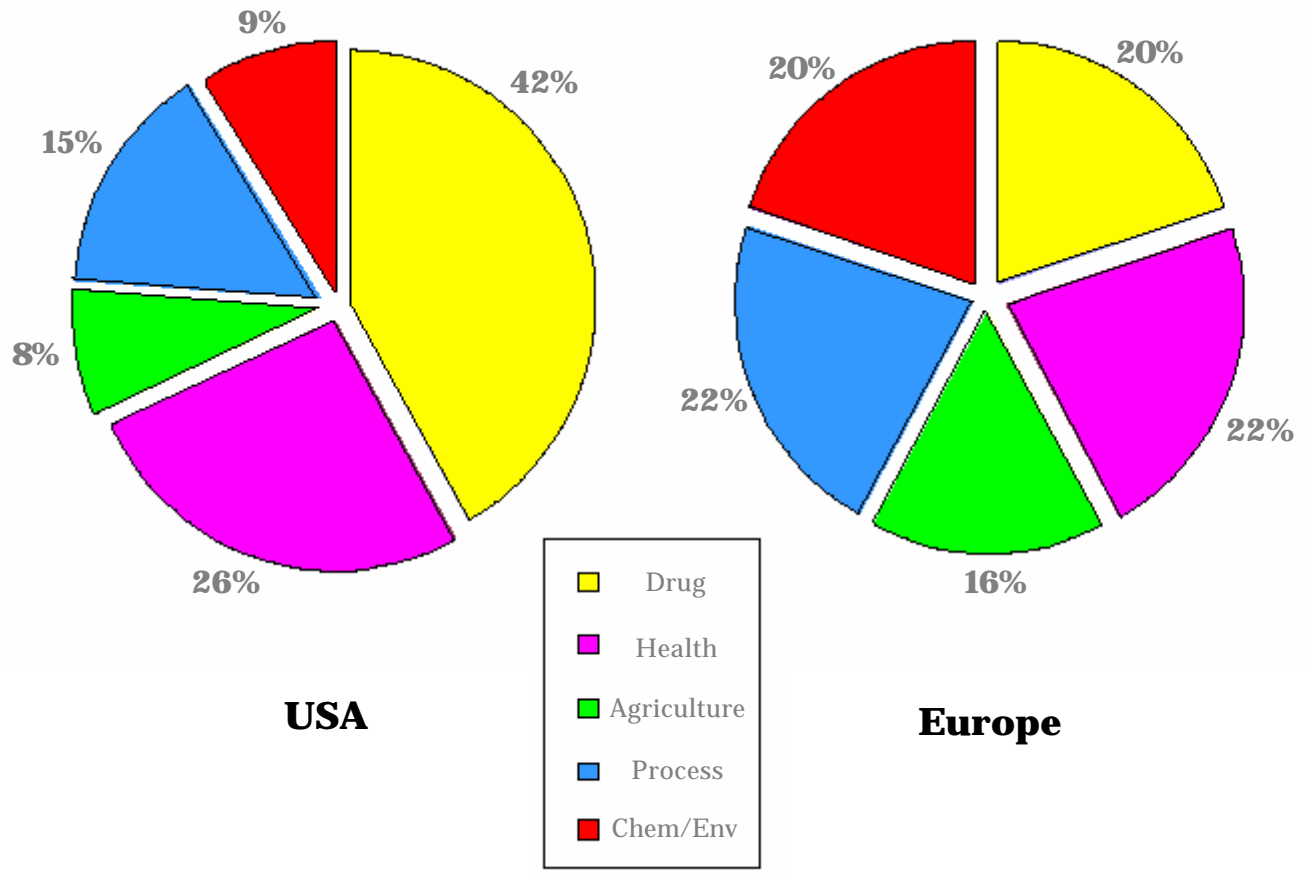
	<i>USA¹⁾</i>	<i>Europe²⁾</i>	<i>Japan³⁾</i>
Total Number of Biofirms	1283	1178	320
R&D Fund (\$billion)	9.9	2.8	14.3
Total Sales (\$billion)	13.4	4.2	9.8
Employee	153,000	46,000	30,000

1) Ernst&Young, 13th Biotechnology Industry Annual Reports(1999)

