

# Report on Survey of Domestic Bioindustry based on 2014

2016. 3.

MINISTRY OF TRADE, INDUSTRY & ENERGY  
Korea Biotechnology Industry Organization

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## I. Survey Overview

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# 1 Survey Overview

## A. Data Sources

- Division of Bio-nano, Ministry of Trade, Industry and Energy (www.motie.go.kr)
- Statistical Sources : Korea Biotechnology Industry Organization (www.koreabio.org)

## B. Type of Statistics and Authorized Number

- Type of Statistics : General Survey Statistics
- Authorized Number: No. 11515
- Authorized Date : October 30th, 2003

## C. Survey Period

- Survey Baseline Date: December 31, 2014
- Targeted Survey Period : January 1, 2014 ~ December 31, 2014
- Conducting Survey Period : July 14, 2015 ~ November 18, 2015

## D. Scope

- Based on 'classification scheme of bioindustry (KS J 1009, recognized by Korean Agency for Technology and Standards, Ministry of Trade, Industry and Energy on January 2008)' which established the scope and definition of the domestic biotechnology and bioindustry in the survey baseline year, the scope of the survey refers to domestic businesses engaged in the activities related to biotechnology. The activities related to biotechnology refers to the following.
  - Using biotechnology as the main technology in the research and development phases, although it uses non-biotechnology in the production phase
  - Using biotechnology in the manufacturing, production and service (including research and development) phases
  - Producing machine, equipment, or plant that are used in the biotechnological process of the research and development phase or

- the production phase
- Selling the above products after importing
- ※ The survey includes companies resulted in sales through the activities stated above as well as companies pushing forward the research development in the survey baseline year.

## E. Survey Targets

- The survey primarily selected bioindustry's fact-finding companies of 2013 among domestic companies falling into the range of the survey as survey targets. The survey then selected corresponding companies using the bio cluster-related companies per geography of December, 2014, other registered company data of Korea Biotechnology Industry Organization, and company yearbooks.

## F. Survey Units

- The survey units refers to companies that sell products or services which went through the production process of value-adding after the assembled capital equipment or raw materials were bought under the control of the entrepreneur.
- The survey units include public enterprises (state-owned enterprises, public enterprises), public - private companies, the private companies (private enterprises, collective enterprises, partnership, joint venture, anonymous company, Co., Ltd., Co., Ltd., co-operatives).
- In case the company has more than two businesses, the survey unit included the sum of the corresponding business' results and received the responses based on the bioindustry results among the overall industrial activities.

## G. Methodology and Approach

- Survey Methodology : Via mail, fax, e-mail, telephone, face-to-face interview
- Survey Approach : Researcher → Research Company → Korea

Biotechnology Industry Organization → Ministry of Trade, Industry and Energy

## H. Announcement of Results

- Announcement Period : Once a year
- Form of Announcement : Publication of the Report on Fact Finding Survey of Domestic Bioindustry

## 2 Background and Purpose

- Ministry of Trade, Industry and Energy and Korea Biotechnology Industry Organization have been conducting fact finding survey of domestic bioindustry since 2003 to build groundwork for economic analysis, international comparison and establishment of related nurturing policies through analyzing overall status of bioindustry and its actual condition.
- The 'Report on Fact Finding Survey of Domestic Bioindustry' that started its survey conduct from July, 2015 aims to increase the successful rate as complete enumeration survey and to grasp more accurate status of domestic bioindustry.
- This survey aims to analyze bioindustry's economic feasibility through grasping sales and financial status and to establish bio-related nurturing policies through studying accurate actual condition of domestic bioindustry.
- Ministry of Trade, Industry and Energy and Korea Biotechnology Industry Organization aims to contribute to the development of domestic bioindustry through the results of this survey.

## 3 Methodology

<b>Target</b>	Company representatives or managers in Bioindustry such as Biopharmaceutical·Biochemical·Biofood·Bioenvironmental· Bioelectronics
<b>Area</b>	Nation-wide(17 areas including Seoul and 6 Metropolitan cities)
<b>Methodology</b>	Research was conducted via mail, fax, e-mail, telephone, face-to-face interview by researcher
<b>Data-mining tool</b>	Structured Questionnaire
<b>Size of population</b>	1,035 Companies (Among primarily selected 1,066 companies, 31 closed-down)
<b>Size of valid sample</b>	975 Companies(94.2% of the population)

### \* Classification of 'No Response' in last 3 years of our survey

Year	Size of population	Valid response cases	No response cases	Type of No response			
				Refusal	Not in the office	Not connected	Shutdown (during surveyed year)
2012	1,029	958 (93%)	71	14	20	22	15
2013	1,037	971 (94%)	66	13	24	18	11
2014	1,035	975 (94%)	60	15	19	20	6

## 4 Contents

Category	Main Contents of the Survey
<b>Company Information</b>	<ul style="list-style-type: none"> <li>- Name of Company, Name of Representative</li> <li>- Business Registration Number, Corporate-parent (Group) Name</li> <li>- Phone, Establishment Date</li> <li>- Address</li> <li>- Respondent Information</li> </ul>
<b>General Status</b>	<ul style="list-style-type: none"> <li>- Capital, Capital Ratio of Net Worth</li> <li>- Number of Workers</li> <li>- Existence of exclusive business, type of company, place of business</li> <li>- Items in the income statement (sales, cost of goods sold, selling expenses &amp; administrative expenses, tax, etc)</li> </ul>
<b>Status of Bio Industry</b>	<ul style="list-style-type: none"> <li>- Core business</li> <li>- Manpower status</li> <li>- R&amp;D cost and Facility Investment cost</li> <li>- Cooperation with Other Organizations</li> <li>- Phase of Growth</li> <li>- Period Resulted in Sales</li> <li>- Product, Service, Commerce Technology (Resulted in Sales, Export·Import)</li> </ul>

## 5 Terminology

### A. General Status

- Selected Companies
  - ① Venture Company : Refers to companies that are selected for meeting the requirements of the venture capital investment, investment in research and development, and companies developing new technologies and technology assessment companies according to 'Act on Special Measures for the Promotion of Venture Businesses'.
  - ② INNO-BIZ : Refers to companies that are selected for Small and Medium Business Administration's 'Fostering Business for technology-innovative (INNO-BIZ) Small and Medium Businesses'.
  - ③ Listed Company : Refers to companies that meet the listing requirements which are being able to sell the issued stocks in the Kosdaq market or the stock market.
- Capital : Refers to the current amount of capital that is paid by the corporation (headquarter) until December 31, 2013.
- Capital Ratio of Net Worth : Refers to the ratio of equity capital (total amount of capital-liabilities) on the total capital (=total amount of capital+liabilities=total assets).

### B. Manpower Status

- Received responses from three groups among bioindustry workers: research, production, and others including sales/administrative.
  - ① Research : Refers to research and development manpower in bioindustry.
  - ② Production : Refers to manpower engaged in production, facilities and quality management in bioindustry. (excluding manpower

in research center)

- ③ Others including sales/administrative : Refers to all manpower except research and production manpower in bioindustry.

### C. R&D and Sales

- R&D Cost : Refers to company's total cost spent in research activities to develop new products or new technology for the past year of 2014. It refers to sales cost in income statement and manufacturing statement, ordinary development expense and investment cost for management, land and equipment acquisition cost related to R&D in balance sheet.
  - ① R&D Cost : Includes self R&D cost (labor costs, material costs and other expenses), commissioned research and development costs, cost for technology implementation
  - ② Facility Investment Cost related to R&D : Includes machinery, land and building acquisition cost related to R&D
- Resulting in Sales
  - ① Selling complete product that was produced in the business
  - ② Selling complete product which was outsourced by other businesses using raw material or half-finished products
  - ③ Refers to providing services and sales resulting from transfer of technology. It includes all the results of domestic sales and export activities.

### D. Classification Scheme of Bioindustry and Biotechnology

#### 1) Classification Scheme of Bioindustry

- In case of classification scheme of bioindustry, the Korean Agency for Technology and Standards established national standard KS J 1009(Bioindustry Classification Code) on January 31, 2008 by reflecting

the business results of Ministry of Trade, Industry and Energy's 'Building groundwork for standardization of biotechnology and industrial products' and the second detail topic 'Building standard classification scheme of bioindustry/biotechnology and analyzing structure of the bioindustry'.

#### <Overview of Bioindustry's Classification Scheme>

##### ■ Purpose of Classification

- To clarify the scope of bioindustry
  - Defined companies that uses biotechnology in the research and development, manufacturing, production, and service phases
- To propose standardized evidences that can be used for bioindustry-related statistics and institutions without confusion
  - Creating industrial statistics such as company profits created from using biotechnology
- To build groundwork for analysis such as economic structure, industrial structure, and correlation with other industries
- To secure the connectivity with the classification scheme of international bioindustry
  - Creating groundwork for comparing and analyzing the statistical data of the international bioindustry

##### ■ Target and Standard of Classification

- Industrial activities conducted by companies using biotechnology
- Characteristics of products (produced goods or provided service) which use biotechnology in the research and development, production and service phases
  - The function and the market of the products

##### ■ Classification Scheme

- Consisted of 8 upper classifications and 51 middle classifications
  - The upper classifications are categorized by KS J 1009(Bioindustry Classification Code)
  - The middle classifications are categorized by goods sold using biotechnology or provided service using biotechnology. These are categorized according to their correlation with industrial activities of corresponding upper classification.



&gt;&gt; &lt;Table 1-1&gt; Classification Scheme of Bioindustry

Code	Name of Industrial Classification
<b>1</b>	<b>Biopharmaceutical Industry</b>
1010	Antibiotics
1020	Anticancer medications
1030	Vaccines
1040	Hormones
1050	Immunotherapeutics
1060	Hemotherapeutics
1070	Growth factors
1080	New therapeutics(ex. gene therapeutics, cell therapy, cloned organs, etc)
1090	Diagnostic kits
1100	Animal medications
1000	Other biopharmaceuticals
<b>2</b>	<b>Biochemical Industry</b>
2010	Biopolymers
2020	Industrial enzymes and reagents
2030	Enzymes and reagents for research
2040	Biocosmetics and home & personal care chemicals
2050	Biological agrochemicals and fertilizers
2000	Other biochemicals
<b>3</b>	<b>Biofood Industry</b>
3010	Functional health foods
3020	Amino acids
3030	Food additives
3040	Fermented foods
3050	Feed additives
3000	Other biofoods
<b>4</b>	<b>Bioenvironmental Industry</b>
4010	Microbial treatment agents
4020	Microbe-immobilized materials and equipments
4030	Bioenvironmental agents and systems
4040	Measuring apparatus for environmental pollution(service for pollution assessment)
4000	Other bioenvironmental productions and services

&gt;&gt; &lt;Table 1-1&gt; Classification Scheme of Bioindustry(Cont'd)

Code	Name of Industrial Classification
<b>5</b>	<b>Bioelectronics Industry</b>
5010	DNA chips
5020	Protein chips
5030	Cell chips
5040	Biosensors
5050	BioMEMS
5000	Other bioelectronics
<b>6</b>	<b>Biochemical Industry</b>
6010	Bioreactors
6020	Biomedical and diagnostic apparatuses
6030	Bioprocess and analysis equipments
6040	Plant and process design
6000	Other Bioprocesses and equipments
<b>7</b>	<b>Bioenergy and bioresource Industry</b>
7010	Biofuel
7020	Artificial seeds and seedlings
7030	Experimental animals
7040	Transgenic animals and plants
7000	Other bioenergy and bioresources
<b>8</b>	<b>Bioassay, bioinformatics and R&amp;D service Industry</b>
8010	Bioinformatics services
8020	Gene analysis services
8030	Protein analysis services
8040	R&D services (ex. drug development services, etc)
8050	Biosafety and efficacy evaluation services
8060	Diagnosis and preservation services
8000	Other bioassays, bioinformatics services

※ Refer to <Appendix 1> for the explanation on classification scheme

## 2) Classification Scheme of Biotechnology

- In case of the classification scheme of biotechnology, it provides 13 sectors biotechnology classification code according to KS J 1009(Bioindustry Classification Code) which is recognized as national standard by the Korean Agency for Technology and Standards in January 31, 2008. This reflected the business results of Ministry of Trade, Industry and Energy's 'Building groundwork for standardization of biotechnology and industrial products' and the second detail topic 'Building standard classification scheme of bioindustry/biotechnology and analyzing structure of the bioindustry'.

### <Overview of Biotechnology's Classification Scheme>

#### ■ Purpose of Classification

- To define the scope of the domestic bioindustry
- To analyze the usage condition of biotechnology in the domestic industry

#### ■ Target and Standard of Classification

- To establish the classification scheme of biotechnology used in industries
- To emphasize the technology used in the current bioindustry and the research development field
- To reflect the development vision of the future bioindustry and biotechnology

#### ■ Classification Scheme

- Consisted of 2 classifications (Upper·Middle). There are 13 upper classifications and 68 middle classifications.
- The upper classification includes the technological scope of the corresponding middle classifications. It is consisted of items that can easily implement and respond to specific details of technology.
- The middle classification limits the technological scope of the upper classification. It is consisted of items that can encompass related new technologies into the list-based definitions.
- Each of the 68 middle classification has corresponding list-based definition which explains the definition and the scope of the middle classification's technology. This list-based definition is consisted of items that allows duplication among middle classifications and focuses on technological names used in industry and the research and development field.

### >> <Table 1-2> Classification Scheme of Biotechnology

Code	Name of Technological Classification
<b>A</b>	<b>Genetic engineering</b>
A1	Gene manipulation
A2	Gene expression and regulation
A3	Gene application
A4	Gene therapy
A0	Genetic engineering, n.e.s.
<b>B</b>	<b>Protein engineering</b>
B1	Protein structure analysis
B2	Protein function analysis
B3	Complex protein engineering
B4	Peptide engineering
B5	Protein application
B0	Protein engineering, n.e.s.
<b>C</b>	<b>Other macromolecule engineering</b>
C1	Lipid engineering
C2	Carbohydrate engineering
C0	Macromolecule engineering, n.e.s.
<b>D</b>	<b>Cell and tissue engineering</b>
D1	Stem cell therapy
D2	Bioenvironment regulation
D3	Functional biomaterial development
D4	Cell engineering
D5	Tissue engineering
D0	Cell and tissue engineering, n.e.s.
<b>E</b>	<b>Systems biology and bioinformatics</b>
E1	Gene sequence analysis
E2	Functional genomics
E3	Proteomics
E4	Bioinformatics
E0	Systems biology and bioinformatics, n.e.s.
<b>F</b>	<b>Metabolic engineering</b>
F1	Metabolite production
F2	Applications of metabolic engineering
F3	Understanding the metabolism and metabolic pathways
F0	Metabolic engineering, n.e.s.
<b>G</b>	<b>Bioprocess</b>
G1.	Fermentation engineering
G2.	Cell culture engineering
G3.	Biotransformation
G4.	Bioseparation engineering
G5.	Industrialization
G0.	Bioprocess, n.e.s.

&gt;&gt; &lt;Table 1-2&gt; Classification Scheme of Biotechnology(Cont'd)

Code	Name of Technological Classification
<b>H</b>	<b>Bioresource production and utilization</b>
H1	Plant resource utilization technology
H2	Animal resource utilization technology
H3	Microbial resource utilization technology
H4	Insect resource utilization technology
H5	Marine/fresh water organism technology
H6	Food engineering
H7	Biomaterializing technology
H8	Biodiversity conservation
H0	Bioresource production and utilization, n.e.s.
<b>I</b>	<b>Environmental biotechnology and bioenergy technology</b>
I1	Clean technology
I2	Environmental pollution control and management technology
I3	Bioenergy technology
I0	Environmental biotechnology and bioenergy technology, n.e.s.
<b>J</b>	<b>Nanobiotechnology</b>
J1	Nano-biodevice fabrication
J2	Nanobiomaterial technology
J3	Nano drug delivery system
J4	BioNEMS(Nanoelectromechanical systems, nano-LOC(lab-on-a-chip)
J0	Nanobiotechnology, n.e.s.
<b>K</b>	<b>Bioelectronics</b>
K1	Biosensor fabrication
K2	Bioelectronic device fabrication
K3	Biochip fabrication
K4	Microfluidics
K0	Bioelectronics, n.e.s.
<b>L</b>	<b>Biosafety and efficacy evaluation</b>
L1	Safety evaluation
L2	Safety management
L3	Environmental assessment
L4	Biohazard management
L5	Efficacy evaluation
L0	Biosafety and efficacy evaluation, n.e.s.
<b>M</b>	<b>Other biotechnology</b>
M1	Combinatorial biology
M2	Drug delivery
M3	Immunotherapy technology
M0	Biotechnology, n.e.s.

※ Refer to <Appendix 1> for the explanation on classification scheme

### 【Special Notes on Statistical Data】

- 1) The missing values (no response, unsureness and none of the above) were excluded from the statistical calculation. (Statistical analysis was conducted based on 100% data with the missing value excluded.)
- 2) The sum of detail items and the total sum may not be identical as all the statistical values are rounded values.
- 3) This report calculates down to one place of decimals and related symbols are as the following:  
「-」 : none of the above  
「0.0」 : less than the unit
- 4) Any inquiries on this report should be contacted to the e Division of Policy Development & Support of the Korea Biotechnology Industry Organization. (Phone : 031-628-0040, 0026~0027)

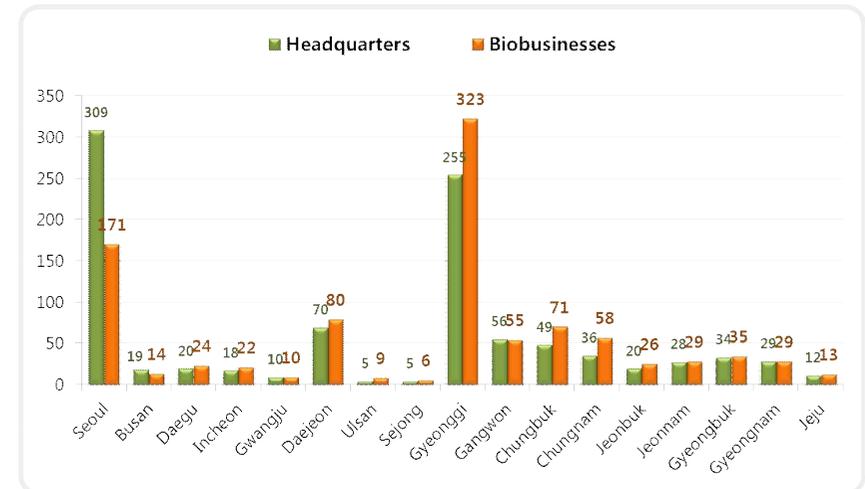
## II. Key Findings

### 1 General Status of Bioindustry

#### A. Bioindustry's Distribution per Place

- Headquarters and biobusinesses of domestic bioindustry are mostly located in Seoul and Gyeonggi province. There are 309 headquarters in Seoul, and 323 biobusinesses in Gyeonggi.

<Figure 2-1> Bioindustry's Distribution per Place (Unit : number of companies)



\* Place of biobusinesses were analyzed according to the following order: factory > research center > headquarter.

<Table 2-1> Bioindustry's Distribution per Place (Unit : number of companies)

Industrial Category	Total	Seoul	Busan	Daegu	In cheon	Gwang ju	Dae jeon	Ulsan	Sejong
Total	975	171	14	24	22	10	80	9	6
Biopharmaceutical industry	322	75	3	7	9	1	20	1	1
Biochemical industry	204	23	2	4	4	2	32	3	3
Biofood industry	197	17	7	4	4	2	6	-	2
Bioenvironmental industry	76	6	1	5	3	2	3	2	-
Bioelectronics industry	24	6	-	1	1	1	2	-	-
Bioprocess and equipment industry	73	19	-	2	1	1	7	-	-
Bioenergy and bioresource industry	28	1	1	-	-	-	4	3	-
Bioassay, bioinformatics and R&D service industry	51	24	-	1	-	1	6	-	-

Industrial Category	Gyeon ggi	Gang won	Chung buk	Chung nam	Jeonb uk	Jeonna m	Gyeon gbuk	Gyeon gnam	Jeju
Total	323	55	71	58	26	29	35	29	13
Biopharmaceutical industry	140	10	27	17	5	1	2	2	1
Biochemical industry	48	12	14	14	5	11	15	8	4
Biofood industry	49	18	19	20	8	10	10	14	7
Bioenvironmental industry	26	8	5	1	4	3	3	4	-
Bioelectronics industry	6	5	-	1	-	-	1	-	-
Bioprocess and equipment industry	32	2	1	4	-	2	2	-	-
Bioenergy and bioresource industry	8	-	3	-	3	2	1	1	1
Bioassay, bioinformatics and R&D service industry	14	-	2	1	1	-	1	-	-

\* The result analyzed the results of 1 core business that was selected for each company.