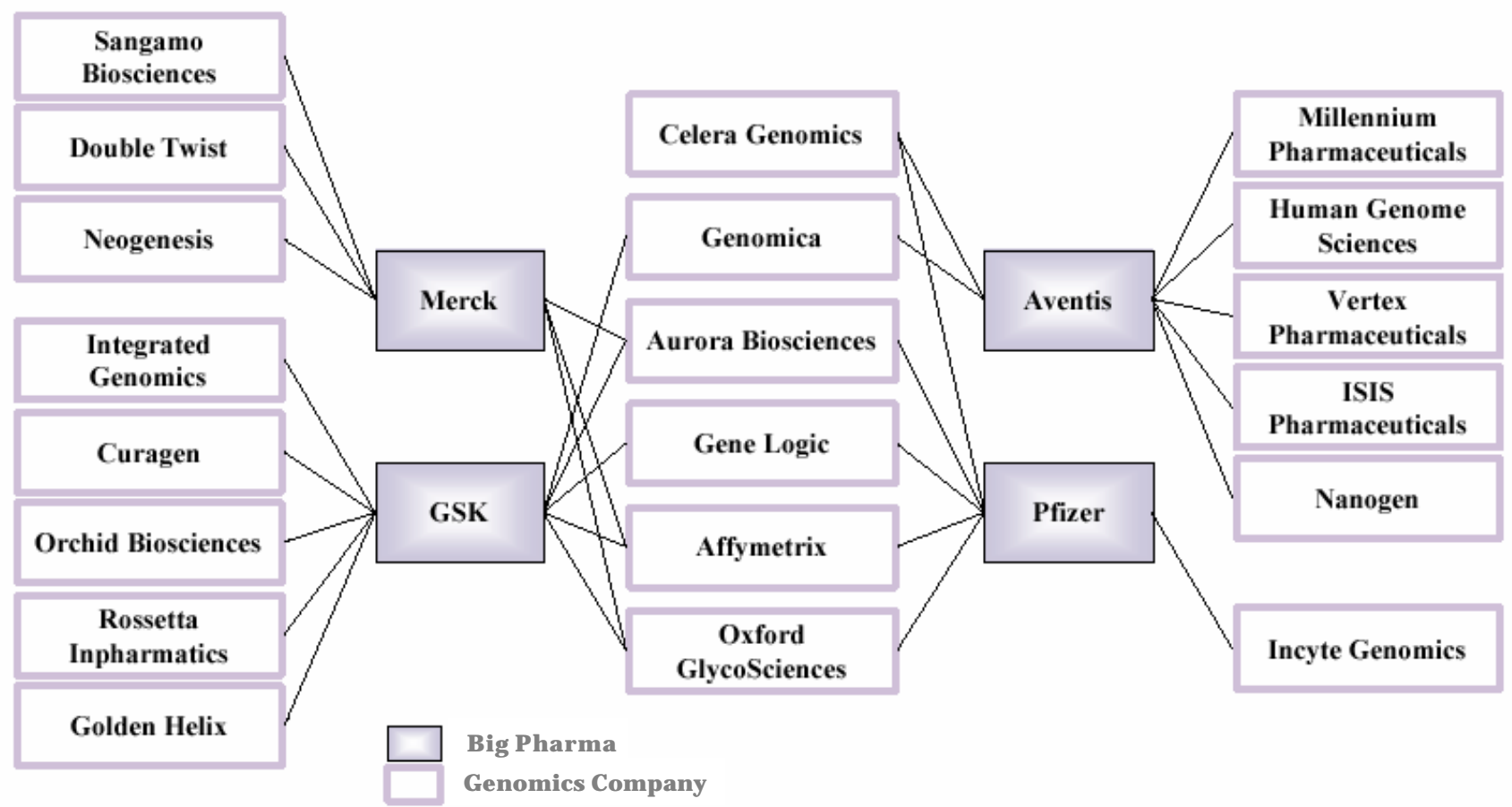
2) Ernst&Young, European Life Science 99(1999)

3) 日經 Bio年鑑 98(1999)

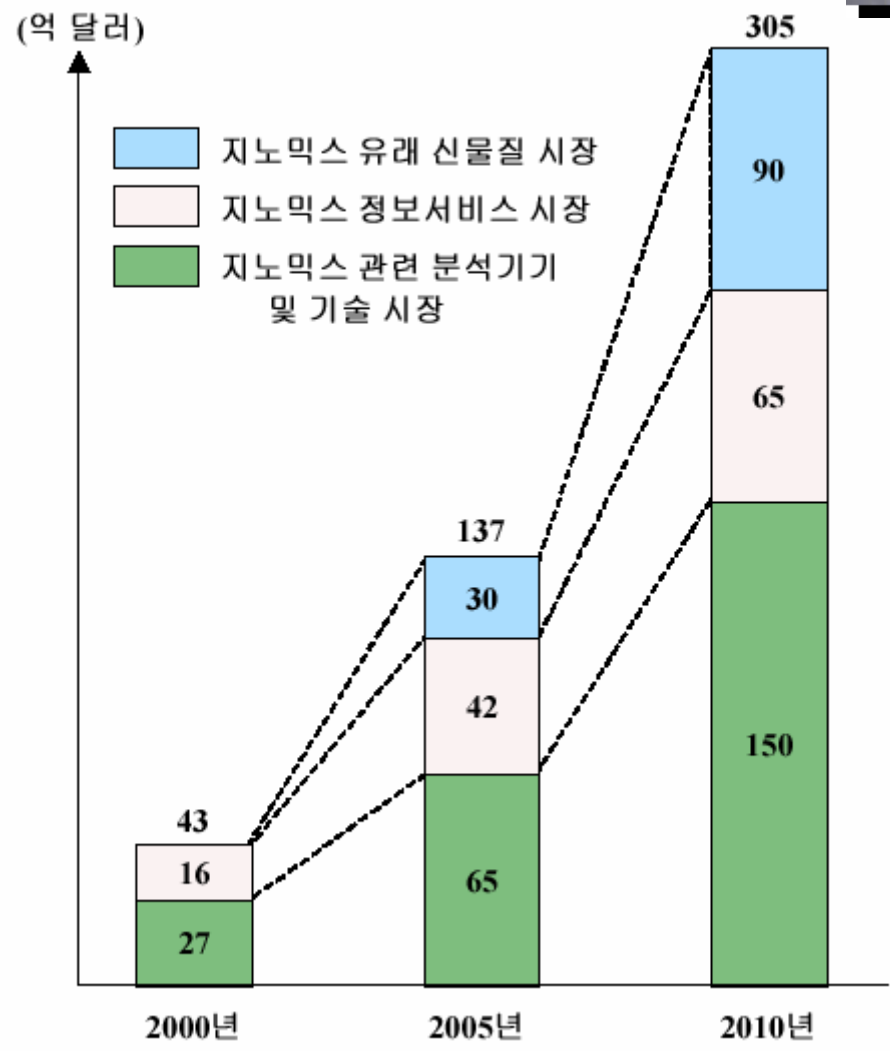
Advanced Countries' BioIndustry



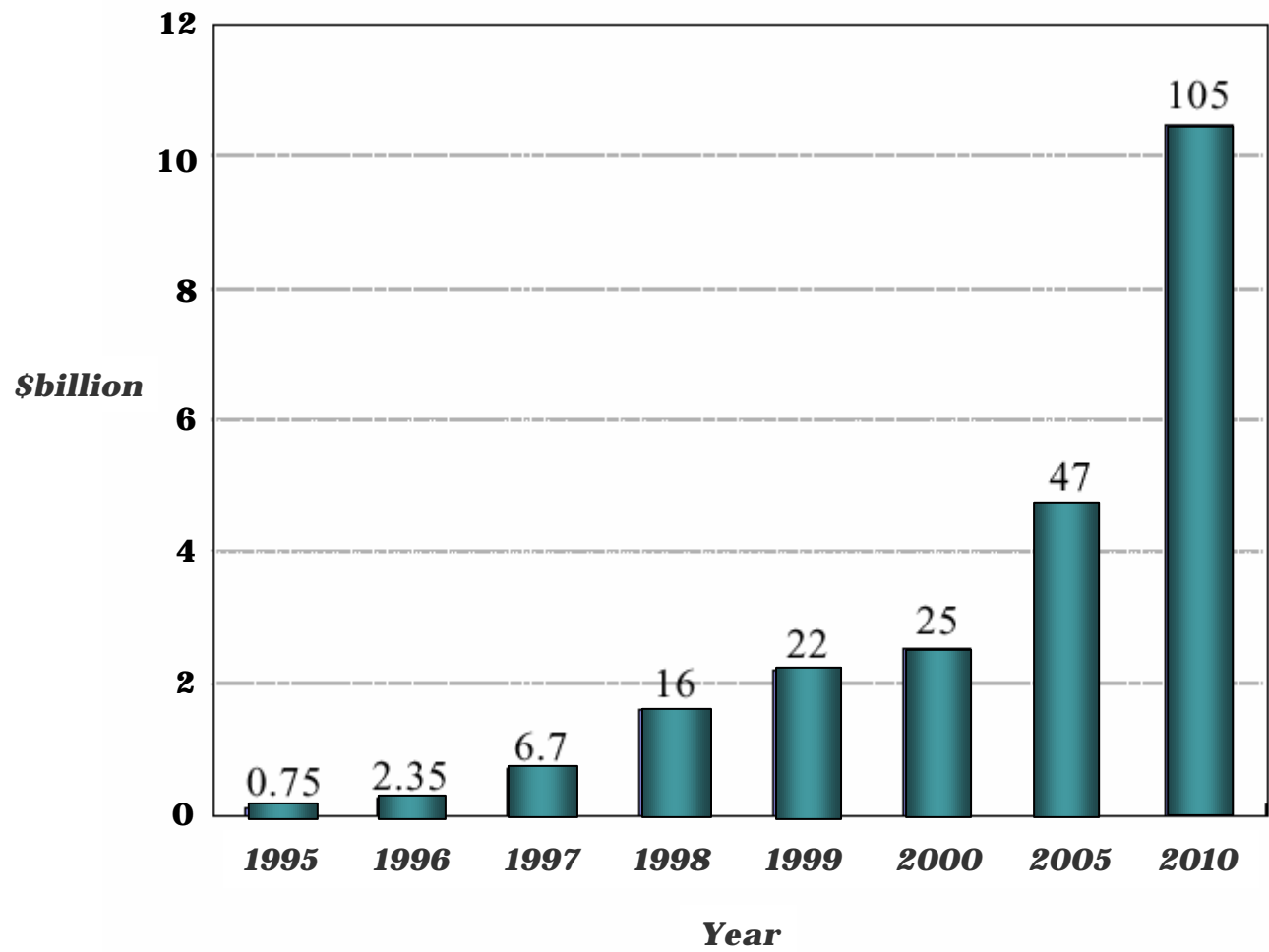
Application Field of USA and European Biotech