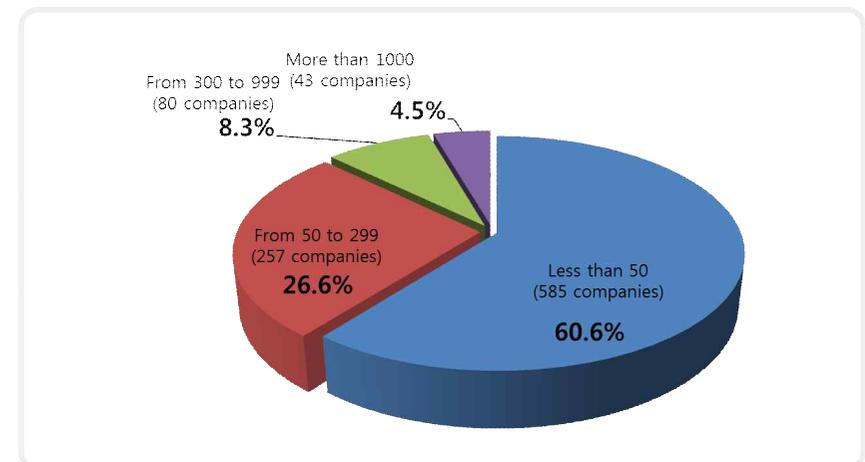
- TOP3 provinces for domestic bioindustry's businesses are as the following:  
 Biopharmaceutical Industry: Gyeonggi 43.5% > Seoul 23.3% > Chungbuk 8.4%  
 Biochemical Industry : Gyeonggi 23.5% > Daejeon 15.7% > Seoul 11.3%  
 Biofood Industry : Gyeonggi 24.9% > Chungnam 10.2% > Chungbuk 9.6%

- Bioenvironmental Industry : Gyeonggi 34.2% > Gangwon 10.5% > Seoul 7.9%
- Bioelectronics Industry : Seoul, Gyeonggi 25.0% > Gangwon 20.8% > Dajeon 8.3%
- Bioprocess and equipment industry : Gyeonggi 43.8% > Seoul 26.0% > Dajeon 9.6%
- Bioenergy and bioresource Industry : Gyeonggi 28.6% > Daejeon 14.3% > Chungbuk 10.7%
- Bioassay, bioinformatics and R&D service Industry : Seoul 47.1% > Gyeonggi 27.5% > Daejeon 11.8%

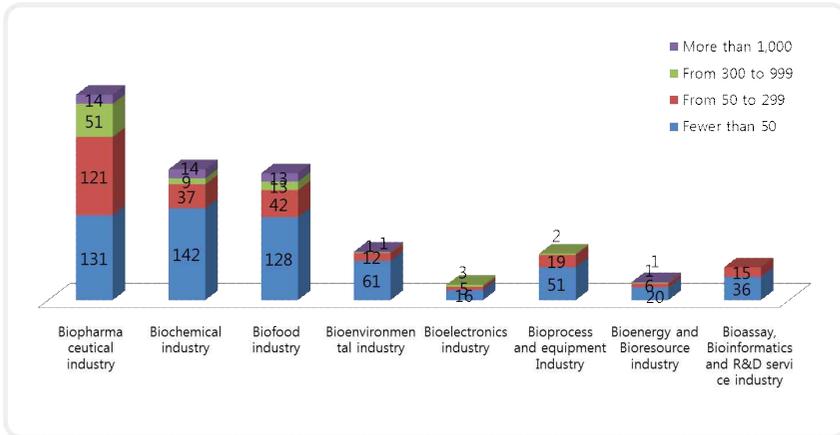
### B. Bioindustry's Distribution per Size of Workers

- There are 585 companies (60.6%) that belongs to 'less than 1~50 workers' among total size of workers. (Excluded 10 no response cases)
- There are 43 companies (4.5%) that have more than 1,000 workers.

<Figure 2-2> Bioindustry's Distribution per Size of Workers



<Figure 2-3> Bioindustry's Size of Workers (Unit : number of companies)

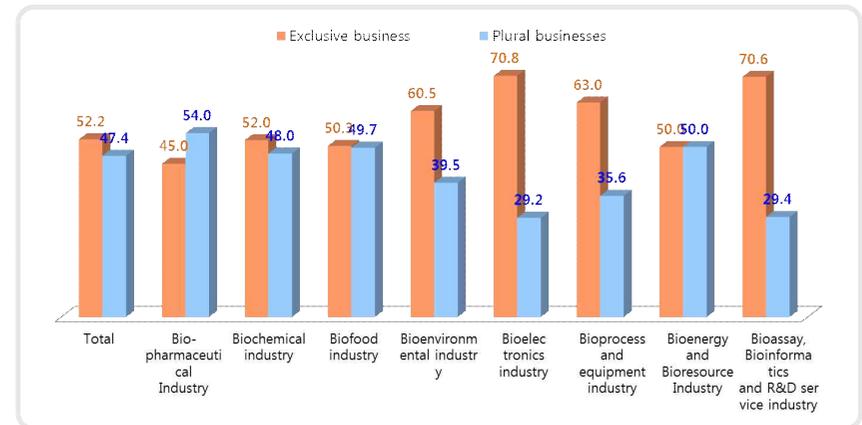


\* Companies that did not have information on the size of workers were excluded from the statistical data.

### C. Bioindustry's Distribution on the Existence of Other Businesses

- Bioindustry's existence of other businesses refers to the existence of factories, research centers or stores in other location.
- Companies that do not have factories, research center or stores in other location are categorized as 'exclusive business'. Companies that have factories, research centers or stores in other location are categorized as 'plural businesses'.
- Among 975 bioindustry companies, 509 companies (52.2%) are 'exclusive business' and 462 companies (47.4%) are 'plural businesses' according to the survey.

<Figure 2-4> Bioindustry's Existence of Other Businesses (Unit : %)



\* Excluded samples that could not classify their operation status as either exclusive or plural

### D. Bioindustry's Financial Analysis

- The total capital of bioindustry is surveyed as 14.4 billion won and the ratio of net worth is 48%.
- Companies in biochemical industry had higher average amount of capital reaching 33.2 billion won. Companies in bioenvironmental, bioelectronics industry had higher value compared to other bioindustries with ratio of net worth reaching 50%.

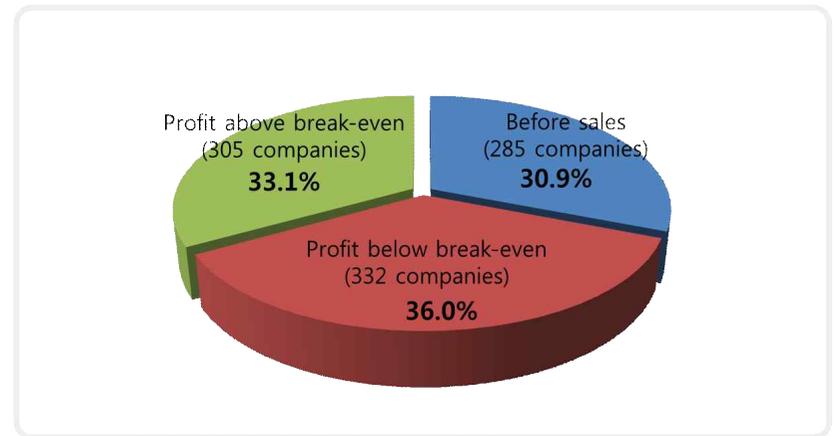
<Table 2-2> Biotechnology Industry's Financial Standing Analysis by Category  
(Unit : %, million Won)

Industrial Category	No. of companies	Capital			Ratio of Net worth		
		Minimum	Maximum	Average	Minimum	Maximum	Average
<b>Total</b>	<b>975</b>	<b>1</b>	<b>1,488,993</b>	<b>14,422</b>	<b>-505</b>	<b>100</b>	<b>48</b>
Biopharmaceutical industry	322	15	815,317	13,288	-241	100	49
Biochemical industry	204	30	1,488,993	33,161	-84	92	49
Biofood industry	197	10	516,625	11,915	-235	100	47
Bioenvironmental industry	76	50	10,846	1,281	-40	100	54
Bioelectronics industry	24	10	6,958	1,992	-15	94	54
Bioprocess and equipment industry	73	40	32,694	2,370	-71	97	49
Bioenergy and bioresource industry	28	100	167,456	11,044	-84	91	33
Bioassay, bioinformatics and R&D service industry	51	1	13,888	1,813	-505	100	35

### E. Type of Biobusiness Being Promoted in Bioindustry

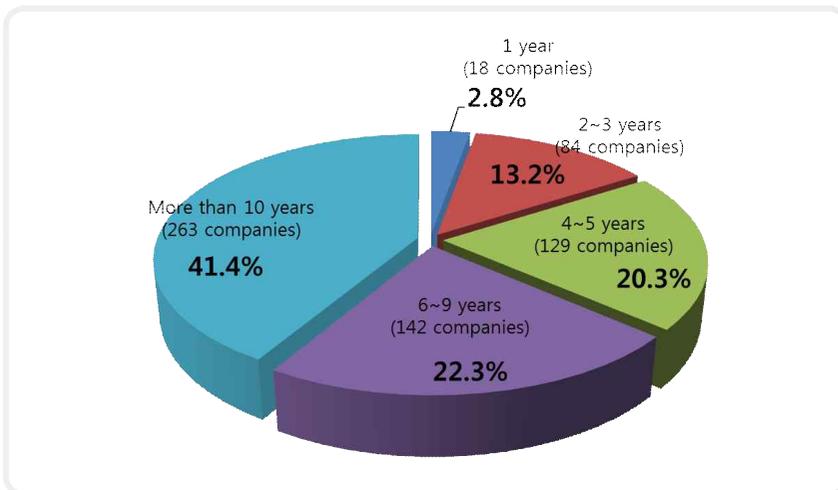
- The result for type of forwarded biobusiness includes responses from 922 companies out of 975 total participants, of which 53 were non-responses.
- Among 922 companies, 285 companies (30.9%) belonged to the phase of 'before sales' in 2014, and among 637 companies that resulted in sales, 332 companies which are almost half the number belonged to 'below BEP'.

<Figure 2-5> Type of Biobusiness Being Promoted in Bioindustry



- Among 636 companies that resulted in sales in 2014, 18 companies (2.8%) had their first sales in 2014. (Excluded 1 no response case)
- There are 263 companies (41.4%) that resulted in sales for more than 10 years.

<Figure 2-6> Bioindustry's Sales Period



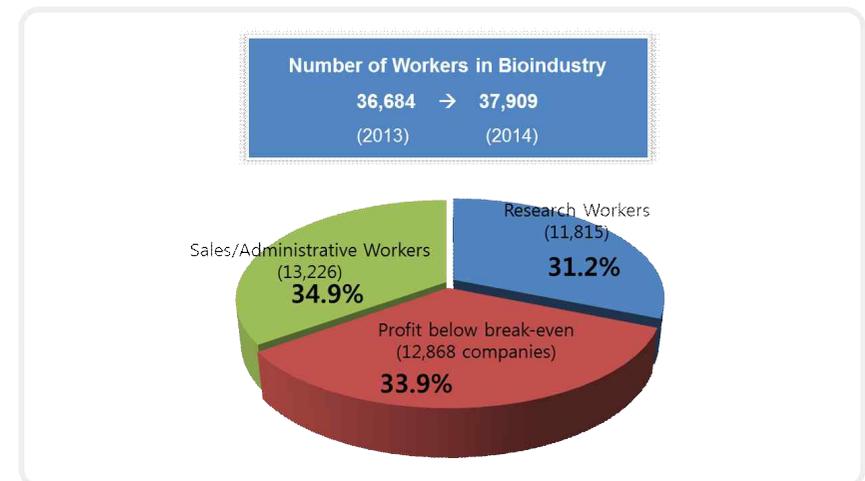
## 2 Manpower Status of Bioindustry

### A. Manpower Status of 2014

#### 1) Manpower Status per Category

- Among 975 domestic bioindustry companies in 2014, there was an increase of 1,225 workers compared to 2013, reaching 37,909 and there are average of 38.9 workers per company.
- Manpower of bioindustry is consisted of 11,815 research workers (31.2%), 12,868 production workers (33.9%), 13,226 sales/administrative workers (34.9%).

<Figure 2-7> 2014 Bioindustry's Distribution of Manpower





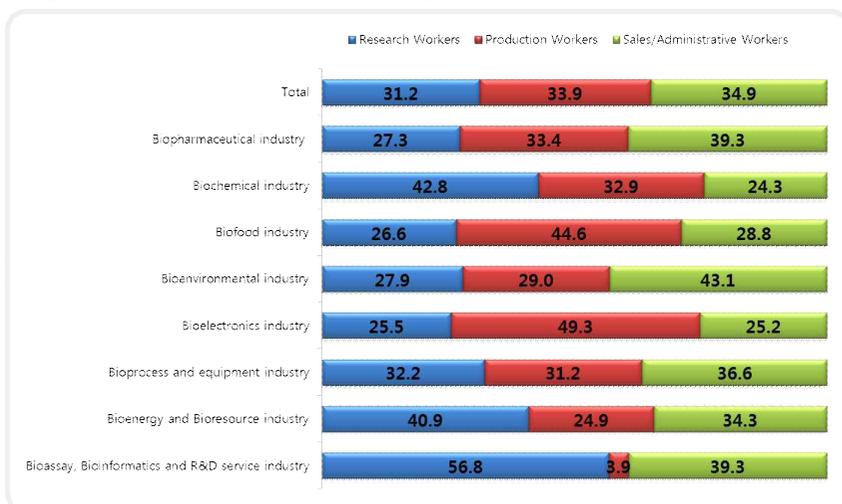
<Table 2-3> 2014 Bioindustry's Manpower Distribution

(Unit : number of companies, workers, %)

Industrial Category		No. of Companies	Research workers	Production workers	Sales/administrative workers	Total	Distribution Ratio
Total	No. of Employees	975	11,815	12,868	13,226	37,909	100.0
	Distribution Ratio	100	31.2	33.9	34.9	100	
Biopharmaceutical industry		319	5,185	6,358	7,481	19,024	50.2
Biochemical industry		194	2,128	1,634	1,210	4,972	13.1
Biofood industry		196	1,851	3,109	2,006	6,966	18.4
Bioenvironmental industry		76	387	401	597	1,385	3.7
Bioelectronics industry		21	293	566	289	1,148	3.0
Bioprocess and equipment industry		71	490	476	558	1,524	4.0
Bioenergy and bioresource industry		28	413	251	346	1,010	2.7
Bioassay, bioinformatics and R&D service industry		50	1,068	73	739	1,880	5.0

<Figure 2-8> Bioindustry's Manpower Proportion of 2014

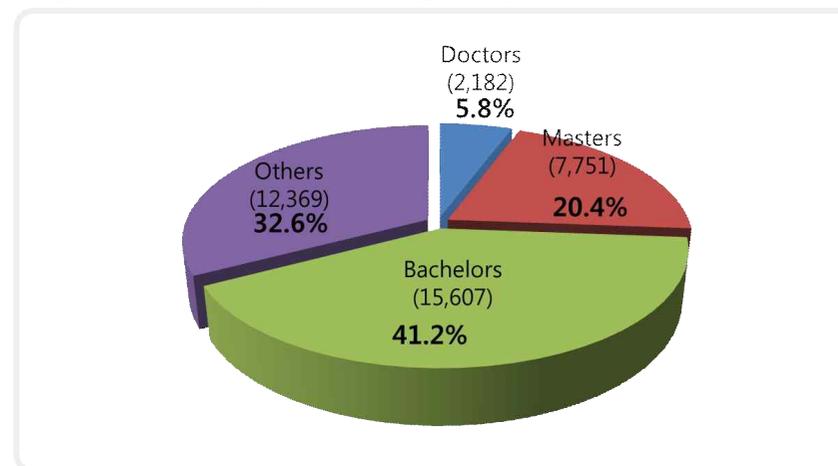
(Unit : %)



## 2) Manpower Status per Academic Degree

- Among bioindustry manpower in 2014, workers with bachelor's degree were the largest in number, reaching 15,607 people (41.2%). Workers with master's degree ranked second with 7,751 workers (20.4%), and workers with doctor's degree the last with 2,182 workers (5.8%).

<Figure 2-9> Bioindustry's Academic Degree Proportion of Workers of 2014



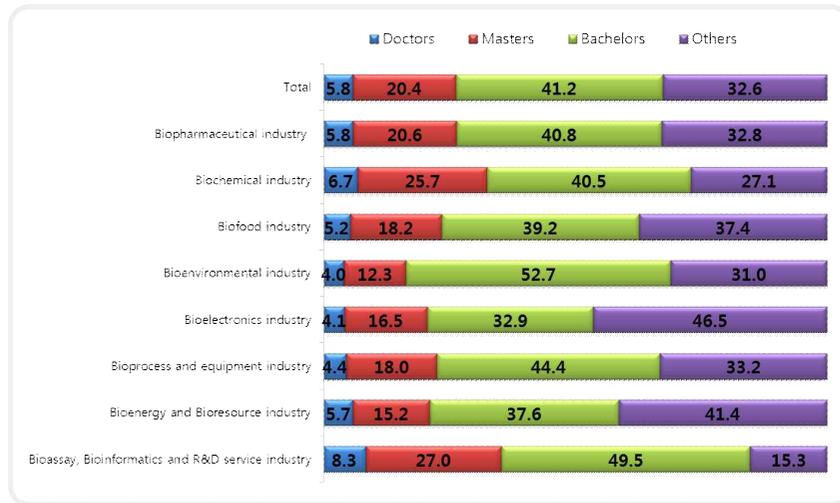
<Table 2-4> 2014 Bioindustry's Distribution of Academic Degree

(Unit : number of people, %)

Industrial Category		Doctor	Master	Bachelor	Others	Total	Distribution Ratio
Total	No. of Employees	2,182	7,751	15,607	12,369	37,909	100.0
	Distribution Ratio	5.8	20.4	41.2	32.6	100.0	
Biopharmaceutical industry		1,101	3,912	7,767	6,244	19,024	50.2
Biochemical industry		334	1,279	2,012	1,347	4,972	13.1
Biofood industry		364	1,265	2,734	2,603	6,966	18.4
Bioenvironmental industry		55	170	730	430	1,385	3.7
Bioelectronics industry		47	189	378	534	1,148	3.0
Bioprocess and equipment industry		67	275	676	506	1,524	4.0
Bioenergy and bioresource industry		58	154	380	418	1,010	2.7
Bioassay, bioinformatics and R&D service industry		156	507	930	287	1,880	5.0

○ Portion of elite manpower such as workers with masters or doctors degree is relatively high in bioassay, bioinformatics and R&D service industry(35.3%) and in biochemical industry(32.4%).

<Figure 2-10> Bioindustry's Academic Degree Proportion of 2014 (Unit : %)



### 3) Manpower Distribution by Area

○ Gyeonggi area held 36.1% of total bioindustry's manpower in 2014, which account for 13,673 workers in numbers. Followed areas that ranked high of possession of bioindustry's manpower are Chungbuk (5,915 people), Seoul(4,198 people), Incheon(2,720 people).

< Talbe 2-5 > 2014 Bioindustry's Manpower Distribution by Area

(Unit : number of people, %)

Area	Doctor	Master	Bachelor	Others	Total	Distribution Ratio
Total	2,182	7,751	15,607	12,369	37,909	100.0
	5.8	20.4	41.2	32.6	100.0	
Seoul	332	963	2,175	728	4,198	11.1
Busan	14	37	65	66	182	0.5
Daegu	19	75	319	171	584	1.5
Incheon	115	683	1,010	912	2,720	7.2
Gwangju	4	14	47	2	67	0.2
Daejeon	278	588	770	328	1,964	5.2
Ulsan	15	88	238	312	653	1.7
Sejong	10	80	213	118	421	1.1
Gyeonggi	775	2,972	4,890	5,036	13,673	36.1
Gangwon	116	331	848	795	2,090	5.5
Chungbuk	197	996	2,668	2,054	5,915	15.6
Chungnam	84	287	636	550	1,557	4.1
Jeonbuk	121	422	1,086	729	2,358	6.2
Jeonnam	29	53	168	107	357	0.9
Gyeongbuk	22	57	158	158	395	1.0
Gyeongnam	25	77	257	245	604	1.6
Jeju	26	28	59	58	171	0.5

## B. Recent Trend of Bioindustry Manpower Status

### 1) 2012~2014 Bioindustry's trend of academic degree of research·production manpower

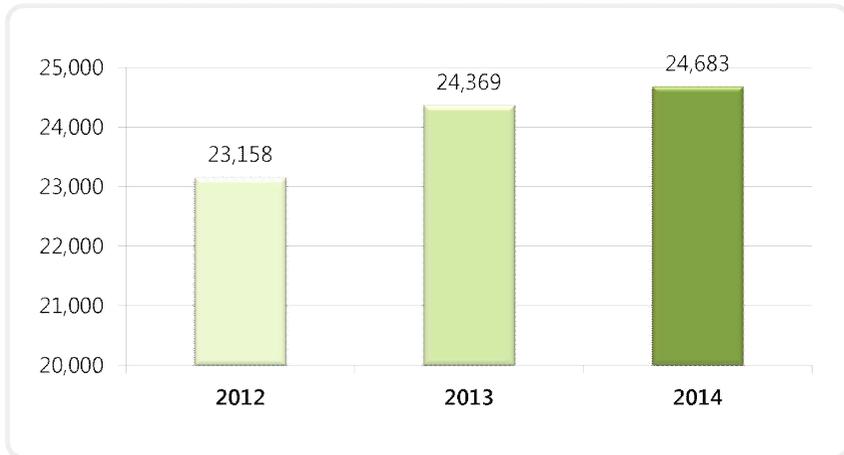
#### ① Bioindustry's Trend of research·production manpower

- The research and production manpower of bioindustry in 2014 had an increase of 314 workers(1.3%) compared to 2013, reaching 24,683 workers.