Technical Tie-up or Affiliated Concern between Biotech Companies

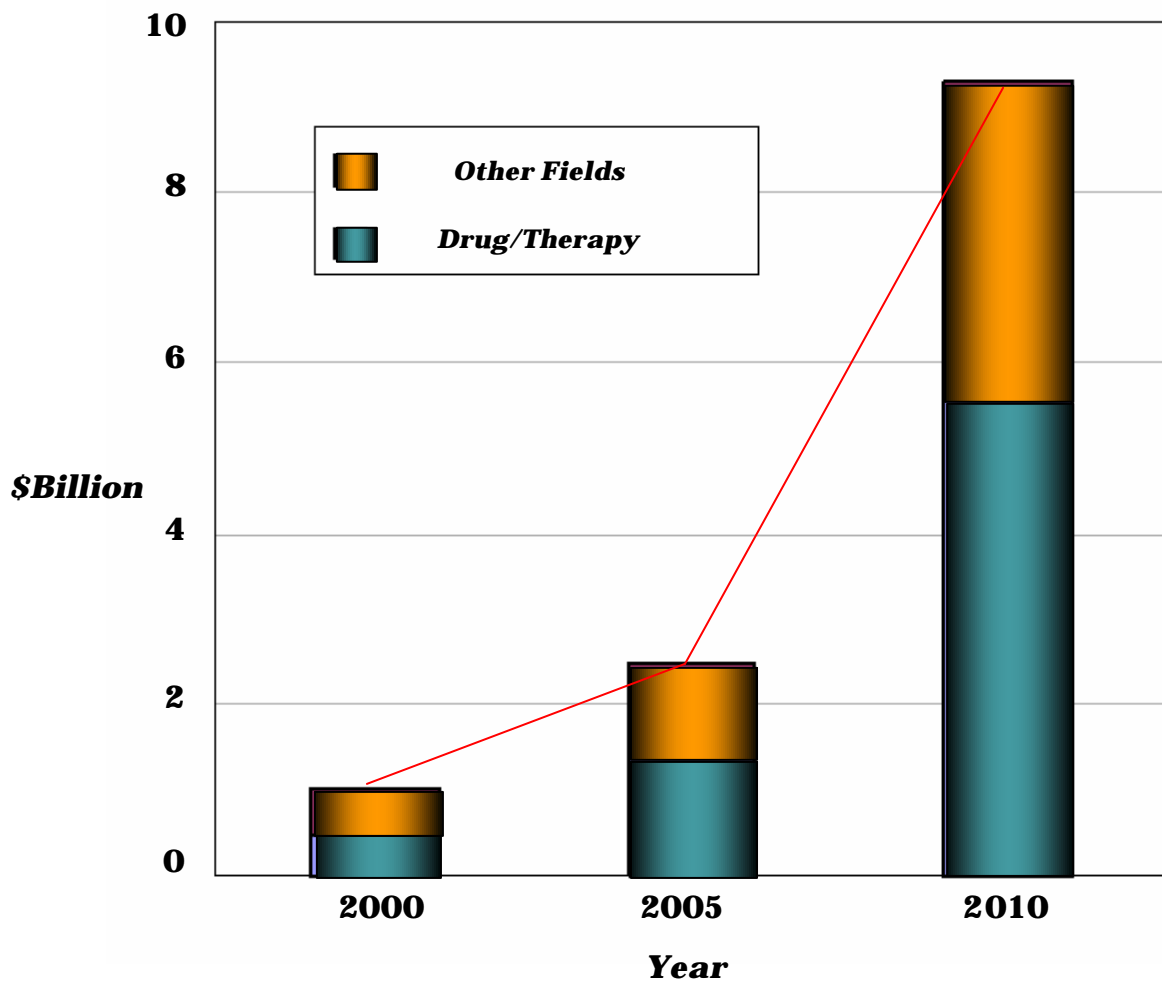


Genomics related World Market Size



*Ernst&Young, Biotechnology Industry Annual Reports(1998~2000)
Consulting Resources(1997), ISAAA Briefs No.12(1999)*

World Market Trend of Transgenic Crop & Plant



Korean Domestic Market Size of Bio-Product

Lift of Barrier for the Academic

*Brain
(Inventor)*

Shift from IT

*Capital
(Investor)*

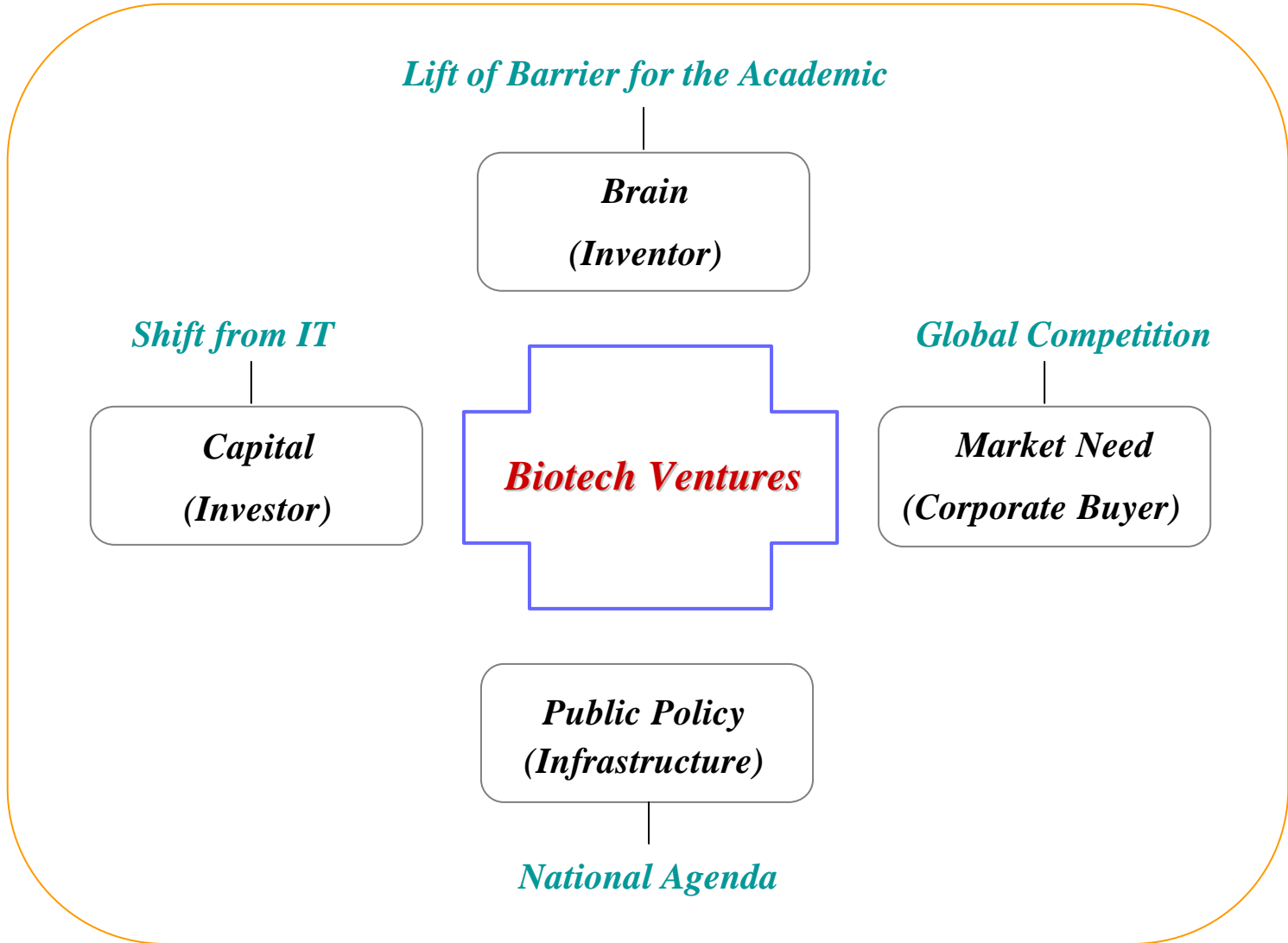
Biotech Ventures

Global Competition

*Market Need
(Corporate Buyer)*

*Public Policy
(Infrastructure)*

National Agenda



Biotech Ventures by Area

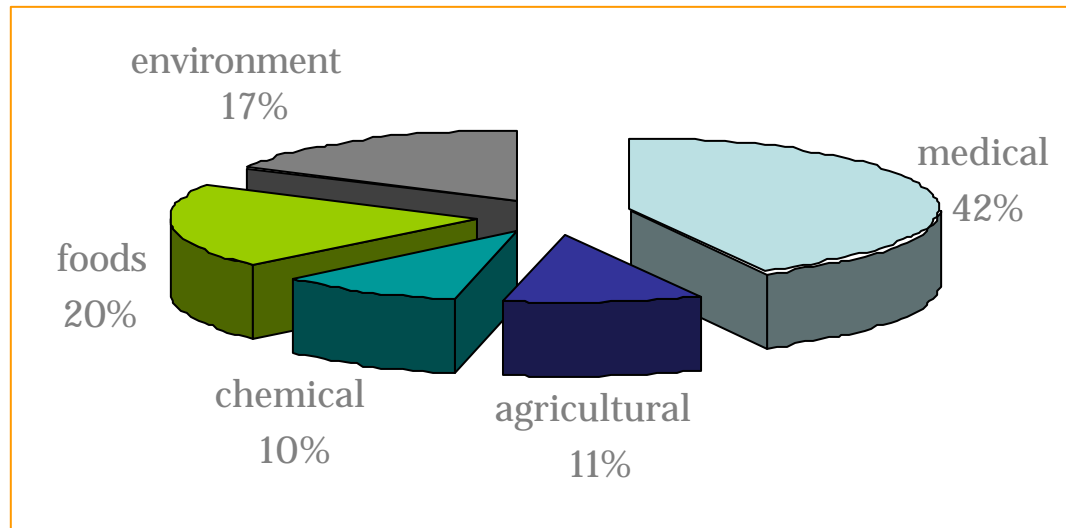
❖ **SMBA**

- ✓ registered Biotech Ventures: 41 ('97), 65 ('98), 118 ('99), 138 (June, 2000)
- ✓ ~2 % of the Total Ventures (7,117 in June, 2000)

❖ **Current Estimation**

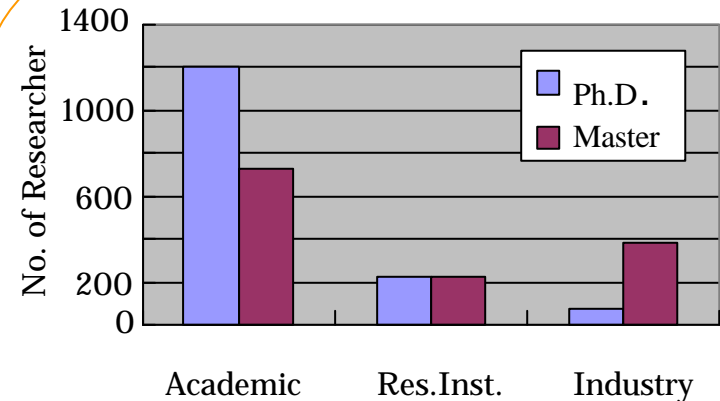
- ✓ 407 Companies (as of March, 2001)

❖ **Biotech Ventures by Area**

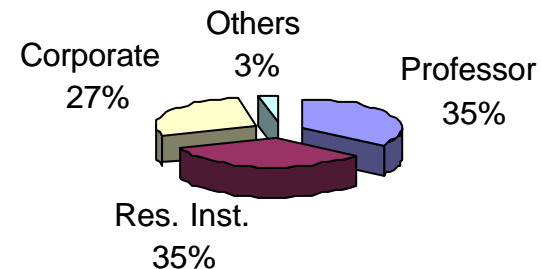


Founders of Biotech Ventures

- ❖ Unlike IT, biotech ventures are heavily dependent upon manpower with long years of research experience and training background.
- ❖ More than 80% of Ph.D. and MS in Biology is concentrated in universities and research institutes.
- ❖ Since 1999, professors and research scientists were allowed to find and pursue ventures.
- ❖ Currently, more than 70% of biotech ventures are founded by professors and research scientists.