<Table 2-5> 2012~2014 Bioindustry's Change in Research·Production Manpower  
(Unit : number of people, %)

Classification	2012	2013	2014	Annual Average Rate of change
No. of Employees	23,158	24,369	24,683	
Rate of Change	4.8	5.2	1.3	

<Figure 2-11> 2012~2014 Bioindustry's Trend of Research·Production Manpower  
(Unit : number of people)



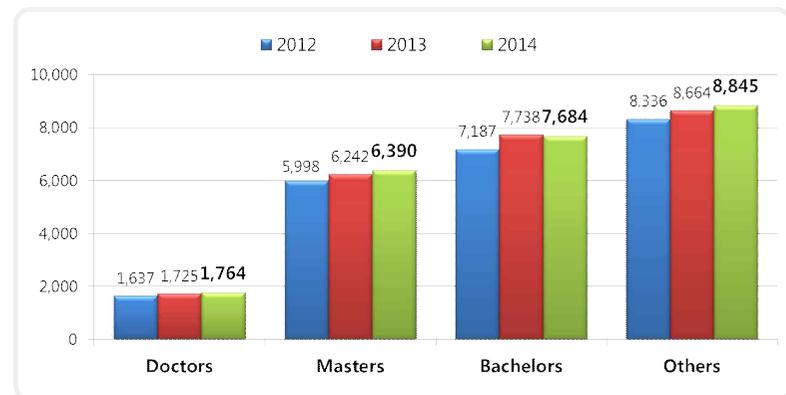
### ② Bioindustry's Trend in Academic Degree of Research·Production Manpower

- Compared to 2013, the proportion of bioindustry workers with bachelor's degree in 2014 decreased slightly from 31.8% to 31.1% (-0.7%p).
- There is no significant difference between the proportion of workers with master's and doctor's degree in 2013.

<Table 2-6> 2012~2014 Bioindustry's Trend in Academic Degree of Research·Production Manpower  
(Unit : number of people, %)

Degree	2011		2012		2013		Variation from the year before	
	No. of Employees	Distribution Ratio	No. of Employees	Distribution Ratio	No. of Employees	Distribution Ratio	No. of Employees	Rate of Change
<b>Total</b>	<b>23,158</b>	<b>100.0</b>	<b>24,369</b>	<b>100.0</b>	<b>24,683</b>	<b>100.0</b>	<b>314</b>	<b>1.3</b>
Doctor	1,637	7.1	1,725	7.1	1,764	7.1	39	2.3
Master	5,998	25.9	6,242	25.6	6,390	25.9	148	2.4
Bachelor	7,187	31	7,738	31.8	7,684	31.1	-54	-0.7
Others	8,336	36	8,664	35.6	8,845	35.8	181	2.1

<Figure 2-12> 2012~2014 Bioindustry's Trend in Academic Degree of Research·Production Manpower (Unit : number of people)



2) 2010~2014 Bioindustry's Trend in Academic Degree of Research·Production Manpower

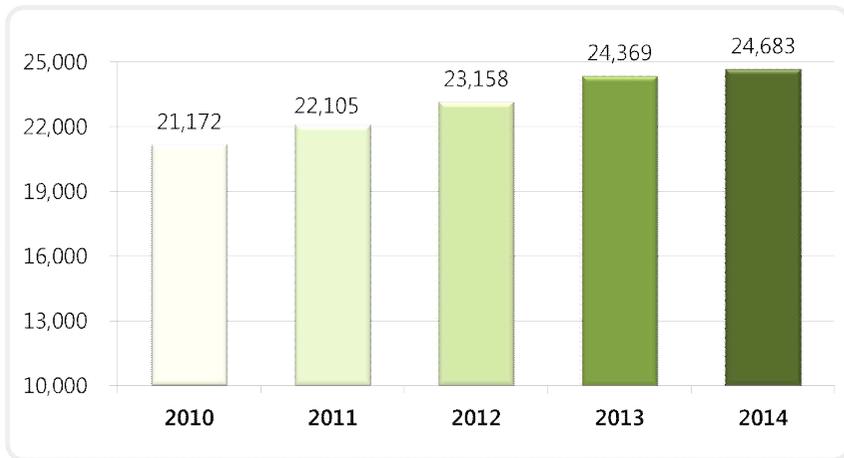
① Bioindustry's Trend of Research·Production Manpower

○ Rate of decline of research, production manpower in 2010 compared to its previous year was relatively high, but it continued to increase since 2011 and maintained its increasing momentum up to 2014.

<Table 2-7> 2009~2013 Bioindustry's Change in Research·Production Manpower (%)  
(Unit : number of people, %)

Classification	2010	2011	2012	2013	2014	Annual Average Rate of Change
	No. of Employees	21,172	22,105	23,158	24,369	
Rate of Change	-7.2	4.4	4.8	5.2	1.3	

<Figure 2-13> 2010~2014 Bioindustry's Trend of Research·Production Manpower  
(Unit : number of people)



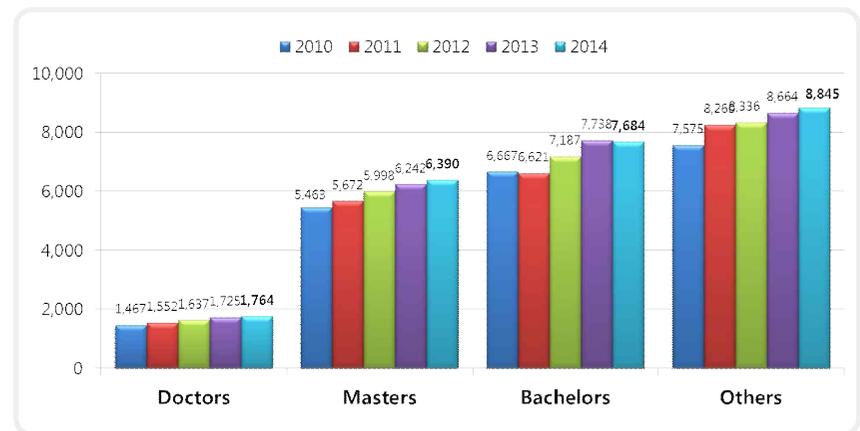
② Bioindustry's Trend in Academic Degree of Research·Production Manpower

○ In 2010 to 2014, number of employees with either master or doctor degree continued to increase, while those with bachelor degrees slightly increased in 2012 and 2013 and then decreased slightly in 2014.

<Table 2-8> 2010 ~ 2014 Bioindustry's Trend in Academic Degree of Research·Production Manpower  
(Unit : number of people, %)

Degree	2010		2011		2012		2013		2014		Variation from the year before	
	No. of Employees	Distribution Ratio	No. of Employees	Distribution Ratio	No. of Employees	Distribution Ratio	No. of Employees	Distribution Ratio	No. of Employees	Distribution Ratio	No. of Employees	Rate of Change
<b>Total</b>	<b>21,172</b>	<b>100.0</b>	<b>22,105</b>	<b>100.0</b>	<b>23,158</b>	<b>100.0</b>	<b>24,369</b>	<b>100.0</b>	<b>24,683</b>	<b>100.0</b>	<b>314</b>	<b>1.3</b>
Doctor	1,467	6.9	1,552	7.0	1,637	7.1	1,725	7.1	1,764	7.1	39	2.3
Master	5,463	25.8	5,672	25.7	5,998	25.9	6,242	25.6	6,390	25.9	148	2.4
Bachelor	6,667	31.5	6,621	30.0	7,187	31.0	7,738	31.8	7,684	31.1	-54	-0.7
Others	7,575	35.8	8,260	37.4	8,336	36.0	8,664	35.6	8,845	35.8	181	2.1

<Figure 2-14> 2010~2014 Bioindustry's Trend in Academic Degree of Research·Production Manpower  
(Unit : number of people)

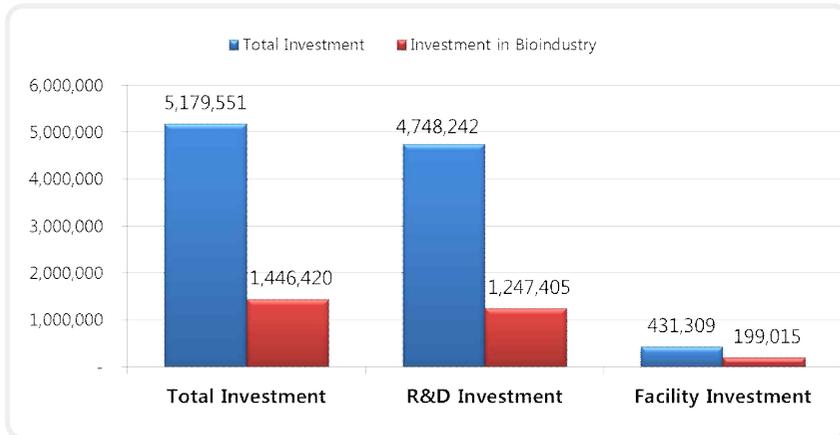


### 3 Investment Status of Bioindustry

#### A. Bioindustry's Investment Status of 2014

- The total amount of investment bioindustry companies made for the past year of 2014 reached 5 trillion and 179.6 billion won, and the investment cost on bioindustry turned out to be 27.9% of the total investment fee reaching 1 trillion and 446.4 billion won.
- The R&D cost in bioindustry turned out to be 26.3% of the total R&D cost reaching 1 trillion and 247.4 billion won, and the facility investment cost in bioindustry took 46.1% of the total facility investment cost reaching 199.0 billion won.

<Figure 2-15> 2014 Total Investment cost and Investment in Bioindustry  
(Unit: million Won)



- Among bioindustries, the total investment was highest in biopharmaceutical industry reaching 1 trillion and 91.9 billion won(75.5%) and then the following highest industries were biofood industry reaching 111.8 billion won(7.7%) and biochemical industry reaching 110.0 billion won(7.6%). These three core bioindustries took 90.8% of bioindustry's the total investment cost.
- Among bioindustries, the total R&D cost was highest in biopharmaceutical industry reaching 941.2 billion won(75.4%) and then the following highest industries were biochemical industry reaching 97.1 billion won(7.8%) and biofood industry reaching 96.0 billion won(7.7%). These three core bioindustries took 90.9% of bioindustry's the total R&D cost.
- Among bioindustry companies, the average amount of R&D cost was highest in biopharmaceutical industry reaching 2.9 billion won and then the following highest industries were bioelectronics industry with 1.0 billion won, bioenergy and bioresource, bioassay, bioinformatics and R&D service industry with 0.7 billion won.
- Among bioindustries, the total facility investment cost was highest in biopharmaceutical industry reaching 150.7 billion won(75.7%) and then the following highest industries were biofood industry reaching 15.8 billion won(7.9%) and biochemical industry reaching 12.9 billion won(6.5%). These three bioindustries took 90.1% of bioindustry's the total facility investment cost.
- Among bioindustry companies, the average amount of facility investment cost was highest in biopharmaceutical industry reaching 0.5 billion won and then the following highest industries were bioassay, bioinformatics and R&D service industry with 0.15 billion won, Bioprocess and equipment industry, Bioenergy and bioresource industry with 0.09 billion won.

<Table 2-9> 2014 Bioindustry's Size of Investment (Unit : number of companies, million Won)

Industrial Category	No. of companies	R&D Investment		Facility Investment		Total Investment	
		Total	Average	Total	Average	Total	Average
<b>Total</b>	<b>975</b>	<b>1,247,405</b>	<b>1,279.4</b>	<b>199,015</b>	<b>204.1</b>	<b>1,446,420</b>	<b>1,483.5</b>
Biopharmaceutical industry	322	941,166	2,922.9	150,693	468.0	1,091,859	3,390.9
Biochemical industry	204	97,081	475.9	12,898	63.2	109,979	539.1
Biofood industry	197	95,996	487.3	15,806	80.2	111,802	567.5
Bioenvironmental industry	76	10,589	139.3	1,929	25.4	12,518	164.7
Bioelectronics industry	24	22,878	953.3	1,361	56.7	24,239	1,010.0
Bioprocess and equipment industry	73	22,859	313.1	6,348	87.0	29,207	400.1
Bioenergy and bioresource industry	28	20,246	723.1	2,389	85.3	22,635	808.4
Bioassay, bioinformatics and R&D service industry	51	36,590	717.5	7,591	148.8	44,181	866.3

- Size of overall R&D investment was highest in Incheon and Gyeonggi area, while that of facility investment was highest in Gyeonggi, Ulsan, and Incheon area.
- Average size of R&D investment was highest in Incheon area where it reached 16.6 billion won, while that of facility investment was highest in Ulsan to reach 4 billion won.

< 표 2-11 > 2014 Bioindustry's Size of Investment by Area

(Unit : number of companies, million Won)

Area	No. of companies	R&D Investment		Facility Investment		Total Investment	
		Total	Average	Total	Average	Total	Average
<b>Total</b>	<b>975</b>	<b>1,247,405</b>	<b>1,279.4</b>	<b>199,015</b>	<b>204.1</b>	<b>1,446,420</b>	<b>1,483.5</b>
Seoul	171	92,165	539.0	7,233	42.3	99,398	581.3
Busan	14	3,083	220.2	4,425	316.1	7,508	536.3
Daegu	24	3,429	142.9	310	12.9	3,739	155.8
Incheon	22	364,340	16,560.9	35,478	1612.6	399,818	18,173.5
Gwangju	10	830	83.0	335	33.5	1,165	116.5
Daejeon	80	124,603	1,557.5	15,809	197.6	140,412	1,755.2
Ulsan	9	32,405	3,600.6	36,050	4005.6	68,455	7,606.1
Sejong	6	3,290	548.3	1,700	283.3	4,990	831.7
Gyeonggi	323	351,375	1,087.8	46,225	143.1	397,600	1,231.0
Gangwon	55	25,920	471.3	5,964	108.4	31,884	579.7
Chungbuk	71	144,286	2,032.2	26,542	373.8	170,828	2,406.0
Chungnam	58	21,988	379.1	8,558	147.6	30,546	526.7
Jeonbuk	26	64,738	2,489.9	6,830	262.7	71,568	2,752.6
Jeonnam	29	2,703	93.2	1,237	42.7	3,940	135.9
Gyeongbuk	35	4,170	119.1	883	25.2	5,053	144.4
Gyeongnam	29	4,324	149.1	384	13.2	4,708	162.3
Jeju	13	3,756	288.9	1,052	80.9	4,808	369.8

B. Recent Trend of Investment Status

1) 2012~2014 Bioindustry's Trend of Investment

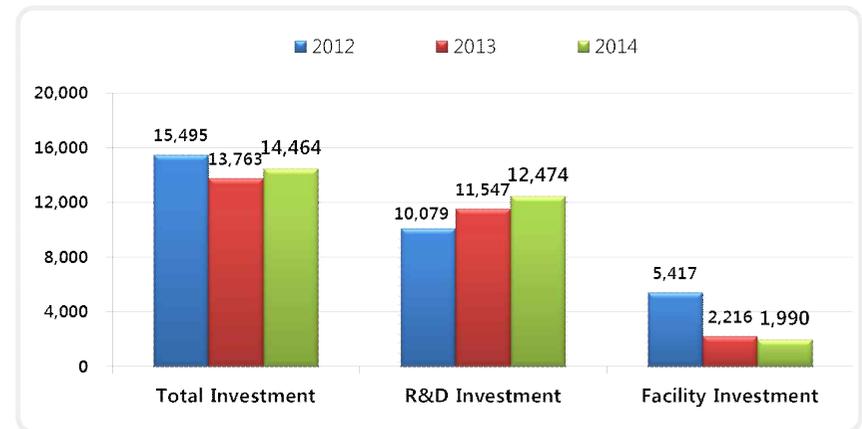
- The total investment cost in bioindustry decreased from 1 trillion and 549.5 billion won in 2012 to 1 trillion and 376.3 billion won in 2013, but increased by 70.1 billion won(5.1%) in 2014 compared to 2013, reaching 1 trillion and 446.4 billion won.

<Table 2-10> 2012~2014 Bioindustry's Trend of Investment

(Unit : one hundred million Won, %)

Classification		2012	2013	2014	Annual Average Rate of Change
Total Investment	Amount	15,495	13,763	14,464	-3.4
	Rate of Change	20	-11.2	5.1	
R&D Investment	Amount	10,079	11,547	12,474	11.2
	Rate of Change	8.3	14.6	8.0	
Facility Investment	Amount	5,417	2,216	1,990	-39.4
	Rate of Change	50.3	-59.1	-10.2	

<Figure 2-16> 2012~2014 Bioindustry Investment Trend (Unit : one hundred million Won)



- In comparison to 2013, overall size of investment for 2014 increased the most in bioenergy and biosource industry by 45.8%, followed by bioelectronics industry by 7.4%; however, its size increased by 9.6% biofood industry.

<Table 2-14> 2012~2014 Bioindustry's Trend in Overall Size of Investment

(Unit : million Won, %)

Industrial Category	2012		2013		2014		Variation from the year before	Annual Average Rate of Change
	Investment Amount	Distribution Ratio	Investment Amount	Distribution Ratio	Investment Amount	Distribution Ratio		
<b>Total</b>	<b>1,549,548</b>	<b>100.0</b>	<b>1,376,336</b>	<b>100.0</b>	<b>1,446,420</b>	<b>100.0</b>	<b>5.1</b>	<b>-3.4</b>
Biopharmaceutical industry	1,142,819	73.8	1,020,871	74.2	1,091,859	75.5	7.0	-2.3
Biochemical industry	134,810	8.7	110,416	8.0	109,979	7.6	-0.4	-9.7
Biofood industry	139,888	9	123,621	9.0	111,802	7.7	-9.6	-10.6
Bioenvironmental industry	15,197	1	12,596	0.9	12,518	0.9	-0.6	-9.2
Bioelectronics industry	22,563	1.5	22,579	1.6	24,239	1.7	7.4	3.6
Bioprocess and equipment industry	23,210	1.5	20,038	1.5	29,207	2.0	45.8	12.2
Bioenergy and biosource industry	20,037	1.3	22,938	1.7	22,635	1.6	-1.3	6.3
Bioassay, bioinformatics and R&D service industry	51,024	3.3	43,277	3.1	44,181	3.1	2.1	-6.9

- In comparison to 2013, R&D cost for 2014 increased by 23.0% in Bioprocess and equipment industry, 11.1% in biopharmaceutical industry, 11.0% in bioassay, bioinformatics and R&D service industry. However, R&D cost decreased the most in 3 industry areas such as biofood industry (by 11.3%), bioenergy and biosource industry (by 2.7%), and bioenvironmental industry (by 1.2%).
- Bioprocess and equipment industry showed the highest increase in the facility investment cost of 2014 compared to 2013, reaching 336.6%. bioenergy and biosource industry also showed a high rate with 11.6% increase. However, facility investment cost decreased the most in 4 industry areas such as bioassay, bioinformatics and r&d service industry

- (by 26.5% each), bioelectronics industry (by 24.8%), biochemical industry (by 15.0%), biopharmaceutical industry (by 13.1%).

<Table 2-12> 2012~2014 Bioindustry's Trend of R&D and Facility Investment Cost

(Unit : million Won, %)

Industrial Category	2012		2013		2014		Variation from the year before		Annual Average Rate of Change	
	R&D	Facility	R&D	Facility	R&D	Facility	R&D	Facility	R&D	Facility
<b>Total</b>	<b>1,007,862</b>	<b>541,686</b>	<b>1,154,719</b>	<b>221,617</b>	<b>1,247,405</b>	<b>199,015</b>	<b>8.0</b>	<b>-10.2</b>	<b>11.3</b>	<b>-39.4</b>
Biopharmaceutical industry	667,038	475,781	847,459	173,412	941,166	150,693	11.1	-13.1	18.8	-43.7
Biochemical industry	113,746	21,064	95,247	15,169	97,081	12,898	1.9	-15.0	-7.6	-21.7
Biofood industry	123,052	16,836	108,190	15,431	95,996	15,806	-11.3	2.4	-11.7	-3.1
Bioenvironmental industry	12,024	3,173	10,717	1,879	10,589	1,929	-1.2	2.7	-6.2	-22.0
Bioelectronics industry	20,945	1,618	20,769	1,810	22,878	1,361	10.2	-24.8	4.5	-8.3
Bioprocess and equipment industry	21,214	1,996	18,584	1,454	22,859	6,348	23.0	336.6	3.8	78.3
Bioenergy and biosource industry	18,435	1,602	20,798	2,140	20,246	2,389	-2.7	11.6	4.8	22.1
Bioassay, bioinformatics and R&D service industry	31,408	19,616	32,955	10,322	36,590	7,591	11.0	-26.5	7.9	-37.8

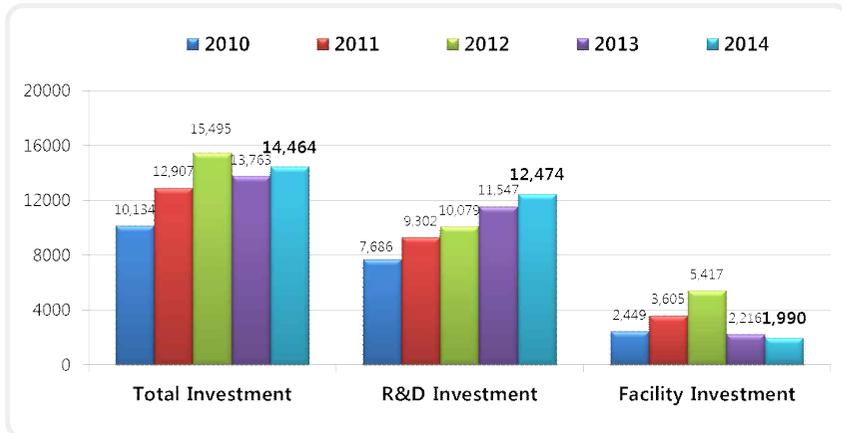
## 2) 2010~2014 Bioindustry's Trend of Investment

- Total size of investment in bioindustry increased compared to its previous year in 2011 and 2012, while it decreased in 2013 by 11.2%, but increased in 2014 by 5.1%.