CEO Background

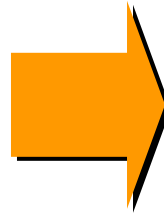


Source: MOCIE (2000)

New Role of Biotech Ventures

- ❖ Change in the way new technologies and products are developed by the industry:

Old R&D
In-House
Research Contract



New R&D
In-House
Research Contract
Industry Consortium
Strategic Investment

- ❖ Global Competition
- ❖ Limited R&D Budget
- ❖ Bigger Projects
- ❖ Limited Resource of Trained Scientists
=> Biotech Ventures as **"R&D Center"**
Shared Risk & Shared Cost

 **Investment Plan by Corporate**

Company	Investment plan to Biotech
Samsung	300 billion won over 3 years
SK	42 billion won in 2001, domestic and oversea investment
LG	110 billion won to Biotech, 40 billion to Biotech Ventures
Daesang	200 billion won over 3 years
Cheiljedang	300 billion won until 2003
Green Cross	132 billion won until 2005
ISU Chemical	150 billion won over 5 years
Doo San	100 billion own over 3 years



Support from the Public Sector

❖ **Direct Support to Ventures:**

- ✓ Start-up financing
- ✓ Tax-benefit
- ✓ Investment through venture capital funds

❖ **Increase of Bio-Industry R&D Budget**

- ✓ 2,564 billion won for 2001-2005 (160 billion won in 1999)

❖ **Infrastructure**

- ✓ Incubating Centers and Support Systems
- ✓ GLP, GMP Facilities
- ✓ Manpower Training and Resource Pool
- ✓ IP Guidelines and Industry Regulations

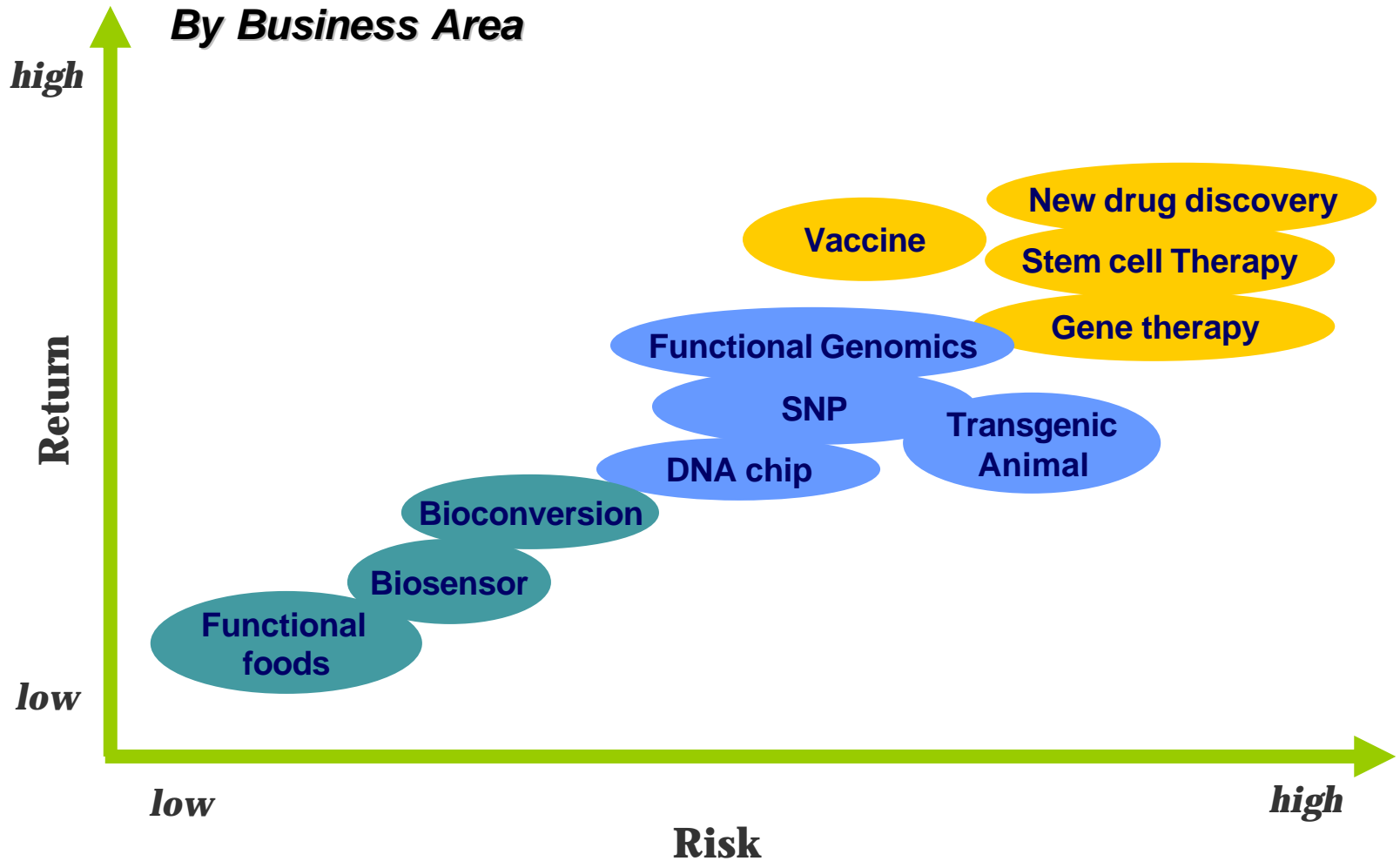


Strategic Needs of Korea Biotech Ventures

- ❖ **Business Strategy Development**
 - ✓ Technology-driven => Business-driven
- ❖ **Corporate Partnering**
 - ✓ Technology-transfer => Co-development
- ❖ **Manpower**
 - ✓ Specific skills => Multidisciplinary training
- ❖ **Management Team**
 - ✓ Scientist founders => Business professionals
- ❖ **Strategic Alliances**
 - ✓ Single, Domestic => Multiple, Global
- ❖ **Support System**
 - ✓ Hardware => Software (Regulatory issues)



Investment Portfolio





Venture Capitals

❖ **146 Venture Capital Firms (March 14, 2001)**

By Major Shareholder:

- ✓ Individual: 57
- ✓ Financial Sector (Banks, Securities): 32
- ✓ Bio-related Firms: 10
- ✓ IT-related Firms: 17
- ✓ Non-Bio, Non-IT Firms: 24
- ✓ Associations and Others: 6