<Table 2-13> 2010~2014 Bioindustry's Trend of Investment  
(Unit : one hundred million Won, %)

Classification		2010	2011	2012	2013	2014	Annual Average Rate of Change
Total Investment	Amount	10,134	12,907	15,495	13,763	14,464	9.3
	Rate of Change	-14.2	27.4	20.1	-11.2	5.1	
R&D Investment	Amount	7,686	9,302	10,079	11,547	12,474	12.9
	Rate of Change	-12.3	21	8.3	14.6	8.0	
Facility Investment	Amount	2,449	3,605	5,417	2,216	1,990	-5.1
	Rate of Change	-19.7	47.2	50.3	-59.1	-10.2	

<Figure 2-17> 2010~2014 Bioindustry Investment Trend (Unit : one hundred million Won)



- For investment in bioindustry since 2010, the investment in biopharmaceutical industry accounts for approx. 60% or more of total investment and the proportion has been increasing gradually to 75.5% as of 2014.
- However, investment size portion of biochemical industry and biofood industry within total industry, of which is 2nd and 3rd largest in volume, is in decreasing trend.

<Table 2-14> 2010~2014 Bioindustry's Trend in Overall Size of Investment  
(Unit : million Won, %)

Industrial Category	2010		2011		2012		2013		2014		Variation from the year before	Annual Average Rate of Change
	Investment Amount	Distribution Ratio	Investment Amount	Distribution Ratio	Investment Amount	Distribution Ratio	Investment Amount	Distribution Ratio	Investment Amount	Distribution Ratio		
<b>Total</b>	<b>1,013,429</b>	<b>100.0</b>	<b>1,290,750</b>	<b>100.0</b>	<b>1,549,548</b>	<b>100.0</b>	<b>1,376,336</b>	<b>100.0</b>	<b>1,446,420</b>	<b>100.0</b>	<b>5.1</b>	<b>9.3</b>
Biopharmaceutical industry	648,689	64.0	903,350	70.0	1,142,819	73.8	1,020,871	74.2	1,091,859	75.5	7.0	13.9
Biochemical industry	115,764	11.4	120,875	9.4	134,810	8.7	110,416	8.0	109,979	7.6	-0.4	-1.3
Biofood industry	122,913	12.1	144,887	11.2	139,888	9.0	123,621	9.0	111,802	7.7	-9.6	-2.3
Bioenvironmental industry	15,966	1.6	14,358	1.1	15,197	1.0	12,596	0.9	12,518	0.9	-0.6	-5.9
Bioelectronics industry	18,249	1.8	20,298	1.6	22,563	1.5	22,579	1.6	24,239	1.7	7.4	7.4
Bioprocess and equipment industry	17,675	1.7	22,634	1.8	23,210	1.5	20,038	1.5	29,207	2.0	45.8	13.4
Bioenergy and bioresource industry	25,799	2.5	26,666	2.1	20,037	1.3	22,938	1.7	22,635	1.6	-1.3	-3.2
Bioassay, bioinformatics and R&D service industry	48,374	4.8	37,682	2.9	51,024	3.3	43,277	3.1	44,181	3.1	2.1	-2.2



- In comparison to 2013, overall size of r&d investment increased the most in 2014 in bioprocess and equipment industry (by 23.0%), biopharmaceutical industry (by 11.1%), bioassay, bioinformatics and R&D service industry (by 11.0%). However, it increased in biofood industry by more than 10% (by 11.3%), bioenergy and biosource industry (2.7%), and in bioenvironmental industry (by 1.2%).
- In comparison to 2013, overall size of facility investment increased the most in 2014 in bioprocess and equipment industry (by 336.6%), bioenergy and biosource industry (by 11.6%). However, it decreased in bioassay, bioinformatics and R&D service industry (by 26.5%), bioelectronics industry (by 24.8%), biochemical industry (by 15.0%), and in biopharmaceutical industry (by 13.1%).

<Table 2-15> 2010~2014 Bioindustry's Trend of R&D and Facility Investment Cost

(Unit : one hundred million Won, %)

Industrial Category	2010		2011		2012		2013		2014		Variation from the year before		Annual Average Rate of Change	
	R&D	Facilit y	R&D	Facilit y	R&D	Facilit y	R&D	Facilit y	R&D	Facilit y	R&D	Facilit y	R&D	Facilit y
<b>Total</b>	<b>7,686</b>	<b>2,449</b>	<b>9,302</b>	<b>3,605</b>	<b>10,079</b>	<b>5,417</b>	<b>11,547</b>	<b>2,216</b>	<b>12,474</b>	<b>1,990</b>	<b>8.0</b>	<b>-10.2</b>	<b>12.9</b>	<b>-5.1</b>
Biopharmaceutical industry	4,931	1,556	6,292	2,741	6,670	4,758	8,475	1,734	9,412	1,507	11.1	-13.1	17.5	-0.8
Biochemical industry	864	294	966	243	1,137	211	952	152	971	129	1.9	-15.0	3.0	-18.6
Biofood industry	952	278	1,136	313	1,231	168	1,082	154	960	158	-11.3	2.4	0.2	-13.2
Bioenvironmental industry	125	34	114	30	120	32	107	19	106	19	-1.2	2.7	-4.1	-13.2
Bioelectronics industry	145	37	182	21	209	16	208	18	229	14	10.2	-24.8	12.1	-22.1
Bioprocess and equipment industry	158	19	200	27	212	20	186	15	229	63	23.0	336.6	9.7	35.2
Bioenergy and biosource industry	173	85	180	87	184	16	208	21	202	24	-2.7	11.6	4.0	-27.2
Bioassay, bioinformatics and R&D service industry	338	146	233	144	314	196	330	103	366	76	11.0	-26.5	2.0	-15.1

## 4 Cooperation with Other Organizations

### A. Cooperation Types

#### 1) Cooperative Relationship with Other Organizations

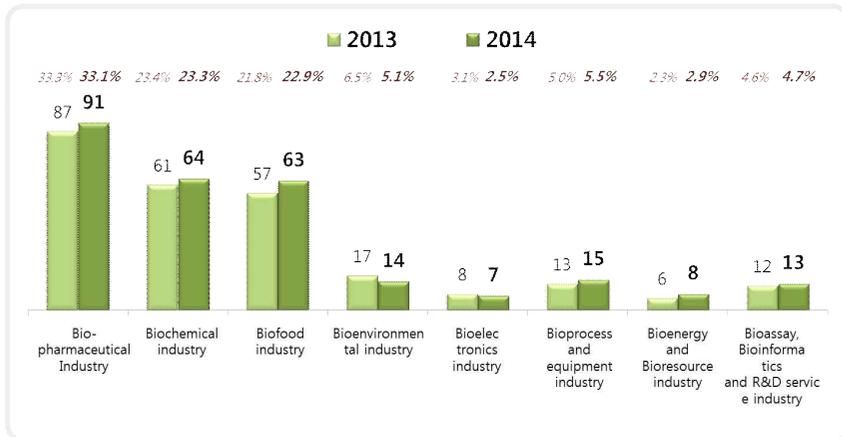
- Of 975 companies in total, 275 companies, 28.2%, have cooperative relationships with other organizations as of 2014.

< Figure 2-18 > Cooperative Relationship



○ By bioindustrial categories, cooperative relationship was established in larger numbers in the order of biopharmaceutical, biochemical and biofood industries. The total number of cooperative relationships in the three industrial categories put together is 218, which is 79.3% of 275 companies holding cooperative relationships.

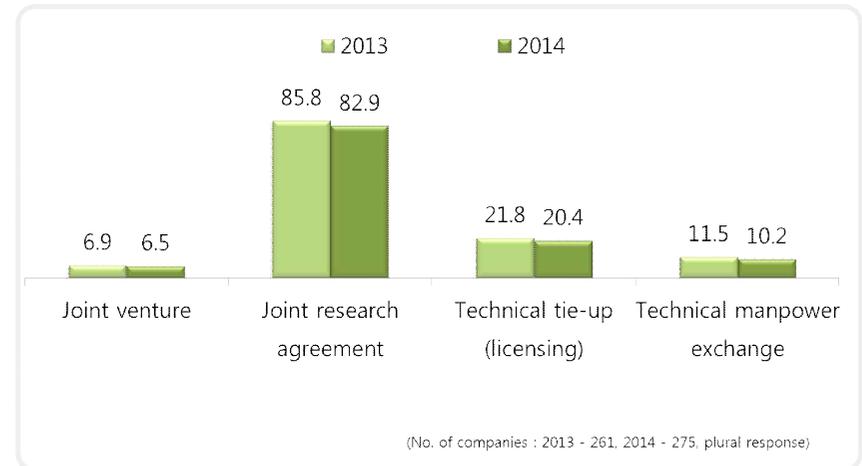
< Figure 2-19 > No. of Companies Holding Cooperative Relationships by Bioindustrial Category



## 2) Types of Cooperative Relationship with Other Organizations

○ Based on 287 responses from 275 companies, the most frequently found type of cooperative relationship was joint R&D contract at 82.9%. It was followed by technical tie-up and licensing (20.4%), domestic and international technical manpower exchange (10.2%) and joint investment (6.5%).

< Figure 2-20 > Types of Cooperative Relationship with Other Organizations

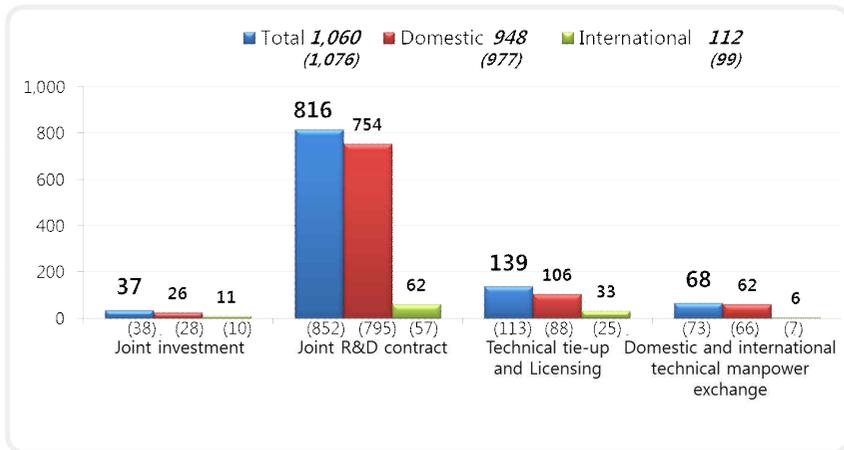


\* Based on 287 responses from 275 companies with cooperative relationships. Multiple responses accepted.

### 3) Number of Cooperation Cases by Cooperative Relationship Type

- The total number of cooperative relationships of 261 companies is 1,060, which is broken down into 948 cooperative relationships in Korea (89.8%) and 112 abroad (10.6%).
- The number of joint R&D contracts is 754 in Korea and 62 in abroad (816 in total). This is the most frequently found cooperative relationship type.

< Figure 2-21 > No. of Cooperation Cases by Cooperative Relationship Type  
(Unit : Cases)



\* Based on 275 companies with cooperative relationships. Multiple responses accepted.  
\* Numbers in brackets are based on 2013 results.

- The number of cooperation cases by bioindustrial category and cooperation type is 401 in biopharmaceutical industry. This accounts for 37.8% of 1,060 cases in total.
- The number of cooperation cases in biofood and biochemical industries are 238 (22.5%) and 173 (16.3%) respectively. Number of cooperation cases by above mentioned 3 industries covers about 76.6% of total cases.

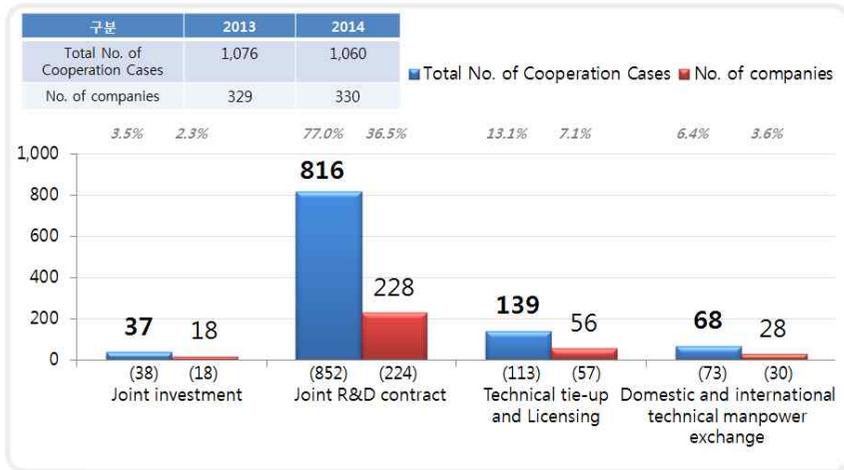
< Table 2-16 > No. of Cooperation Cases by Bioindustrial Category and Cooperation Type  
(Unit : Cases)

Industrial Category	2013		2014		Cooperation Type			
	Total	%	Total	%	Joint Investment	Joint R&D Contract	Technical Tie-up and Licensing	Technical Manpower Exchange
<b>Total</b>	<b>1,076</b>	<b>(100.0%)</b>	<b>1,060</b>	<b>(100.0%)</b>	<b>37</b>	<b>816</b>	<b>139</b>	<b>68</b>
Biopharmaceutical industry	425	(39.5%)	401	<b>37.8%</b>	27	279	82	13
Biochemical industry	191	(17.8%)	173	<b>16.3%</b>	3	144	16	10
Biofood industry	244	(22.7%)	238	<b>22.5%</b>	6	203	19	10
Bioenvironmental industry	32	(3.0%)	28	<b>2.6%</b>	1	19	7	1
Bioelectronics industry	79	(7.3%)	74	<b>7.0%</b>	-	46	-	28
Bioprocess and equipment industry	32	(3.0%)	45	<b>4.2%</b>	-	39	3	3
Bioenergy and bioresource industry	22	(2.0%)	33	<b>3.1%</b>	-	24	8	1
Bioassay, bioinformatics and R&D service industry	51	(4.7%)	68	<b>6.4%</b>	-	62	4	2

#### 4) Number of Partners by Cooperative Relationship Type

○ As for cooperation types, 228 companies have established joint R&D contract relationships and the count of cooperation was found to be 816. It is identified that a company holding a joint R&D contract relationship has conducted an average of 3.6 cooperation cases arithmetically.

< Figure 2-22 > No. of Partners by Cooperative Relationship Type (Unit : Cases, Count)



\* Based on 275 companies with cooperative relationships. Multiple responses accepted.

\* Numbers in brackets are based on 2013 results.

○ The number of companies holding cooperative relationships was the largest at 121 in biopharmaceutical industry. It was followed by biochemical and biofood industries.

< Table 2-17 > No. of Partners by Bioindustrial Category and Cooperation Type (Unit: Count)

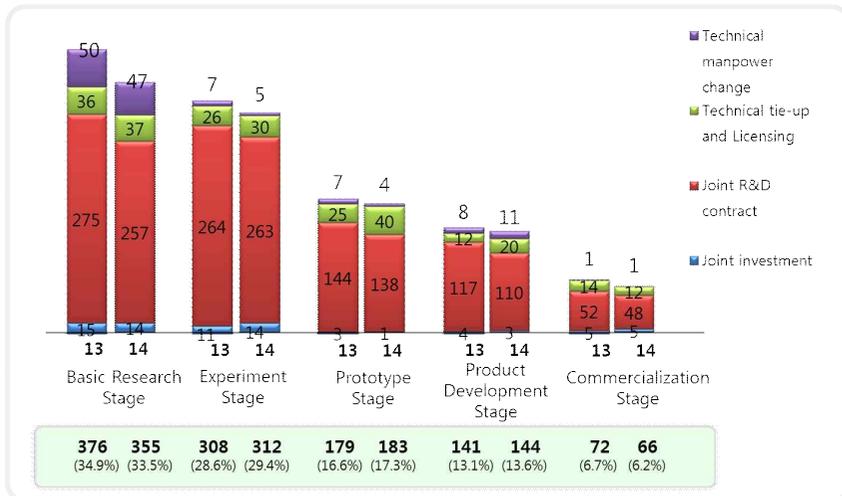
Industrial Category	2013		2014		Cooperation Type			
	Companies in Total	%	Companies in Total	%	Joint Investment	Joint R&D Contract	Technical Tie-up and Licensing	Technical Manpower Exchange
<b>Total</b>	<b>329</b>	<b>(100.0%)</b>	<b>330</b>	<b>(100.0%)</b>	<b>18</b>	<b>228</b>	<b>56</b>	<b>28</b>
Biopharmaceutical industry	125	(38.0%)	121	(36.7%)	12	72	30	7
Biochemical industry	73	(22.2%)	75	(22.7%)	2	54	12	7
Biofood industry	62	(18.8%)	66	(20.0%)	3	52	5	6
Bioenvironmental industry	19	(5.8%)	16	(4.8%)	1	10	4	1
Bioelectronics industry	10	(3.0%)	8	(2.4%)	-	7	-	1
Bioprocess and equipment industry	16	(4.9%)	17	(5.2%)	-	13	2	2
Bioenergy and bioresource industry	6	(1.8%)	9	(2.7%)	-	7	1	1
Bioassay, bioinformatics and R&D service industry	18	(5.5%)	18	(5.5%)	-	13	2	3

## B. Cooperation Stages

### 1) Number of Cooperation Cases by Cooperation Stage

- As per cooperation stage, 355 cooperation cases, the largest, were completed in the stage of basic research, which is 33.5% of 1,060 cases in total. It was followed by 312 cases in experiment stage (29.4%).
- In commercialization stage, the final stage, 66 cases (6.2%) were completed, which is a relatively smaller number. This indicates that the companies cooperate frequently with other organizations in basic research and experiment stages, the initial stages.
- Compared to its previous year, portion of cooperation cases in basic research stage slightly decreased while that increased in experiment stage and prototype stage.

< Figure 2-23 > No. of Cooperation Cases by Cooperation Stage (Unit : Cases)



\* Based on 275 companies with cooperative relationships. Multiple responses accepted.

< Table 2-18 > No. of Cooperation Cases by Cooperation Stage (Unit : Cases)

Classification	Cooperative Relationships in Total	Domestic					Overseas				
		Total	Joint Investment	Joint R&D	Technical Tie-up	Technical Manpower Exchange	Total	Joint Investment	Joint R&D	Technical Tie-up	Technical Manpower Exchange
Total of 2013	1,076	977	28	795	88	66	99	10	57	25	7
Total of 2014	1,060	948	26	754	106	62	112	11	62	33	6
Basic Research Stage	355	327	13	239	30	45	28	1	18	7	2
Experiment Stage	312	279	10	242	22	5	33	4	21	8	-
Prototype Stage	183	153	1	123	27	2	30	-	15	13	2
Product Development Stage	144	133	2	103	18	10	11	1	7	2	1
Commercialization Stage	66	56	-	47	9	-	10	5	1	3	1

- By industry classification, no. of cooperations cases were most frequent in experiment stage for biopharmaceutical industry, biofood industry, and bioassay, bioinformatics and r&d service industry, while it occurred more frequent in basic research stage in other industry areas.

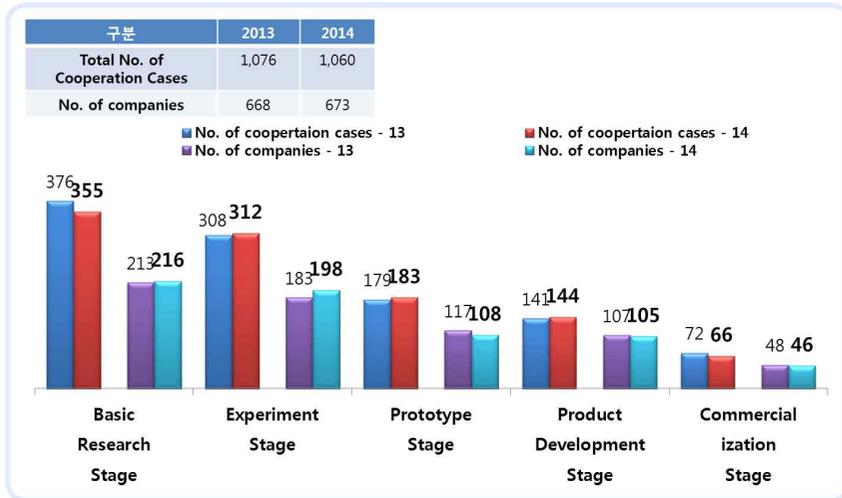
< Table 2-19 > No. of Cooperation Cases by Bioindustrial Category and Cooperation Stage (Unit : Cases)

Industrial Category	Companies in Total	Companies with Cooperative Relationships	Cooperation Stage					Total
			Basic Research Stage	Experiment Stage	Prototype Stage	Product Development Stage	Commercialization Stage	
<b>Total</b>	975	275	355	312	183	144	66	1,060 (100.0%)
Biopharmaceutical industry	322	91	109	129	98	54	11	401 (37.8%)
Biochemical industry	204	64	60	37	17	26	33	173 (16.3%)
Biofood industry	197	63	64	83	35	46	10	238 (22.5%)
Bioenvironmental industry	76	14	8	8	5	1	6	28 (2.6%)
Bioelectronics industry	24	7	59	3	6	4	2	74 (7.0%)
Bioprocess and equipment industry	73	15	11	11	9	10	4	45 (4.2%)
Bioenergy and bioresource industry	28	8	14	7	11	1	-	33 (3.1%)
Bioassay, bioinformatics and R&D service industry	51	13	30	34	2	2	-	68 (6.4%)

## 2) Number of Partners by Cooperation Stage

- The number of companies with cooperative relationships by stage including those that made multiple responses is 673. By stage, 193 companies (28.7%) are in the stage of basic research.
- When cooperation case and company number percentages are compared, the percentage of company count is lower than the rate of cooperation cases in basic research and experiment stages. This indicates that the average cooperation cases per company are larger in the initial stages of cooperation than the later stages.

< Figure 2-24 > No. of Partners by Cooperation Stage (Unit : Cases, Count)



\* Based on 275 companies with cooperative relationships. Multiple responses accepted.

< Table 2-20 > No. of Partners by Cooperation Stage (Unit : Cases, Count)

Classification		Total	Basic Research	Experimental	Prototype	Product Development	Commercialization
No. of cases	Domestic	948	327	279	153	133	56
	Overseas	112	28	33	30	11	10
Total		<b>1,060</b>	<b>355</b>	<b>312</b>	<b>183</b>	<b>144</b>	<b>66</b>
Percentage		100	33.5	29.4	17.3	13.6	6.2
No. of companies	Domestic	594	193	176	92	96	37
	Overseas	79	23	22	16	9	9
Total		<b>673</b>	<b>216</b>	<b>198</b>	<b>108</b>	<b>105</b>	<b>46</b>
Percentage		100	32.1	29.4	16	15.6	6.8

○ As for the number of partners by bioindustrial category and cooperation stage, there was a total of 531 partners in biopharmaceutical, biochemical and biofood industries(78.9% of all partners).

○ In biopharmaceutical and biofood industries, the percentage of experiment stage was found to be high.

< Table 2-21 > No. of Partners by Bioindustrial Category and Cooperation Stage (Unit : Count)

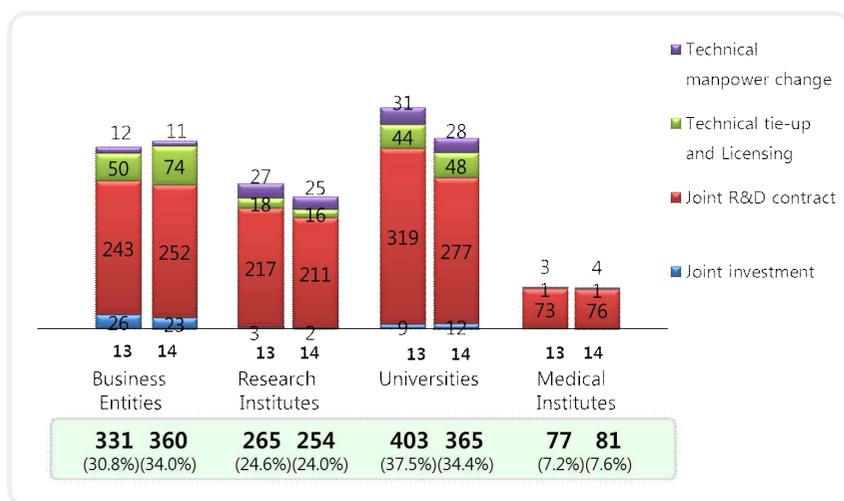
Industrial Category	2013		2014		Cooperation Stage				
	Companies in Total	%	Companies in Total	%	Basic Research	Experimental	Prototype	Product Development	Commercialization
<b>Total</b>	<b>668</b>	<b>(100.0%)</b>	<b>673</b>	<b>(100.0%)</b>	<b>216</b>	<b>198</b>	<b>108</b>	<b>105</b>	<b>46</b>
Biopharmaceutical industry	249	(37.3%)	249	(37.0%)	74	80	47	38	10
Biochemical industry	139	(20.8%)	132	(19.6%)	49	31	15	22	15
Biofood industry	148	(22.2%)	150	(22.3%)	38	50	24	29	9
Bioenvironmental industry	30	(4.5%)	26	(3.9%)	6	8	5	1	6
Bioelectronics industry	28	(4.2%)	25	(3.7%)	12	3	4	4	2
Bioprocess and equipment industry	26	(3.9%)	33	(4.9%)	7	7	7	8	4
Bioenergy and bioresource industry	20	(3.0%)	25	(3.7%)	13	7	4	1	-
Bioassay, bioinformatics and R&D service industry	28	(4.2%)	33	(4.9%)	17	12	2	2	-

## C. Cooperating Organizations

### 1) Number of Cooperation Cases by Cooperating Organization

- By cooperating organization, the number of cooperation cases with universities was the largest at 365, which is 34.4% of 1,060 cases in total. It was followed by cooperation cases with business entities (360), research institutes (254) and medical institutes (81).

< Figure 2-25 > No. of Cooperation Cases by Cooperating Organization (Unit : Cases)



\* Based on 275 companies with cooperative relationships.  
Multiple responses accepted.

< Table 2-22 > No. of Cooperation Cases by Cooperating Organization (Unit : Cases)

Classification	Cooperative Relationships in Total	Domestic					Overseas				
		Total	Joint Investment	Joint R&D	Technical Tie-up	Technical Manpower Exchange	Total	Joint Investment	Joint R&D	Technical Tie-up	Technical Manpower Exchange
<b>Total</b>	<b>1,060</b>	<b>948</b>	<b>26</b>	<b>754</b>	<b>106</b>	<b>62</b>	<b>112</b>	<b>11</b>	<b>62</b>	<b>33</b>	<b>6</b>
<b>Business Entities</b>	<b>360</b>	280	12	214	47	7	<b>80</b>	11	38	27	4
Small and Medium-scale Venture Companies	<b>287</b>	230	11	173	39	7	<b>57</b>	5	28	20	4
Middle-standing Companies	<b>33</b>	25	-	22	3	-	<b>8</b>	2	4	2	-
Large Enterprises	<b>40</b>	25	1	19	5	-	<b>15</b>	4	6	5	-
<b>Research Institutes</b>	<b>254</b>	238	2	196	15	25	<b>16</b>	-	15	1	-
Government-invested Research Institutes	<b>203</b>	194	1	164	12	17	<b>9</b>	-	9	-	-
Private Research Institutes	<b>51</b>	44	1	32	3	8	<b>7</b>	-	6	1	-
<b>Universities</b>	<b>365</b>	352	12	270	44	26	<b>13</b>	-	7	4	2
<b>Medical Institutes</b>	<b>81</b>	78	-	74	-	4	<b>3</b>	-	2	1	-

- By bioindustrial category, the number of cooperation cases in biopharmaceutical industry was the largest with business entities. However, the cases of cooperation with in biochemical and biofood industries were relatively larger with universities.

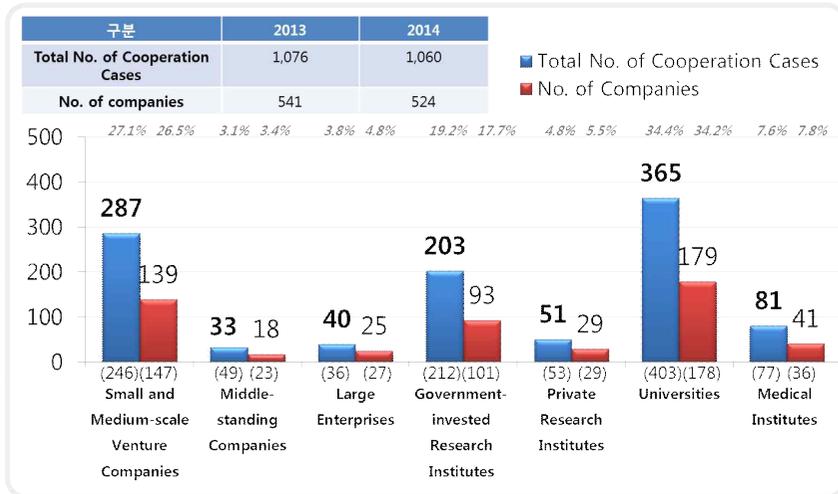
< Table 2-23 > No. of Cooperation Cases by Bioindustrial Category and Cooperating Organization (Unit : Cases)

Industrial Category	Companies in Total	Companies with Cooperative Relationships	Cooperating Organization				Total
			Business Entities	Research Institutes	Universities	Medical Institutes	
<b>Total</b>	<b>975</b>	<b>275</b>	<b>360</b>	<b>254</b>	<b>365</b>	<b>81</b>	<b>1,060 (100.0%)</b>
Biopharmaceutical industry	322	91	161	62	116	62	<b>401 (37.8%)</b>
Biochemical industry	204	64	43	74	56	-	<b>173 (16.3%)</b>
Biofood industry	197	63	84	30	117	7	<b>238 (22.5%)</b>
Bioenvironmental industry	76	14	11	5	12	-	<b>28 (2.6%)</b>
Bioelectronics industry	24	7	10	33	26	5	<b>74 (7.0%)</b>
Bioprocess and equipment industry	73	15	18	12	12	3	<b>45 (4.2%)</b>
Bioenergy and bioresource industry	28	8	19	3	8	3	<b>33 (3.1%)</b>
Bioassay, bioinformatics and R&D service industry	51	13	14	35	18	1	<b>68 (6.4%)</b>

## 2) Number of Partners by Cooperating Organization

- The number of bio-companies holding cooperative relationships with universities is 179. It was found that an average of 2 cooperation cases was completed per each of these companies.

< Figure 2-26 > No. of Partners by Cooperating Organization (Unit : Cases, Count)



\* Based on 275 companies with cooperative relationships.  
 Multiple responses accepted.  
 \* Numbers in brackets are based on 2013 results.

- By bioindustrial category, the number of partners in biopharmaceutical industry was the largest with business entities. However, the partners of cooperation in biochemical and biofood industries were relatively larger with universities.

< Table 2-24 > No. of Partners by Bioindustrial Category and Cooperating Organization (Unit : Cases)

Industrial Category	Companies in Total	Companies with Cooperative Relationships	Cooperating Organization				Total	
			Business Entities	Research Institutes	Universities	Medical Institutes		
<b>Total</b>	<b>975</b>	<b>275</b>	<b>182</b>	<b>122</b>	<b>179</b>	<b>41</b>	<b>524</b>	<b>(100.0%)</b>
Biopharmaceutical industry	322	91	83	35	56	25	199	(38.0%)
Biochemical industry	204	64	24	37	39	-	100	(19.1%)
Biofood industry	197	63	34	21	46	6	107	(20.4%)
Bioenvironmental industry	76	14	7	5	10	-	22	(4.2%)
Bioelectronics industry	24	7	5	5	5	5	20	(3.8%)
Bioprocess and equipment industry	73	15	8	7	9	2	26	(5.0%)
Bioenergy and bioresource industry	28	8	11	3	7	2	23	(4.4%)
Bioassay, bioinformatics and R&D service industry	51	13	10	9	7	1	27	(5.2%)



< Table 2-25 > Domestic and Overseas Cooperative Relationships and Cooperating Organizations (Unit : Cases, Count, %)

Classification		Total	Venture Companies	Middle-standing Companies	Large Enterprises	Government-invested Research Institutes	Private Research Institutes	Universities	Medical Institutes	
Joint investment	Total Investments	Domestic	26	11	-	1	1	12	-	
		Overseas	11	5	2	4	-	-	-	
		Subtotal	37	16	2	5	1	1	12	-
	No. of Companies	Domestic	16	7	-	1	1	1	6	-
		Overseas	8	5	1	2	-	-	-	-
		Subtotal	24	12	1	3	1	1	6	-
Joint R&D contract	Total Investments	Domestic	754	173	22	19	164	32	270	74
		Overseas	62	28	4	6	9	6	7	2
		Subtotal	816	201	26	25	173	38	277	76
	No. of Companies	Domestic	352	73	10	13	72	17	131	36
		Overseas	35	15	3	3	4	4	5	1
		Subtotal	387	88	13	16	76	21	136	37
Technical tie-up and Licensing	Total Investments	Domestic	106	39	3	5	12	3	44	-
		Overseas	33	20	2	5	-	1	4	1
		Subtotal	139	59	5	10	12	4	48	1
	No. of Companies	Domestic	57	22	2	4	10	3	16	-
		Overseas	18	9	2	2	-	1	3	1
		Subtotal	75	31	4	6	10	4	19	1
Technical manpower change	Total Investments	Domestic	62	7	-	-	17	8	26	4
		Overseas	6	4	-	-	-	-	2	-
		Subtotal	68	11	-	-	17	8	28	4
	No. of Companies	Domestic	33	5	-	-	6	3	16	3
		Overseas	5	3	-	-	-	-	2	-
		Subtotal	38	8	-	-	6	3	18	3
<b>Cooperation Cases in Total</b>		<b>1,060</b>	<b>287</b>	<b>33</b>	<b>40</b>	<b>203</b>	<b>51</b>	<b>365</b>	<b>81</b>	
<b>Percentage</b>		<b>100</b>	<b>27.1</b>	<b>3.1</b>	<b>3.8</b>	<b>19.2</b>	<b>4.8</b>	<b>34.4</b>	<b>7.6</b>	
<b>Companies in Total</b>		<b>524</b>	<b>139</b>	<b>18</b>	<b>25</b>	<b>93</b>	<b>29</b>	<b>179</b>	<b>41</b>	
<b>Percentage</b>		<b>100.0</b>	<b>26.5</b>	<b>3.4</b>	<b>4.8</b>	<b>17.7</b>	<b>5.5</b>	<b>34.2</b>	<b>7.8</b>	

### 3) Cooperating Organizations by Scale of Workers

- The number of cooperation cases between a small and medium-scale venture company with 1 - 299 workers and a same small and medium-scale venture company (with 1 - 299 workers) is large at 234.
- The numbers of cooperation cases between a bioindustrial company with 1 - less than 50 workers and a government-invested research institute and a university are also large at 126 and 222 respectively (123 and 216 in Korea respectively).

< Table 2-26 > Cooperating Organizations by Scale of Workers (Unit : Count)

Classification	Cooperative Relationships in Total	Business Entities				Research Institutes				Universities	Medical Institutes
		Total	Venture Companies	Middle-standing Companies	Large Enterprises	Total	Government-invested Research Institutes	Private Research Institutes			
Total	Total	<b>1,060</b>	<b>360</b>	<b>287</b>	<b>33</b>	<b>40</b>	<b>254</b>	<b>203</b>	<b>51</b>	<b>365</b>	<b>81</b>
	1 - less than 50 workers	490	152	118	11	23	125	102	23	193	20
	50 - 299	351	133	116	9	8	77	61	16	109	32
	300 - 999	110	20	17	2	1	36	30	6	33	21
	1,000 or more	109	55	36	11	8	16	10	6	30	8
Domestic	Total	<b>948</b>	<b>280</b>	<b>230</b>	<b>25</b>	<b>25</b>	<b>238</b>	<b>194</b>	<b>44</b>	<b>352</b>	<b>78</b>
	1 - less than 50 workers	443	114	89	10	15	121	100	21	189	19
	50 - 299	313	104	93	4	7	74	59	15	105	30
	300 - 999	97	15	15	-	-	29	25	4	32	21
	1,000 or more	95	47	33	11	3	14	10	4	26	8
Overseas	Total	<b>112</b>	<b>80</b>	<b>57</b>	<b>8</b>	<b>15</b>	<b>16</b>	<b>9</b>	<b>7</b>	<b>13</b>	<b>3</b>
	1 - less than 50 workers	47	38	29	1	8	4	2	2	4	1
	50 - 299	38	29	23	5	1	3	2	1	4	2
	300 - 999	13	5	2	2	1	7	5	2	1	-
	1,000 or more	14	8	3	-	5	2	-	2	4	-

## 5 Supply and Demand Status of Bioindustry

### A. Bioindustry's Supply and Demand Status of 2014

- Total size of supply in 2014 bioindustry reached 8.9 trillion won, and portion of production within total supply is 84.4% in portion, and its amount is 7.5 trillion won. Size of import is 1.4 trillion won (15.6% in portion). Total size of supply increased by 2.4% compared to last year, while portion of production and import remains the same.
- Total size of domestic demand is 5.95 trillion won, which occupies 62.2% of total supply and its portion slightly decreased compared to last year; however, total size of export is 3.39 trillion won and it occupies 37.8% of total supply.

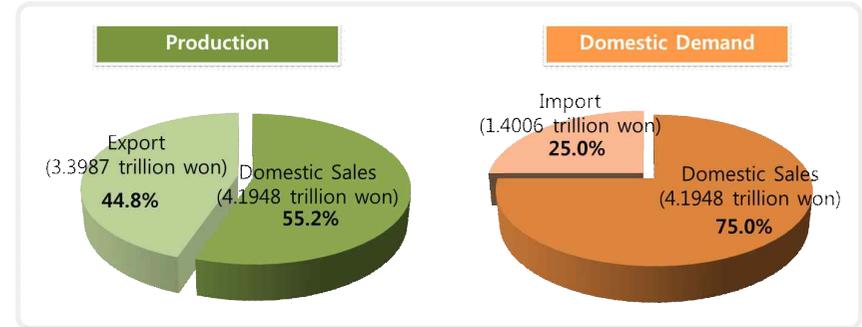
<Table 2-27> 2012~2014 Bioindustry's Trend of Supply and Demand

(Unit : one hundred million Won)

Year	Supply				Total	Demand			
	Production		Import			Domestic Demand		Export	
	Amount	Distribution Ratio	Amount	Distribution Ratio		Amount	Distribution Ratio	Amount	Distribution Ratio
2012	71,445	83.3	14,311	16.7	85,756	55,281	64.5	30,475	35.5
2013	75,108	84.4	13,872	15.6	88,980	57,337	64.4	31,642	35.6
2014	75,935	84.4	14,006	15.6	89,942	55,955	62.2	33,987	37.8
Annual Average Rate of Change	3.1		-1.1		2.4	0.6		5.6	

- The production size of domestic bioindustry in 2014 reached 7 trillion and 593.5 billion won. Among them, the domestic sales took 55.2% with 4 trillion and 194.8 billion won and the export took, 44.8% with 3 trillion and 398.7 billion won.
- The size of domestic demand due to domestic sales and import reached 5 trillion and 595.5 billion won. Among them, the domestic sales took 75.0% with 4 trillion and 194.8 billion won and the import took 25.0% with 1 trillion and 400.6 billion won.

<Figure 2-27> 2014 Bioindustry's Size of Production and Domestic Demand



- The production size of bioindustry reached 3 trillion and 493.0 billion won which is 40.2% of the total industry, and biopharmaceutical industry took 37.8% with 2 trillion and 868.9 billion won.
- The industry that has the largest proportion in the bioindustry's domestic demand market is biopharmaceutical industry reaching 2 trillion and 748.5 billion won which is 49.1% of the total market.

<Table 2-28> 2014 Bioindustry's Status of Production and Domestic Demand

(Unit : million Won, %)

Industrial Category	Production				Domestic Demand			
	Domestic Sales	Export	Total	Distribution Ratio	Domestic Sales	Import	Total	Distribution Ratio
<b>Total</b>	<b>4,194,817</b>	<b>3,398,692</b>	<b>7,593,509</b>	<b>100.0</b>	<b>4,194,817</b>	<b>1,400,645</b>	<b>5,595,462</b>	<b>100.0</b>
Biopharmaceutical industry	1,525,873	1,342,988	2,868,861	37.8	1,525,873	1,222,661	2,748,534	49.1
Biochemical industry	392,179	132,339	524,518	6.9	392,179	81,114	473,293	8.5
Biofood industry	1,379,073	1,670,317	3,049,390	40.2	1,379,073	31,140	1,410,213	25.2
Bioenvironmental industry	37,076	192	37,268	0.5	37,076	226	37,302	0.7
Bioelectronics industry	34,700	118,729	153,429	2.0	34,700	760	35,460	0.6
Bioprocess and equipment industry	51,619	55,600	107,220	1.4	51,619	54,737	106,356	1.9
Bioenergy and bioresource industry	605,945	37,230	643,175	8.5	605,945	8,525	614,470	11.0
Bioassay, bioinformatics and R&D service industry	168,351	41,297	209,648	2.8	168,351	1,482	169,833	3.0

○ Size of supply and domestic demand in Gyeonggi area occupies 44.7%, 33.2% each in total industry and is the highest compared to other areas.

< Table 2-31 > 2014 Bioindustry's Status of Production and Domestic Demand by Area (Unit : million Won, %)

Area	Production				Domestic Demand			
	Domestic Sales	Export	Total	Distribution Ratio	Domestic Sales	Import	Total	Distribution Ratio
<b>Total</b>	<b>4,194,817</b>	<b>3,398,692</b>	<b>7,593,509</b>	<b>100.0</b>	<b>4,194,817</b>	<b>1,400,645</b>	<b>5,595,462</b>	<b>100.0</b>
Seoul	179,867	43,762	223,629	2.9	179,867	678,250	858,117	15.3
Busan	1,040	-	1,040	0.0	1,040	-	1,040	0.0
Daegu	7,110	1,102	8,212	0.1	7,110	-	7,110	0.1
Incheon	34,631	543,420	578,051	7.6	34,631	156,583	191,214	3.4
Gwangju	4,179	724	4,903	0.1	4,179	-	4,179	0.1
Daejeon	166,544	179,803	346,347	4.6	166,544	60,604	227,148	4.1
Ulsan	552,661	4,604	557,265	7.3	552,661	-	552,661	9.9
Sejong	22,245	126	22,371	0.3	22,245	1,851	24,096	0.4
Gyeonggi	1,542,706	1,854,533	3,397,239	44.7	1,542,706	313,698	1,856,404	33.2
Gangwon	69,175	110,809	179,984	2.4	69,175	2,902	72,077	1.3
Chungbuk	998,162	294,602	1,292,764	17.0	998,162	153,347	1,151,509	20.6
Chungnam	80,156	14,200	94,356	1.2	80,156	27,816	107,972	1.9
Jeonbuk	328,021	314,758	642,779	8.5	328,021	2	328,023	5.9
Jeonnam	155,169	1,043	156,212	2.1	155,169	-	155,169	2.8
Gyeongbuk	33,126	5,508	38,634	0.5	33,126	-	33,126	0.6
Gyeongnam	17,900	27,615	45,515	0.6	17,900	5,592	23,492	0.4
Jeju	2,125	2,082	4,207	0.1	2,125	-	2,125	0.0

## B. Recent Trend of Supply and Demand Status

### 1) 2012~2014 Trend of Supply and Demand Status

○ Total size of bioindustry's supply continues to increase, while its increasing rate is stagnant; total size of domestic demand increased up to 2013 but decreased in 2014 by 2.4% compared to its previous year.