By Foundation Year:

'86 (11) '87 (5) '88 (3) '89 (5)
'90 (12) '91 (2) '92 (1) '96 (4)
'97 (7) '98(10) **'99(21) '00(64)** '01(1)

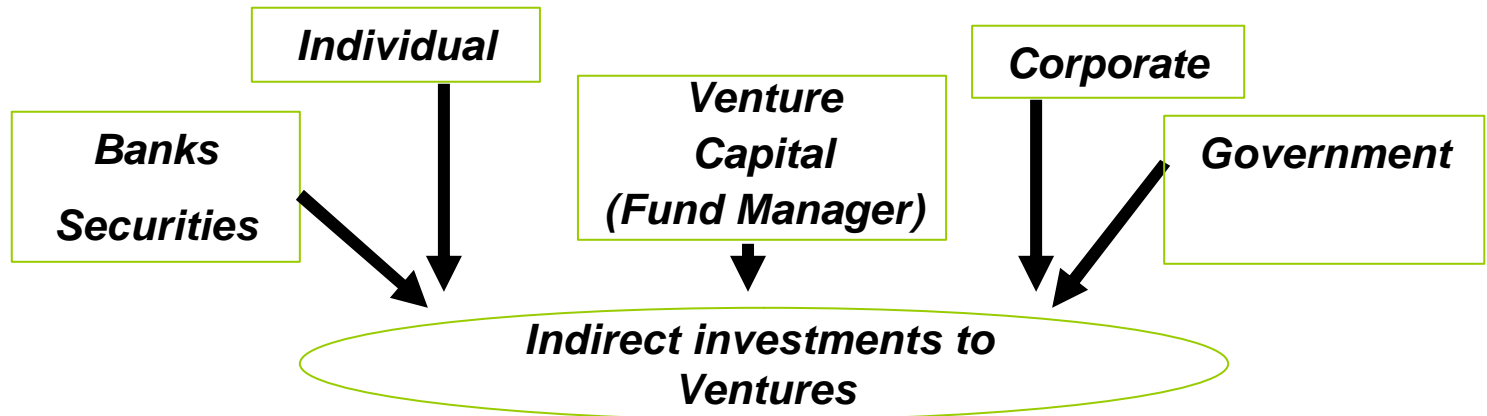
Investment by Venture Capitals

	<u>Year 2000</u>	<u>Year 2001</u>
❖ Total Investment	1,697 billion won (For USA, 103 billion USD in 2000)	1,630 billion won
❖ Investment Area		
IT	64%	53.4%
Manufacturing	12.3%	20.3%
Biotech	7.8%	12.8%
	(For USA, 2.68% for biotech industry)	
❖ Average Investment Size		
Total Ventures	8,798* (SMBA)	192 million won
	(For USA, 5,380 VC-backed companies in 2000 & average investment size of 19 million USD)	
Biotech Ventures	500	264 million won

* Source: Survey from 121 venture capital firms (Korea)
National Venture Capital Association (USA)