○ For the average variation rate per year since 2012, the supply and demand marked 2.4%, production 3.1%, and domestic demand 0.6%.

<Table 2-29> 2012~2014 Bioindustry's Trend of Production and Domestic Demand (Unit : one hundred million Won, %)

Classification		2012	2013	2014	Annual Average Rate of Change
Supply and Demand (Production+Import)	Investment Amount	85,756	88,980	89,942	2.4
	Distribution Ratio	7.8	3.8	1.1	
Production (Domestic Sales+Export)	Investment Amount	71,445	75,108	75,935	3.1
	Distribution Ratio	11.7	5.1	1.1	
Domestic Demand (Domestic Sales+Import)	Investment Amount	55,281	57,337	55,955	0.6
	Distribution Ratio	6.1	3.7	-2.4	

<Figure 2-28> 2012~2014 Bioindustry's Trend of Production and Domestic Demand (Unit : one hundred million Won)



- The production sector increased by 1.1% in 2014 compared to 2013, and Bioenvironmental industry reached the highest growth rate with 23.8%.
- Total supply of biopharmaceutical industry and biofood industry, which occupies the largest portion in the total industry, increased by 3.8% and 0.9% each, while that of bioprocess and equipment industry decreased by 11.8%.
- The domestic demand sector decreased by 2.4% in 2014 compared to 2013.
- Domestic demand of biopharmaceutical industry decreased by 3.5%, while that of biofood industry increased by 3.2%, which are 2 industries that occupy largest portion in total industry.

<Table 2-30> 2012~2014 Bioindustry's Trend of Supply and Demand by Category  
(Unit : one hundred million Won, %)

Industrial Category	Production					Domestic Demand				
	2012	2013	2014	Variation from the year before	Annual Average Rate of Change	2012	2013	2014	Variation from the year before	Annual Average Rate of Change
<b>Total</b>	<b>71,445</b>	<b>75,108</b>	<b>75,935</b>	<b>1.1</b>	<b>3.1</b>	<b>55,281</b>	<b>57,337</b>	<b>55,955</b>	<b>-2.4</b>	<b>0.6</b>
Biopharmaceutical industry	27,087	27,635	28,689	3.8	2.9	28,194	28,490	27,485	-3.5	-1.3
Biochemical industry	5,030	5,622	5,245	-6.7	2.1	4,749	5,147	4,733	-8.0	-0.2
Biofood industry	28,579	30,211	30,494	0.9	3.3	13,019	13,666	14,102	3.2	4.1
Bioenvironmental industry	275	301	373	23.8	16.4	277	303	373	23.0	16.0
Bioelectronics industry	1,238	1,517	1,534	1.1	11.3	242	373	355	-4.9	21.0
Bioprocess and equipment industry	1,219	1,216	1,072	-11.8	-6.2	1,308	1,294	1,064	-17.8	-9.8
Bioenergy and bioresource industry	6,122	6,659	6,432	-3.4	2.5	5,959	6,504	6,145	-5.5	1.5
Bioassay, bioinformatics and R&D service industry	1,895	1,947	2,096	7.7	5.2	1,533	1,560	1,698	8.8	5.3

2) 2010~2014 Trend of Supply and Demand

- Bioindustry's trend of supply and demand from 2010 to 2014 can be summarized as follows: Bioindustry's supply continues to increase upto 2014, however its growth range is in decreasing trend from 2012, while demand increased upto 2013 but slightly decreased in 2014 by 2.4%.
- Due to such tendency, growth range of total supply and demand is in decreasing trend as of 2012, so average growth rate of total supply and demand since 2010 was 5.7%, and that of supply alone was 7.0%, while that of demand was 4.2%.

<Table 2-31> 2010~2014 Bioindustry's Trend of Supply and Demand  
(Unit : one hundred million Won, %)

Classification		2010	2011	2012	2013	2014	Annual Average Rate of Change
Supply and Demand (Production+Import)	Investment Amount	79,574	85,756	88,980	89,942	5.7	7.8
	Distribution Ratio	10.6	7.8	3.8	1.1	5.3	
Production (Domestic Sales+Export)	Investment Amount	63,963	71,445	75,108	75,935	7.0	8.9
	Distribution Ratio	10.5	11.7	5.1	1.1	5.3	
Domestic Demand (Domestic Sales+Import)	Investment Amount	52,081	55,281	57,337	55,955	4.2	8.5
	Distribution Ratio	9.6	6.1	3.7	-2.4	6.1	

<Figure 2-29> 2010~2014 Bioindustry's Trend of Supply and Demand  
(Unit : one hundred million Won)



<Table 2-32> 2010~2014 Bioindustry's Trend of Supply and Demand by Category  
(Unit : one hundred million Won, %)

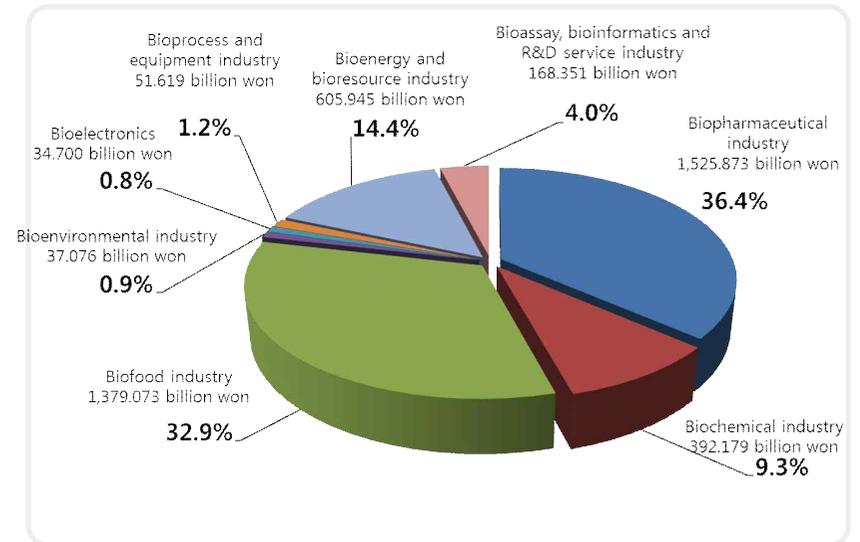
Industrial Category	Production							Domestic Demands						
	2010	2011	2012	2013	2014	Variation from the year before	Annual Average Rate of Change	2010	2011	2012	2013	2014	Variation from the year before	Annual Average Rate of Change
<b>Total</b>	<b>57,878</b>	<b>63,963</b>	<b>71,445</b>	<b>75,108</b>	<b>75,935</b>	<b>1.1</b>	<b>7.0</b>	<b>47,519</b>	<b>52,081</b>	<b>55,281</b>	<b>57,337</b>	<b>55,955</b>	<b>-2.4</b>	<b>4.2</b>
Biopharmaceutical industry	23,732	24,607	27,087	27,635	28,689	3.8	4.9	26,210	27,367	28,194	28,490	27,485	-3.5	1.2
Biochemical industry	2,904	4,305	5,030	5,622	5,245	-6.7	15.9	3,245	4,354	4,749	5,147	4,733	-8.0	9.9
Biofood industry	23,461	25,978	28,579	30,211	30,494	0.9	6.8	9,992	10,989	13,019	13,666	14,102	3.2	9.0
Bioenvironmental industry	1,060	1,092	275	301	373	23.8	-23.0	1,037	1,066	277	303	373	23.0	-22.6
Bioelectronics industry	1,212	1,164	1,238	1,517	1,534	1.1	6.1	489	239	242	373	355	-4.9	-7.7
Bioprocess and equipment industry	963	811	1,219	1,216	1,072	-11.8	2.7	2,405	2,496	1,308	1,294	1,064	-17.8	-18.5
Bioenergy and bioresource industry	2,913	4,387	6,122	6,659	6,432	-3.4	21.9	2,769	4,237	5,959	6,504	6,145	-5.5	22.1
Bioassay, bioinformatics and R&D service industry	1,633	1,620	1,895	1,947	2,096	7.7	6.4	1,373	1,333	1,533	1,560	1,698	8.8	5.5

## 6 Domestic Sales of Bioindustry

### A. Domestic Sales Status of 2014

- The size of bioindustry's domestic sales in 2014 reached 4 trillion and 194.8 billion won and biopharmaceutical industry took the largest proportion among them with 1 trillion and 525.9 billion won(36.4%).
- The following largest industries were biofood industry with 1 trillion and 379.1 billion won(32.9%) and bioenergy and bioresource industry with 605.9 billion won(14.4%).
- Biopharmaceutical industry, biofood industry, bioenergy and bioresource industry took 83.7%(82.9% in 2013) of the total market for the bioindustry's domestic sales in 2014.

<Figure 2-30> 2014 Bioindustry's Size of Domestic Sales by Category



- [Table 2-36] shows the domestic bioproducts or bioservices that have more than 1.0% domestic sales among 51 domestic bioproducts and bioservices, according to the size. Feed additive's size of domestic sales took 16.5% of the total bioindustry with 694.2 billion won.
- The following largest bioproducts or bioservices were Other biopharmaceuticals(12.3%), Biofuel(9.8%), Functional health foods(8.8%), Hemotherapeutics(8.6%). Among the TOP5 products, 2 items belonged to biopharmaceutical and biofood industry.

<Table 2-36> 2014 Main Bioproduct's Size of Domestic Sales (Unit : million Won, %)

Ranking	Code	Product Name	Domestic Sales	Distribution Ratio
1	3050	Feed additives	694,175	16.5
2	1000	Other biopharmaceuticals	514,264	12.3
3	7010	Biofuel	412,253	9.8
4	3010	Functional health foods	370,807	8.8
5	1060	Hemotherapeutics	359,993	8.6
6	1030	Vaccines	295,113	7.0
7	2040	Biocosmetics and home & personal care chemicals	270,326	6.4
8	3030	Food additives	164,139	3.9
9	7020	Artificial seeds and seedlings	120,890	2.9
10	1040	Hormones	98,588	2.4
11	1100	Animal medications	95,812	2.3
12	8050	Biosafety and efficacy evaluation services	85,752	2.0
13	3040	Fermented foods	83,080	2.0
14	1080	New therapeutics	52,916	1.3
15	7000	Other bioenergy and bioresources	46,748	1.1
16	2030	Enzymes and reagents for research	43,052	1.0

## B. Recent Trend of Domestic Sales Status

### 1) 2012~2014 Trend of Domestic Sales Status

- The size of bioindustry's domestic sales in 2014 decreased by 151.7 billion won(3.5%) with 4 trillion and 346.5 billion won compared to 4 trillion and 194.8 billion won in 2013.

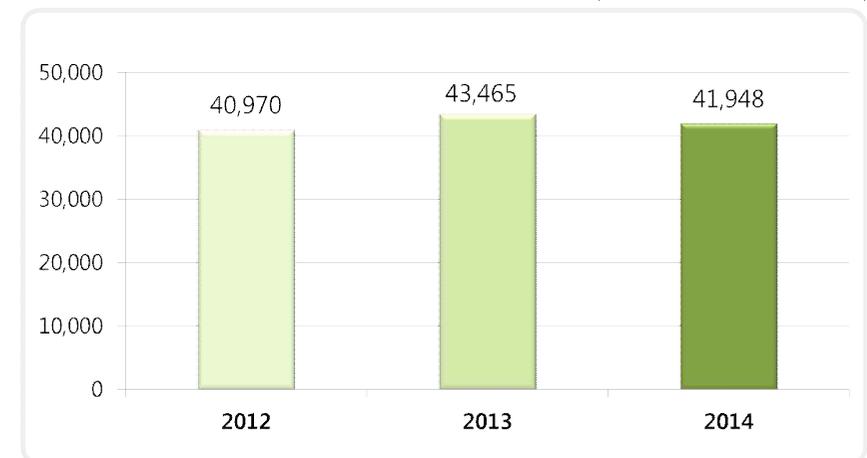
<Table 2-34> 2012~2014 Bioindustry's Trend of Domestic Sales

(Unit : one hundred million Won, %)

Classification		2012	2013	2014	Annual Average Rate of Change
Domestic Sales	Amount of money	40,970	43,465	41,948	1.2
	Rate of Change	12.3	6.1	-3.5	

<Figure 2-31> 2012~2014 Bioindustry's Trend of Domestic Sales

(Unit : one hundred million Won)



- The growth size of biofood industry increased by 3.0% with 40.1 billion won compared to 2013, and its proportion within the industry increased from 30.8% to 32.9%.
- Domestic sales volume of bioenvironmental industry increased as compared to 2013 by 23.2%, while that of bioassay, bioinformatics and R&D service industry increased by 9.5%, and their portion in total market also increased.
- However, domestic sales volume of bioprocess and equipment industry decreased (by 20.8 billion won), while that of biopharmaceutical industry also decreased by 101.3 billion won.

<Table 2-38> 2012~2014 Bioindustry's Trend of Domestic Sales by Category  
(Unit : million Won, %)

Industrial Category	2012		2013		2014		Variation from the year before		Annual Average Rate of Change
	Domestic Sales	Distribution Ratio	Domestic Sales	Distribution Ratio	Domestic Sales	Distribution Ratio	Domestic Sales	Rate of Change	
<b>Total</b>	<b>4,097,024</b>	<b>100</b>	<b>4,346,527</b>	<b>100</b>	<b>4,194,817</b>	<b>100.0</b>	<b>-151,710</b>	<b>-3.5</b>	<b>1.2</b>
Biopharmaceutical industry	1,577,524	38.5	1,627,163	37.4	1,525,873	36.4	-101,290	-6.2	-1.7
Biochemical industry	406,185	9.9	451,091	10.4	392,179	9.3	-58,912	-13.1	-1.7
Biofood industry	1,250,255	30.5	1,338,933	30.8	1,379,073	32.9	40,140	3.0	5.0
Bioenvironmental industry	27,446	0.7	30,093	0.7	37,076	0.9	6,983	23.2	16.2
Bioelectronics industry	23,987	0.6	35,814	0.8	34,700	0.8	-1,114	-3.1	20.3
Bioprocess and equipment industry	76,691	1.9	72,391	1.7	51,619	1.2	-20,772	-28.7	-18.0
Bioenergy and bioresource industry	582,984	14.2	637,245	14.7	605,945	14.4	-31,300	-4.9	2.0
Bioassay, bioinformatics and R&D service industry	151,952	3.7	153,797	3.5	168,351	4.0	14,554	9.5	5.3

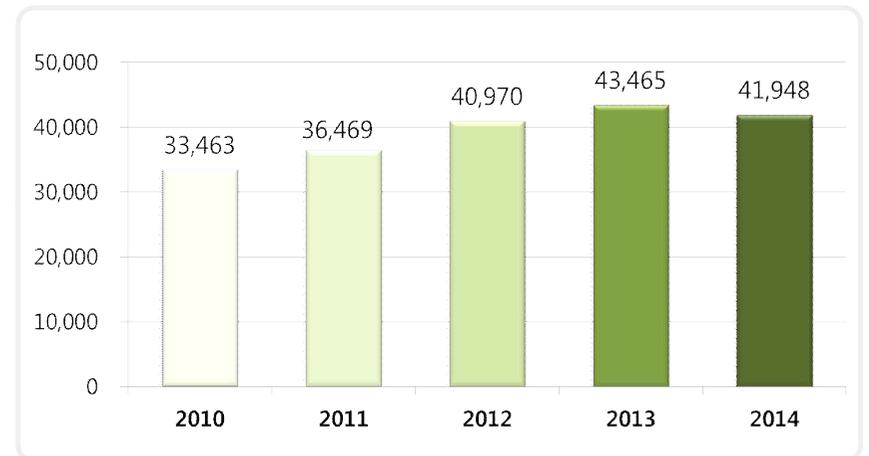
## 2) 2010~2014 Trend of Domestic Sales

- Since 2010, the average variation rate per year for the past 5 years showed 5.8%.
- Total size of domestic sales continued to increase up to 2013 but slightly decreased in 2014 by 3.5% compared to its previous year, but total size remains above 4 trillion won.

<Table 2-36> 2010~2014 Bioindustry's Trend of Domestic Sales Status  
(Unit : one hundred million Won, %)

Classification	2010	2011	2012	2013	2014	Annual Average Rate of Change	
Domestic Sales	Amount of money	33,463	36,469	40,970	43,465	41,948	5.8
	Rate of Change	15.1	9.0	12.3	6.1	-3.5	

<Figure 2-32> 2010~2014 Bioindustry's Trend of Domestic Sales Status  
(Unit : one hundred million Won)



<Table 2-40> 2010~2014 Bioindustry's Trend of Domestic Sales by Category

(Unit : million Won, %)

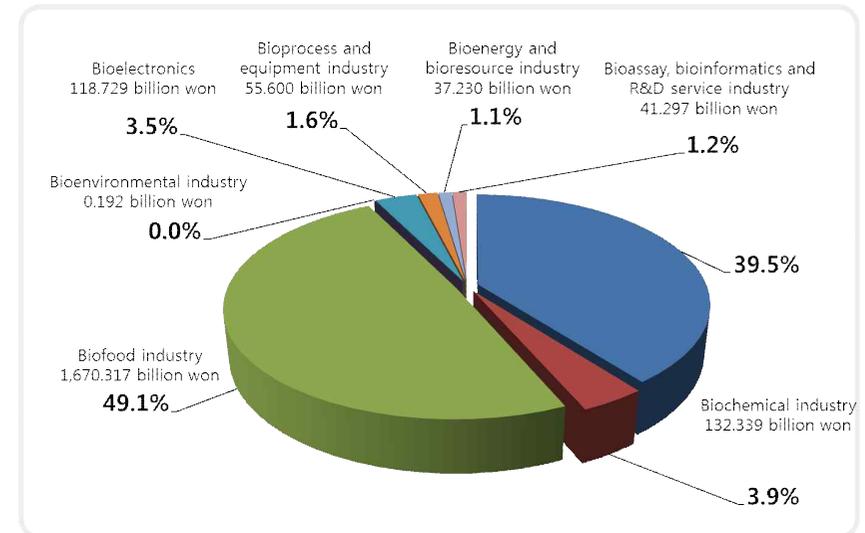
Industrial Category	2010		2011		2012		2013		2014		Variation from the year before		Annual Average Rate of Change
	Domestic Sales	Distribution Ratio	Domestic Sales	Distribution Ratio	Domestic Sales	Distribution Ratio	Domestic Sales	Distribution Ratio	Domestic Sales	Distribution Ratio	Domestic Sales	Rate of Change	
<b>Total</b>	<b>3,346,287</b>	<b>100</b>	<b>3,646,896</b>	<b>100</b>	<b>4,097,024</b>	<b>100</b>	<b>4,346,527</b>	<b>100</b>	<b>4,194,817</b>	<b>100</b>	<b>-151,710</b>	<b>-3.5</b>	<b>5.8</b>
Biopharmaceutical industry	1,521,210	45.5	1,506,329	41.3	1,577,524	38.5	1,627,163	37.4	1,525,873	36.4	-101,290	-6.2	0.1
Biochemical industry	230,073	6.9	355,684	9.8	406,185	9.9	451,091	10.4	392,179	9.3	-58,912	-13.1	14.3
Biofood industry	989,797	29.6	1,065,834	29.2	1,250,255	30.5	1,338,933	30.8	1,379,073	32.9	40,140	3.0	8.6
Bioenvironmental industry	103,052	3.1	106,381	2.9	27,446	0.7	30,093	0.7	37,076	0.9	6,983	23.2	-22.6
Bioelectronics industry	48,039	1.4	23,738	0.7	23,987	0.6	35,814	0.8	34,700	0.8	-1,114	-3.1	-7.8
Bioprocess and equipment industry	48,803	1.5	43,895	1.2	76,691	1.9	72,391	1.7	51,619	1.2	-20,772	-28.7	1.4
Bioenergy and bioresource industry	269,342	8.0	413,275	11.3	582,984	14.2	637,245	14.7	605,945	14.4	-31,300	-4.9	22.5
Bioassay, bioinformatics and R&D service industry	135,971	4.1	131,760	3.6	151,952	3.7	153,797	3.5	168,351	4.0	14,554	9.5	5.5

## 7 Export Status of Bioindustry

### A. Export Status of 2014

- The size of bioindustry's export in 2014 reached 3 trillion and 398.7 billion won.
- Biofood industry took the largest proportion with 1 trillion and 670.3 billion won(49.1%) and the following largest industry was biopharmaceutical industry with 1 trillion and 343.0 billion won(39.5%) according to the bioindustry's size of export by category.