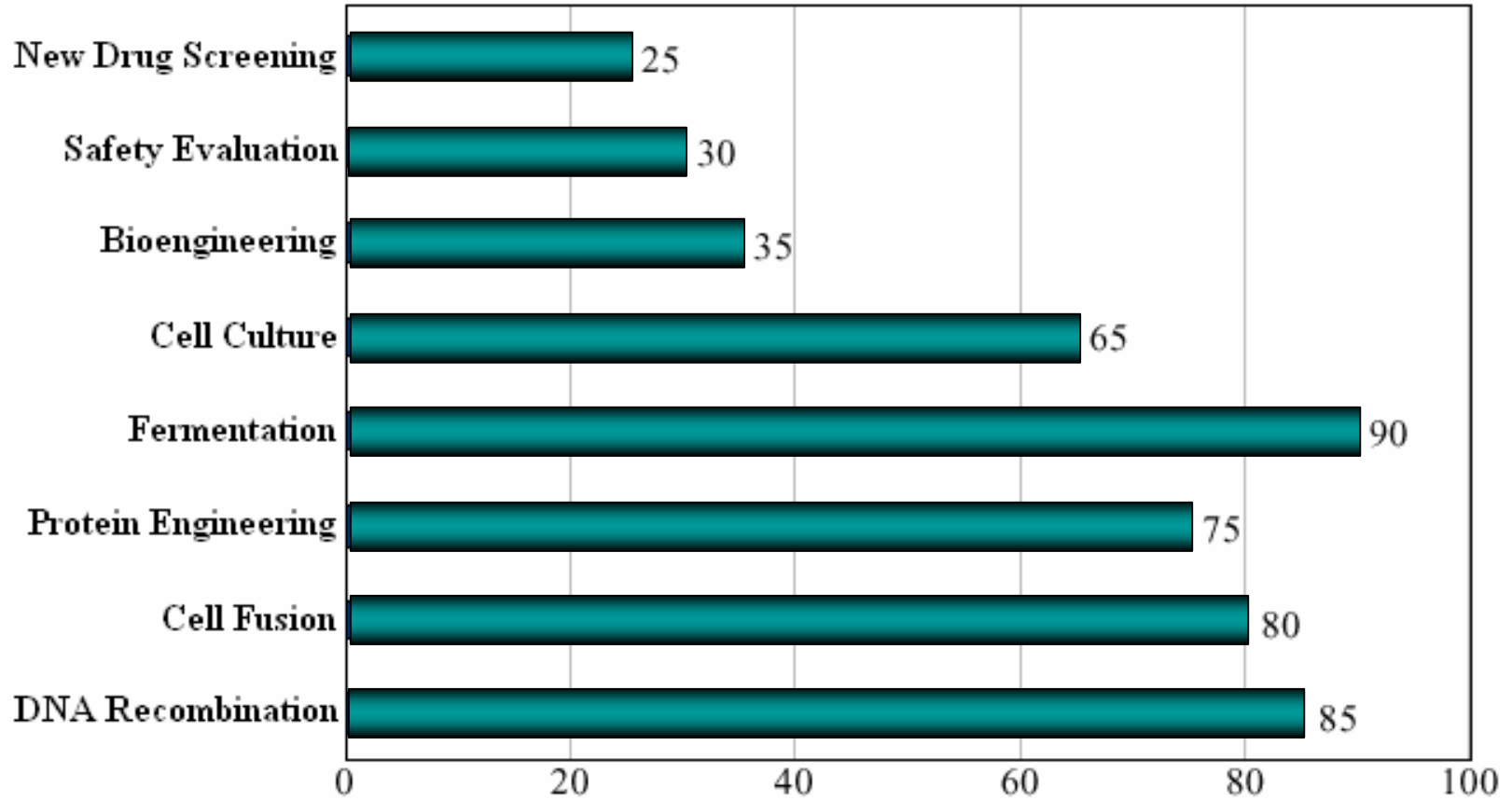
Investment Funds



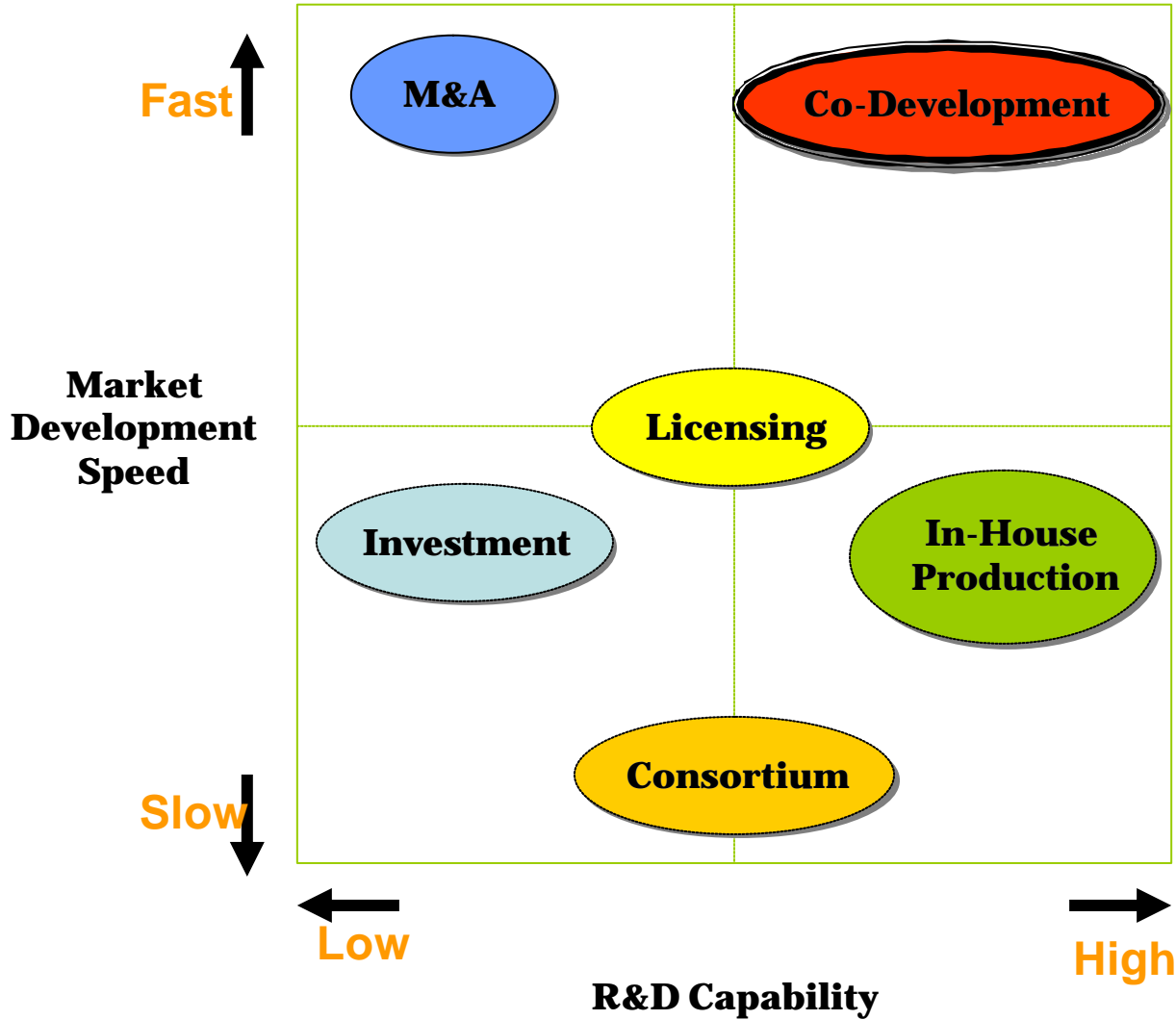
Year	<u>No. of New Funds</u>	<u>Size</u>
1999	82	462 billion won
2000	194	1,430 billion won
	9 (Bio-Funds)	69 billion won
	(For USA, total 12.3 billion USD raised for 162 funds)	
2001	150	1,000 billion won (est.)



USA 100



Korean Biotechnology Status





	R&D	R&D
R&D Process	needs concept 	concept needs
	,	,
	Insight	
	needs	needs
	needs ,	