<Figure 2-33> 2014 Bioindustry's Size of Export by Category





- [Table 2-41] shows domestic bioproducts or bioservices that have more than 1.0% export amount among 51 domestic bioproducts and bioservices, according to the size. 17 products showed more than 1.0% of exports.
- Feed additives ranked the highest amount of export with 1 trillion and 202.3 billion won(35.4%) and the following largest Immunotherapeutics(12.4%), Food additives(11.0%), Vaccines(5.8%) and other biopharmaceuticals(4.8%). Among the TOP5 products, 3 items belonged to biopharmaceutical and 2 items belonged to biofood industry.

<Table 2-41> 2014 Main Bioproduct's Export (Unit : million Won, %)

Ranking	Code	Product Name	Amount of Export	Distribution Ratio
1	3050	Feed additives	1,202,266	35.4
2	1050	Immunotherapeutics	420,368	12.4
3	3030	Food additives	372,355	11.0
4	1030	Vaccines	196,140	5.8
5	1000	Other biopharmaceuticals	163,931	4.8
6	1090	Diagnostic kits	155,107	4.6
7	5040	Biosensors	116,754	3.4
8	1020	Anticancer medications	110,444	3.2
9	1060	Hemotherapeutics	92,127	2.7
10	1040	Hormones	83,650	2.5
11	1010	Antibiotics	69,873	2.1
12	1100	Animal medications	45,742	1.3
13	3020	Amino acids	44,250	1.3
14	3010	Functional health foods	42,382	1.2
15	2040	Biocosmetics and home & personal care chemicals	42,108	1.2
16	2030	Enzymes and reagents for research	40,586	1.2
17	7020	Artificial seeds and seedlings	37,230	1.1

## B. Recent Trend of Export Status

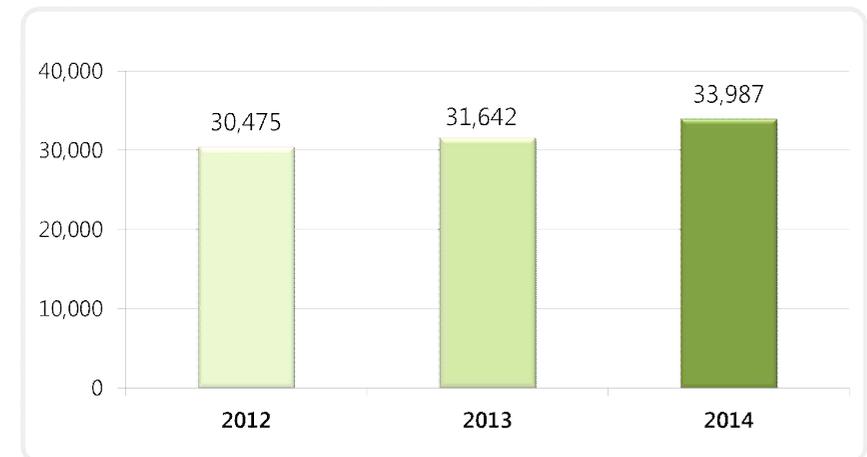
### 1) 2012~2014 Trend of Export

- The amount of bioindustry's export in 2014 increased by 234.4 billion won(7.4%) with 3 trillion and 398.7 billion won compared to 3 trillion and 164.2 billion won in 2013.

<Table 2-39> 2012~2014 Bioindustry's Trend of Export (Unit : one hundred million Won, %)

Classification		2012	2013	2014	Annual Average Rate of Change
Export	Amount	30,475	31,642	33,987	5.6
	Rate of Change	10.8	3.8	7.4	

<Figure 2-34> 2012~2014 Bioindustry's Trend of Export (Unit : one hundred million Won)



○ Bioenergy and bioresource industry export recorded the highest increase to KRW 37.2 billion by KRW 8.5 billion (29.8%) from 2013.

<Table 2-43> 2012~2014 Bioindustry's Trend of Export by Category

(Unit : million Won, %)

Industrial Category	2012		2013		2014		Variation from the year before		Annual Average Rate of Change
	Amount of Export	Distribution Ratio	Amount of Export	Distribution Ratio	Amount of Export	Distribution Ratio	Amount of Export	Rate of Change	
<b>Total</b>	<b>3,047,520</b>	<b>100.0</b>	<b>3,164,248</b>	<b>100.0</b>	<b>3,398,692</b>	<b>100</b>	<b>234,444</b>	<b>7.4</b>	<b>5.6</b>
Biopharmaceutical industry	1,131,198	37.1	1,136,385	35.9	1,342,988	39.5	206,603	18.2	9.0
Biochemical industry	96,766	3.2	111,110	3.5	132,339	3.9	21,229	19.1	16.9
Biofood industry	1,607,654	52.8	1,682,131	53.2	1,670,317	49.1	-11,814	-0.7	1.9
Bioenvironmental industry	18	0.0	12	0.0	192	0.0	180	1498.7	226.5
Bioelectronics industry	99,841	3.3	115,882	3.7	118,729	3.5	2,847	2.5	9.0
Bioprocess and equipment industry	45,256	1.5	49,177	1.6	55,600	1.6	6,423	13.1	10.8
Bioenergy and bioresource industry	29,254	1.0	28,690	0.9	37,230	1.1	8,540	29.8	12.8
Bioassay, bioinformatics and R&D service industry	37,534	1.2	40,861	1.3	41,297	1.2	436	1.1	4.9

## 2) 2010~2014 Trend of Export

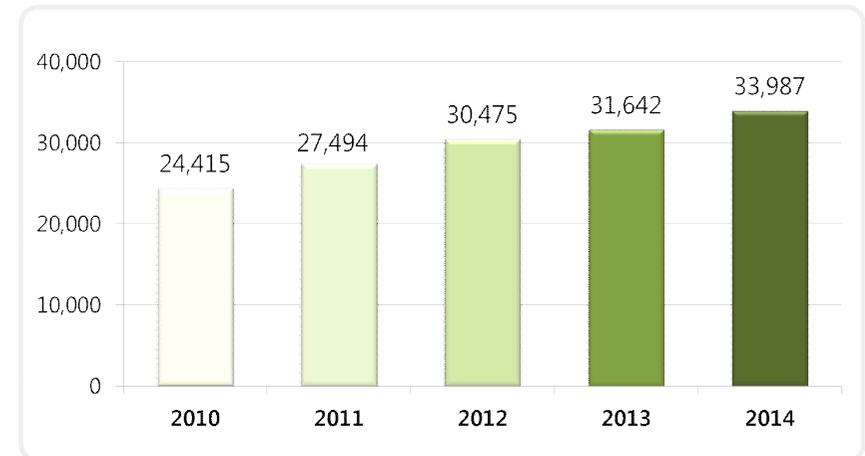
- Total size of export slightly decreased in 2010 by 0.2%, but continued to increase since 2011, and it increased by 7.4% in 2014.
- Since 2010, bioindustry's export showed continuous growth with 8.6% increase of average variation rate per year.

<Table 2-41> 2010~2014 Bioindustry's Trend of Export

(Unit : one hundred million Won, %)

Classification		2010	2011	2012	2013	2014	Annual Average Rate of Change
Export	Amount	24,415	27,494	30,475	31,642	33,987	8.6
	Rate of Change	-0.2	12.6	10.8	3.8	7.4	

<Figure 2-35> 2010~2014 Bioindustry's Trend of Export (Unit : one hundred million Won)



<Table 2-45> 2010~2014 Bioindustry's Trend of Export by Category

(Unit : million Won, %)

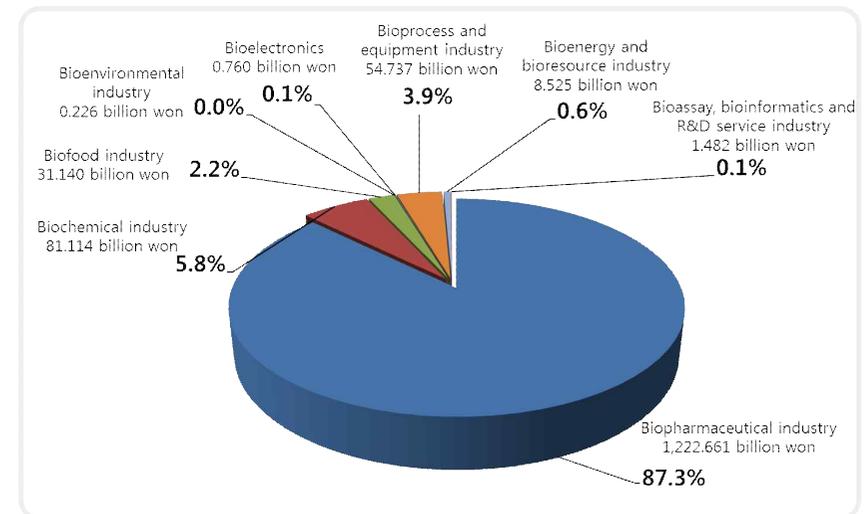
Industrial Category	2010		2011		2012		2013		2014		Variation from the year before		Annual Average Rate of Change
	Amount of Export	Distribution Ratio	Amount of Export	Distribution Ratio	Amount of Export	Distribution Ratio	Amount of Export	Distribution Ratio	Amount of Export	Distribution Ratio	Domestic Sales	Rate of Change	
<b>Total</b>	<b>2,441,539</b>	<b>100.0</b>	<b>2,749,356</b>	<b>100.0</b>	<b>3,047,520</b>	<b>100.0</b>	<b>3,164,248</b>	<b>100.0</b>	<b>3,398,692</b>	<b>100.0</b>	<b>234,444</b>	<b>7.4</b>	<b>8.6</b>
Biopharmaceutical industry	852,028	34.9	954,412	34.7	1,131,198	37.1	1,136,385	35.9	1,342,988	39.5	206,603	18.2	12.0
Biochemical industry	60,352	2.5	74,783	2.7	96,766	3.2	111,110	3.5	132,339	3.9	21,229	19.1	21.7
Biofood industry	1,356,334	55.6	1,531,965	55.7	1,607,654	52.8	1,682,131	53.2	1,670,317	49.1	-11,814	-0.7	5.3
Bioenvironmental industry	2,902	0.1	2,782	0.1	18	0.0	12	0.0	192	0.0	180	1498.7	-49.3
Bioelectronics industry	73,181	3.0	92,623	3.4	99,841	3.3	115,882	3.7	118,729	3.5	2,847	2.5	12.9
Bioprocess and equipment industry	47,483	1.9	37,199	1.4	45,256	1.5	49,177	1.6	55,600	1.6	6,423	13.1	4.0
Bioenergy and bioresource industry	21,950	0.9	25,393	0.9	29,254	1.0	28,690	0.9	37,230	1.1	8,540	29.8	14.1
Bioassay, bioinformatics and R&D service industry	27,309	1.1	30,198	1.1	37,534	1.2	40,861	1.3	41,297	1.2	436	1.1	10.9

## 8 Import Status of Bioindustry

### A. Import Status of 2014

- The size of bioindustry's import in 2014 reached 1 trillion and 400.6 billion won.
- Biopharmaceutical industry showed the highest proportion among the total import amount with 1 trillion and 222.7 billion won(87.3%) according to the bioindustry's size of import by category.

<Figure 2-36> 2014 Bioindustry's Size of Import by Category



- Among 51 domestic bioproducts and bioservices, there is 14 products that have more than 1.0% import amount.
- Among bioproducts, vaccines ranked the highest import amount among the total imports with 361.5 billion won(25.8%) and then the following highest products were anticancer medications with 225.2 billion won(16.1%), hemotherapeutics with 221.0 billion won(15.1%), hormones with 144.8 billion won(10.3%) and other biopharmaceuticals with 128.3 billion won(9.2%).
- 10 products among 14 belonged to biopharmaceutical industry according to the size of imports, and it took 87.3% among the total import amount.

<Table 2-43> 2014 Main Bioproduct's Import (Unit : million Won, %)

Ranking	Code	Product Name	Amount of Import	Distribution Ratio
1	1030	Vaccines	361,477	25.8
2	1020	Anticancer medications	225,172	16.1
3	1060	Hemotherapeutics	211,005	15.1
4	1040	Hormones	144,836	10.3
5	1000	Other biopharmaceuticals	128,302	9.2
6	6030	Bioprocess and analysis equipments	51,566	3.7
7	1050	Immunotherapeutics	50,242	3.6
8	2030	Enzymes and reagents for research	42,395	3.0
9	1080	New therapeutics	31,485	2.2
10	1090	Diagnostic kits	30,418	2.2
11	1100	Animal medications	23,692	1.7
12	2000	Other biochemicals	18,191	1.3
13	1010	Antibiotics	16,030	1.1
14	2020	Industrial enzymes and reagents	15,810	1.1

## B. Recent Trend of Import Status

### 1) 2012~2014 Bioindustry's Trend of Import

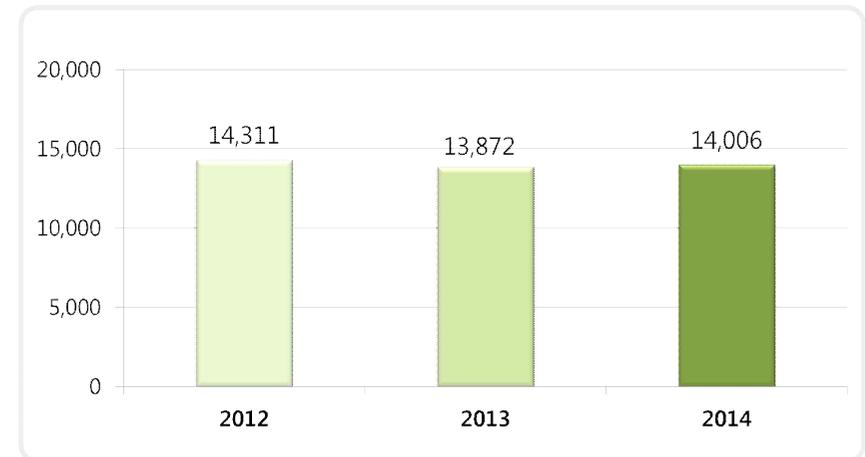
- The amount of bioindustry's import in 2014 increased by 13.4 billion won(1.0%) with 1 trillion and 400.6 billion won compared to 1 trillion and 387.2 billion won in 2013.
- The average variation rate per year for 2012~2014 is -1.1%.

<Table 2-44> 2012~2014 Bioindustry's Trend of Import

(Unit : one hundred million Won, %)

Classification		2012	2013	2014	Annual Average Rate of Change
Import	Amount	14,311	13,872	14,006	-1.1
	Rate of Change	-8.3	-3.1	1.0	

<Figure 2-37> 2012~2014 Bioindustry's Trend of Import (Unit : one hundred million Won)



<Table 2-48> 2012~2014 Bioindustry's Trend of Import by Category

(Unit : million Won, %)

Industrial Category	2012		2013		2014		Variation from the year before		Annual Average Rate of Change
	Amount of Import	Distribution Ratio	Amount of Import	Distribution Ratio	Amount of Import	Distribution Ratio	Amount of Import	Rate of Change	
<b>Total</b>	<b>1,431,097</b>	<b>100.0</b>	<b>1,387,198</b>	<b>100.0</b>	<b>1,400,645</b>	<b>100.0</b>	<b>13,447</b>	<b>1.0</b>	<b>-1.1</b>
Biopharmaceutical industry	1,241,893	86.8	1,221,854	88.1	1,222,661	87.3	807	0.1	-0.8
Biochemical industry	68,726	4.8	63,609	4.6	81,114	5.8	17,505	27.5	8.6
Biofood industry	51,680	3.6	27,639	2.0	31,140	2.2	3,501	12.7	-22.4
Bioenvironmental industry	230	0.0	226	0.0	226	0.0	0	-0.1	-0.9
Bioelectronics industry	248	0.0	1471	0.1	760	0.1	-711	-48.3	75.1
Bioprocess and equipment industry	54,113	3.8	57,026	4.1	54,737	3.9	-2,289	-4.0	0.6
Bioenergy and bioresource industry	12,897	0.9	13,142	0.9	8,525	0.6	-4,617	-35.1	-18.7
Bioassay, bioinformatics and R&D service industry	1,310	0.1	2,231	0.2	1,482	0.1	-749	-33.6	6.4

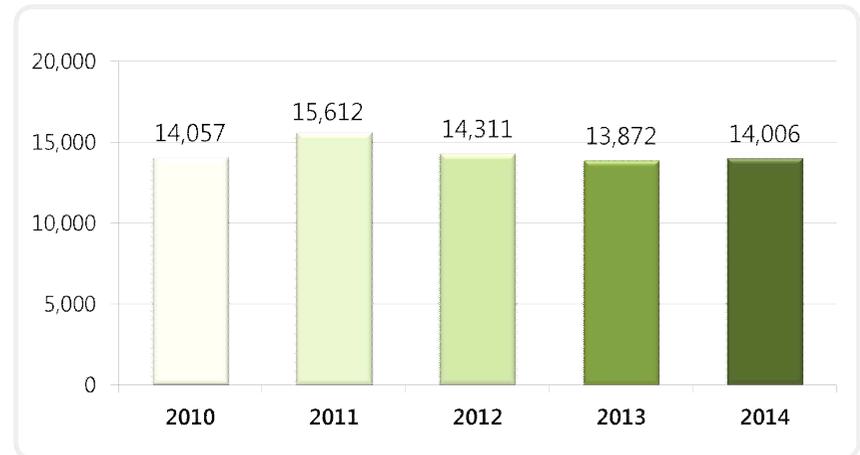
2) 2010~2014 Bioindustry's Trend of Import

○ Domestic bioindustry's import decreased in 2013, but increased again in 2014. Its average increase rate of import per year marked -0.1% since 2010.

<Table 2-46> 2010~2014 Bioindustry's Trend of Import (Unit : one hundred million Won, %)

Classification	2010	2011	2012	2013	2014	Annual Average Rate of Change	
Import	Amount	14,057	15,612	14,311	13,872	14,006	-0.1
	Rate of Change	5.8	11.1	-8.3	-3.1	1.0	

<Figure 2-38> 2010~2014 Bioindustry's Trend of Import (Unit : one hundred million Won)



&lt;Table 2-50&gt; 2010~2014 Bioindustry's Trend of Import by Category

(Unit : one hundred million Won, %)

Industrial Category	2010		2011		2012		2013		2014		Variation from the year before		Annual Average Rate of Change
	Amount of Import	Distribution Ratio	Amount of Import	Distribution Ratio	Amount of Import	Distribution Ratio	Amount of Import	Distribution Ratio	Amount of Import	Distribution Ratio	Domestic Sales	Rate of Change	
<b>Total</b>	<b>1,405,659</b>	<b>100.0</b>	<b>1,561,182</b>	<b>100.0</b>	<b>1,431,097</b>	<b>100.0</b>	<b>1,387,198</b>	<b>100.0</b>	<b>1,400,645</b>	<b>100.0</b>	<b>13,447</b>	<b>1.0</b>	<b>-0.1</b>
Biopharmaceutical industry	1,099,776	78.2	1,230,328	78.8	1,241,893	86.8	1,221,854	88.1	1,222,661	87.3	807	0.1	2.7
Biochemical industry	94,432	6.7	79,718	5.1	68,726	4.8	63,609	4.6	81,114	5.8	17,505	27.5	-3.7
Biofood industry	9,383	0.7	33,073	2.1	51,680	3.6	27,639	2.0	31,140	2.2	3,501	12.7	35.0
Bioenvironmental industry	676	0.0	239	0.0	230	0.0	226	0.0	226	0.0	0	-0.1	-24.0
Bioelectronics industry	822	0.1	150	0.0	248	0.0	1471	0.1	760	0.1	-711	-48.3	-1.9
Bioprocess and equipment industry	191,672	13.6	205,724	13.2	54,113	3.8	57,026	4.1	54,737	3.9	-2,289	-4.0	-26.9
Bioenergy and bioresource industry	7,550	0.5	10,436	0.7	12,897	0.9	13,142	0.9	8,525	0.6	-4,617	-35.1	3.1
Bioassay, bioinformatics and R&D service industry	1346	0.1	1,514	0.1	1,310	0.1	2,231	0.2	1,482	0.1	-749	-33.6	2.4

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	Total	Seoul	Busan	Daegu	Incheon	Gwangju	Daejeon	Ulsan	Sejong	Gyeonggi	Gangwon	Chungbuk	Chungnam	Jeonbuk	Jeonnam	Gyeongbuk	Gyeongnam	Jeju
Number of companies	975	171	14	24	22	10	80	9	6	323	55	71	58	26	29	35	29	13
<b>■ Sales Situation</b>																		
No sales	285	45	5	9	9	3	18	2	2	113	13	15	18	6	9	8	6	4
Sales below break-even - 1 year	18	5	-	1	-	2	-	-	5	1	3	1	-	-	-	-	-	-
Sales below break-even - 2~3 years	67	10	1	4	2	2	9	1	1	16	5	4	-	2	4	4	2	-
Sales below break-even - 4~5 years	94	17	-	3	1	1	12	-	1	22	8	2	9	6	2	4	5	1
Sales below break-even - 6~9 years	82	15	2	3	1	1	8	1	-	23	9	5	-	2	3	4	4	1
Sales below break-even - 10 or more years	70	5	2	-	-	1	7	-	2	28	4	6	6	2	3	2	1	1
Sales below break-even - Unknown	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Sales above break-even - 2~3 years	17	1	-	1	2	1	-	-	7	1	1	-	-	1	-	2	-	-
Sales above break-even - 4~5 years	35	7	-	1	1	-	3	-	7	2	2	4	-	1	4	1	2	-
Sales above break-even - 6~9 years	60	5	1	1	2	-	6	2	-	12	2	10	3	2	4	4	4	2
Sales above break-even - 10 or more years	193	41	3	1	2	1	11	3	-	76	6	21	13	5	1	3	4	2
Sales - Unknown	53	20	-	1	1	-	4	-	-	14	4	2	3	1	1	2	-	-
<b>■ Main type of industry</b>																		
Biopharmaceutical industry	322	75	3	7	9	1	20	1	1	140	10	27	17	5	1	2	2	1
Biochemical industry	204	23	2	4	4	2	32	3	3	48	12	14	14	5	11	15	8	4
Biofood industry	197	17	7	4	4	2	6	-	2	49	18	19	20	8	10	10	14	7
Bioenvironmental industry	76	6	1	5	3	2	3	2	-	26	8	5	1	4	3	3	4	-
Bioelectronics industry	24	6	-	1	1	1	2	-	-	6	5	-	1	-	-	1	-	-
Bioprocess and equipment industry	73	19	-	2	1	1	7	-	-	32	2	1	4	-	2	2	-	-
Bioenergy and bioresource industry	28	1	1	-	-	-	4	3	-	8	-	3	-	3	2	1	1	1
Bioassay, bioinformatics and R&D service industry	51	24	-	1	-	1	6	-	-	14	-	2	1	1	-	1	-	-
<b>□ No sales</b>																		
Biopharmaceutical industry	103	21	1	2	5	-	3	-	-	52	1	8	5	2	1	-	1	1
Biochemical industry	44	4	-	1	-	-	10	1	1	11	1	3	3	3	2	2	1	1
Biofood industry	59	6	2	2	2	-	-	-	1	18	6	3	9	-	3	2	3	2
Bioenvironmental industry	23	2	1	3	2	-	-	-	7	4	1	-	-	1	2	-	-	-
Bioelectronics industry	8	4	-	-	-	1	-	-	1	1	-	-	-	-	1	-	-	-
Bioprocess and equipment industry	24	5	-	1	-	1	-	-	-	13	-	-	1	-	2	1	-	-
Bioenergy and bioresource industry	13	1	1	-	-	-	3	1	-	5	-	-	-	1	-	-	1	-
Bioassay, bioinformatics and R&D service industry	11	2	-	-	-	1	2	-	-	6	-	-	-	-	-	-	-	-
<b>□ Sales below break-even - 1 year</b>																		
Biopharmaceutical industry	9	4	-	-	1	-	-	-	-	2	1	1	-	-	-	-	-	-
Biochemical industry	2	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-
Biofood industry	4	-	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-
Bioelectronics industry	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Bioassay, bioinformatics and R&D service industry	2	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
<b>□ Sales below break-even - 2~3 years</b>																		
Biopharmaceutical industry	17	5	-	-	-	2	-	-	8	1	1	-	-	-	-	-	-	-
Biochemical industry	23	2	-	1	1	2	4	-	1	4	1	1	-	-	2	3	1	-
Biofood industry	11	-	1	2	-	-	1	-	-	2	3	-	-	-	1	-	1	-
Bioenvironmental industry	4	1	-	-	1	-	-	-	-	-	-	1	-	1	-	-	-	-
Bioelectronics industry	3	-	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Bioprocess and equipment industry	3	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Bioenergy and bioresource industry	5	-	-	-	-	-	1	-	-	-	-	1	-	1	1	-	-	-
Bioassay, bioinformatics and R&D service industry	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>□ Sales below break-even - 4~5 years</b>																		
Biopharmaceutical industry	22	4	-	1	-	1	1	-	-	9	3	-	2	-	-	1	-	-
Biochemical industry	22	4	-	-	-	-	5	-	1	3	2	-	3	-	1	2	1	-
Biofood industry	19	2	-	-	-	-	-	-	-	6	2	1	2	3	-	1	1	1
Bioenvironmental industry	11	1	-	1	-	2	-	-	1	-	1	-	1	1	-	3	-	-
Bioelectronics industry	4	-	-	-	-	1	-	-	1	1	-	1	-	-	-	-	-	-
Bioprocess and equipment industry	8	3	-	1	1	-	1	-	-	2	-	-	-	-	-	-	-	-
Bioenergy and bioresource industry	2	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-
Bioassay, bioinformatics and R&D service industry	6	3	-	-	-	1	-	-	-	-	-	-	1	1	-	-	-	-

	Total	Seoul	Busan	Daegu	Inched n	Gwan gju	Daeje on	Ulsan	Sejong	Gyeong ggi	Gang won	Chung buk	Chung nam	Jeonb uk	Jeonn am	Gyeong gbuk	Gyeong gnam	Jeju
Number of companies	975	171	14	24	22	10	80	9	6	323	55	71	58	26	29	35	29	13
<input type="checkbox"/> Sales below break-even - 6~9 years																		
Biopharmaceutical industry	22	5	-	1	-	-	4	-	-	6	2	4	-	-	-	-	-	-
Biochemical industry	23	2	1	1	-	-	2	-	-	7	3	1	-	-	1	3	2	-
Biofood industry	17	2	1	-	1	-	1	-	-	3	1	-	-	2	2	1	2	1
Bioenvironmental industry	10	1	-	-	-	1	1	1	-	5	1	-	-	-	-	-	-	-
Bioelectronics industry	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Bioprocess and equipment industry	3	1	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-
Bioassay, bioinformatics and R&D service industry	6	4	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
<input type="checkbox"/> Sales below break-even - 10 or more years																		
Biopharmaceutical industry	26	3	1	-	-	-	3	-	1	13	-	2	2	1	-	-	-	-
Biochemical industry	10	1	1	-	-	-	1	-	-	3	-	1	2	-	1	-	-	-
Biofood industry	22	1	-	-	-	1	2	-	1	4	2	2	2	1	2	2	1	1
Bioenvironmental industry	5	-	-	-	-	-	-	-	-	4	1	-	-	-	-	-	-	-
Bioelectronics industry	2	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-
Bioprocess and equipment industry	4	-	-	-	-	-	1	-	-	3	-	-	-	-	-	-	-	-
Bioassay, bioinformatics and R&D service industry	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
<input type="checkbox"/> Sales below break-even - Unknown																		
Biofood industry	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
<input type="checkbox"/> Sales above break-even - 2~3 years																		
Biopharmaceutical industry	5	1	-	1	-	-	-	-	-	2	1	-	-	-	-	-	-	-
Biochemical industry	3	-	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-
Biofood industry	3	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	1	-
Bioenvironmental industry	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Bioelectronics industry	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Bioprocess and equipment industry	3	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
Bioenergy and bioresource industry	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
<input type="checkbox"/> Sales above break-even - 4~5 years																		
Biopharmaceutical industry	13	2	-	1	1	-	1	-	-	6	-	1	1	-	-	-	-	-
Biochemical industry	11	2	-	-	-	-	2	-	-	-	1	1	2	-	-	3	-	-
Biofood industry	5	-	-	-	-	-	-	-	-	-	-	-	1	-	1	1	1	1
Bioenvironmental industry	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Bioprocess and equipment industry	2	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Bioenergy and bioresource industry	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Bioassay, bioinformatics and R&D service industry	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<input type="checkbox"/> Sales above break-even - 6~9 years																		
Biopharmaceutical industry	12	2	-	-	1	-	1	1	-	3	1	1	-	-	-	1	1	-
Biochemical industry	18	1	-	-	1	-	2	-	-	3	-	4	1	-	2	1	1	2
Biofood industry	14	-	1	-	-	-	2	-	-	2	1	4	1	-	1	-	2	-
Bioenvironmental industry	5	-	-	1	-	-	-	-	-	-	-	-	-	2	1	1	-	-
Bioelectronics industry	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bioprocess and equipment industry	5	-	-	-	-	-	1	-	-	3	-	-	1	-	-	-	-	-
Bioenergy and bioresource industry	2	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-
Bioassay, bioinformatics and R&D service industry	3	1	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-
<input type="checkbox"/> Sales above break-even - 10 or more years																		
Biopharmaceutical industry	66	12	1	1	1	-	3	-	-	33	-	8	6	1	-	-	-	-
Biochemical industry	35	7	-	-	-	-	3	2	-	10	2	3	2	2	1	-	2	1
Biofood industry	38	5	2	-	1	-	-	-	-	12	2	5	4	2	-	2	2	1
Bioenvironmental industry	14	-	-	-	-	1	-	1	-	8	1	2	1	-	-	-	-	-
Bioelectronics industry	3	1	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-
Bioprocess and equipment industry	17	8	-	-	-	-	2	-	-	5	-	1	-	-	-	1	-	-
Bioenergy and bioresource industry	4	-	-	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-
Bioassay, bioinformatics and R&D service industry	16	8	-	-	-	-	3	-	-	4	-	1	-	-	-	-	-	-
<input type="checkbox"/> Sales - Unknown																		
Biopharmaceutical industry	27	16	-	-	-	-	2	-	-	6	-	1	1	1	-	-	-	-
Biochemical industry	13	-	-	1	1	-	2	-	-	5	2	-	-	-	1	1	-	-
Biofood industry	4	1	-	-	-	-	-	-	-	-	1	1	-	-	-	1	-	-
Bioenvironmental industry	2	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Bioprocess and equipment industry	4	-	-	-	-	-	-	-	-	2	-	-	2	-	-	-	-	-
Bioassay, bioinformatics and R&D service industry	3	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-

< Table 1-2 > Existence of other business within the company(II-4-1)

(Unit : number of firms)

	Total	Exclusive business	Plural businesses	Unknown
Number of companies	975	509	462	4
<input checked="" type="checkbox"/> Sales Situation				
No sales	285	140	145	-
Sales below break-even - 1 year	18	14	4	-
Sales below break-even - 2~3 years	67	39	28	-
Sales below break-even - 4~5 years	94	59	35	-
Sales below break-even - 6~9 years	82	49	33	-
Sales below break-even - 10 or more years	70	40	30	-
Sales below break-even - Unknown	1	-	1	-
Sales above break-even - 2~3 years	17	9	8	-
Sales above break-even - 4~5 years	35	19	16	-
Sales above break-even - 6~9 years	60	36	24	-
Sales above break-even - 10 or more years	193	73	119	1
Sales - Unknown	53	31	19	3
<input checked="" type="checkbox"/> Main type of industry				
Biopharmaceutical industry	322	145	174	3
Biochemical industry	204	106	98	-
Biofood industry	197	99	98	-
Bioenvironmental industry	76	46	30	-
Bioelectronics industry	24	17	7	-
Bioprocess and equipment industry	73	46	26	1
Bioenergy and bioresource industry	28	14	14	-
Bioassay, bioinformatics and R&D service industry	51	36	15	-
<input type="checkbox"/> No sales				
Biopharmaceutical industry	103	48	55	-
Biochemical industry	44	19	25	-
Biofood industry	59	22	37	-
Bioenvironmental industry	23	15	8	-
Bioelectronics industry	8	6	2	-
Bioprocess and equipment industry	24	15	9	-
Bioenergy and bioresource industry	13	8	5	-
Bioassay, bioinformatics and R&D service industry	11	7	4	-
<input type="checkbox"/> Sales below break-even - 1 year				
Biopharmaceutical industry	9	6	3	-
Biochemical industry	2	2	-	-
Biofood industry	4	3	1	-
Bioelectronics industry	1	1	-	-
Bioassay, bioinformatics and R&D service industry	2	2	-	-
<input type="checkbox"/> Sales below break-even - 2~3 years				
Biopharmaceutical industry	17	10	7	-
Biochemical industry	23	13	10	-
Biofood industry	11	6	5	-
Bioenvironmental industry	4	2	2	-
Bioelectronics industry	3	2	1	-
Bioprocess and equipment industry	3	2	1	-
Bioenergy and bioresource industry	5	3	2	-
Bioassay, bioinformatics and R&D service industry	1	1	-	-
<input type="checkbox"/> Sales below break-even - 4~5 years				
Biopharmaceutical industry	22	13	9	-
Biochemical industry	22	13	9	-
Biofood industry	19	12	7	-
Bioenvironmental industry	11	8	3	-
Bioelectronics industry	4	3	1	-
Bioprocess and equipment industry	8	6	2	-
Bioenergy and bioresource industry	2	1	1	-
Bioassay, bioinformatics and R&D service industry	6	3	3	-



	Total	Exclusive business	Plural businesses	Unknown
Number of companies	975	509	462	4
<input type="checkbox"/> Sales below break-even - 6~9 years				
Biopharmaceutical industry	22	14	8	-
Biochemical industry	23	11	12	-
Biofood industry	17	11	6	-
Bioenvironmental industry	10	7	3	-
Bioelectronics industry	1	-	1	-
Bioprocess and equipment industry	3	1	2	-
Bioassay, bioinformatics and R&D service industry	6	5	1	-
<input type="checkbox"/> Sales below break-even - 10 or more years				
Biopharmaceutical industry	26	6	20	-
Biochemical industry	10	8	2	-
Biofood industry	22	15	7	-
Bioenvironmental industry	5	4	1	-
Bioelectronics industry	2	2	-	-
Bioprocess and equipment industry	4	4	-	-
Bioassay, bioinformatics and R&D service industry	1	1	-	-
<input type="checkbox"/> Sales below break-even - Unknown				
Biofood industry	1	-	1	-
<input type="checkbox"/> Sales above break-even - 2~3 years				
Biopharmaceutical industry	5	-	5	-
Biochemical industry	3	2	1	-
Biofood industry	3	3	-	-
Bioenvironmental industry	1	1	-	-
Bioelectronics industry	1	1	-	-
Bioprocess and equipment industry	3	2	1	-
Bioenergy and bioresource industry	1	-	1	-
<input type="checkbox"/> Sales above break-even - 4~5 years				
Biopharmaceutical industry	13	5	8	-
Biochemical industry	11	7	4	-
Biofood industry	5	3	2	-
Bioenvironmental industry	1	-	1	-
Bioprocess and equipment industry	2	1	1	-
Bioenergy and bioresource industry	1	1	-	-
Bioassay, bioinformatics and R&D service industry	2	2	-	-
<input type="checkbox"/> Sales above break-even - 6~9 years				
Biopharmaceutical industry	12	7	5	-
Biochemical industry	18	9	9	-
Biofood industry	14	9	5	-
Bioenvironmental industry	5	2	3	-
Bioelectronics industry	1	1	-	-
Bioprocess and equipment industry	5	4	1	-
Bioenergy and bioresource industry	2	1	1	-
Bioassay, bioinformatics and R&D service industry	3	3	-	-
<input type="checkbox"/> Sales above break-even - 10 or more years				
Biopharmaceutical industry	66	20	46	-
Biochemical industry	35	16	19	-
Biofood industry	38	12	26	-
Bioenvironmental industry	14	5	9	-
Bioelectronics industry	3	1	2	-
Bioprocess and equipment industry	17	10	6	1
Bioenergy and bioresource industry	4	-	4	-
Bioassay, bioinformatics and R&D service industry	16	9	7	-
<input type="checkbox"/> Sales - Unknown				
Biopharmaceutical industry	27	16	8	3
Biochemical industry	13	6	7	-
Biofood industry	4	3	1	-
Bioenvironmental industry	2	2	-	-
Bioprocess and equipment industry	4	1	3	-
Bioassay, bioinformatics and R&D service industry	3	3	-	-

<Table 1-3 > Distribution by Type of Company[Duplication](II-4-2)

(Unit : number of firms)

	Total	Venture companies	INNO-BIZ	Kosdaq-listed companies	Listed companies	Not applicable/Unknown
Number of companies	975	329	324	89	87	406
<input checked="" type="checkbox"/> Sales Situation						
No sales	285	83	79	20	36	126
Sales below break-even - 1 year	18	8	4	1	-	9
Sales below break-even - 2~3 years	67	24	21	3	4	31
Sales below break-even - 4~5 years	94	41	31	6	3	41
Sales below break-even - 6~9 years	82	36	36	7	5	28
Sales below break-even - 10 or more years	70	24	28	10	6	22
Sales below break-even - Unknown	1	1	1	-	-	-
Sales above break-even - 2~3 years	17	7	2	-	1	8
Sales above break-even - 4~5 years	35	11	9	4	-	19
Sales above break-even - 6~9 years	60	34	33	6	4	12
Sales above break-even - 10 or more years	193	51	68	27	22	80
Sales - Unknown	53	9	12	5	6	30
<input checked="" type="checkbox"/> Main type of industry						
Biopharmaceutical industry	322	89	79	48	43	142
Biochemical industry	204	77	79	13	21	76
Biofood industry	197	61	65	10	18	81
Bioenvironmental industry	76	27	40	1	1	32
Bioelectronics industry	24	13	7	3	-	9
Bioprocess and equipment industry	73	26	30	7	1	35
Bioenergy and bioresource industry	28	9	7	2	3	12
Bioassay, bioinformatics and R&D service industry	51	27	17	5	-	19
<input type="checkbox"/> No sales						
Biopharmaceutical industry	103	28	19	12	15	45
Biochemical industry	44	15	19	1	7	14
Biofood industry	59	10	11	4	12	30
Bioenvironmental industry	23	9	14	-	-	8
Bioelectronics industry	8	1	2	-	-	6
Bioprocess and equipment industry	24	9	9	2	-	13
Bioenergy and bioresource industry	13	4	3	-	2	6
Bioassay, bioinformatics and R&D service industry	11	7	2	1	-	4
<input type="checkbox"/> Sales below break-even - 1 year						
Biopharmaceutical industry	9	4	4	1	-	4
Biochemical industry	2	2	-	-	-	-
Biofood industry	4	1	-	-	-	3
Bioelectronics industry	1	1	-	-	-	-
Bioassay, bioinformatics and R&D service industry	2	-	-	-	-	2
<input type="checkbox"/> Sales below break-even - 2~3 years						
Biopharmaceutical industry	17	6	7	2	2	7
Biochemical industry	23	7	5	1	2	12
Biofood industry	11	5	5	-	-	4
Bioenvironmental industry	4	1	2	-	-	2
Bioelectronics industry	3	2	-	-	-	1
Bioprocess and equipment industry	3	1	1	-	-	2
Bioenergy and bioresource industry	5	1	1	-	-	3
Bioassay, bioinformatics and R&D service industry	1	1	-	-	-	-
<input type="checkbox"/> Sales below break-even - 4~5 years						
Biopharmaceutical industry	22	11	6	3	2	8
Biochemical industry	22	6	4	2	1	12
Biofood industry	19	10	7	-	-	7
Bioenvironmental industry	11	7	7	-	-	4
Bioelectronics industry	4	2	1	1	-	2
Bioprocess and equipment industry	8	3	3	-	-	4
Bioenergy and bioresource industry	2	1	1	-	-	1
Bioassay, bioinformatics and R&D service industry	6	1	2	-	-	3

	Total	Venture companies	INNO-BIZ	Kosdaq-listed companies	Listed companies	Not applicable/Unknown
<b>Number of companies</b>	<b>975</b>	<b>329</b>	<b>324</b>	<b>89</b>	<b>87</b>	<b>406</b>
<input type="checkbox"/> Sales below break-even - 6~9 years						
Biopharmaceutical industry	22	9	8	1	2	9
Biochemical industry	23	14	14	4	2	3
Biofood industry	17	5	4	-	1	8
Bioenvironmental industry	10	2	5	1	-	5
Bioelectronics industry	1	1	1	-	-	-
Bioprocess and equipment industry	3	1	2	1	-	1
Bioassay, bioinformatics and R&D service industry	6	4	2	-	-	2
<input type="checkbox"/> Sales below break-even - 10 or more years						
Biopharmaceutical industry	26	10	10	7	5	5
Biochemical industry	10	3	3	-	1	4
Biofood industry	22	7	12	2	-	6
Bioenvironmental industry	5	1	-	-	-	4
Bioelectronics industry	2	2	1	1	-	-
Bioprocess and equipment industry	4	1	2	-	-	2
Bioassay, bioinformatics and R&D service industry	1	-	-	-	-	1
<input type="checkbox"/> Sales below break-even - Unknown						
Biofood industry	1	1	1	-	-	-
<input type="checkbox"/> Sales above break-even - 2~3 years						
Biopharmaceutical industry	5	2	1	-	1	2
Biochemical industry	3	1	-	-	-	2
Biofood industry	3	1	-	-	-	2
Bioenvironmental industry	1	-	1	-	-	-
Bioelectronics industry	1	1	-	-	-	-
Bioprocess and equipment industry	3	1	-	-	-	2
Bioenergy and bioresource industry	1	1	-	-	-	-
<input type="checkbox"/> Sales above break-even - 4~5 years						
Biopharmaceutical industry	13	3	2	3	-	7
Biochemical industry	11	3	2	-	-	7
Biofood industry	5	2	2	-	-	2
Bioenvironmental industry	1	1	1	-	-	-
Bioprocess and equipment industry	2	2	2	1	-	-
Bioenergy and bioresource industry	1	-	-	-	-	1
Bioassay, bioinformatics and R&D service industry	2	-	-	-	-	2
<input type="checkbox"/> Sales above break-even - 6~9 years						
Biopharmaceutical industry	12	4	3	4	1	5
Biochemical industry	18	12	13	1	2	2
Biofood industry	14	9	10	-	-	2
Bioenvironmental industry	5	1	2	-	1	1
Bioelectronics industry	1	1	-	-	-	-
Bioprocess and equipment industry	5	3	2	-	-	2
Bioenergy and bioresource industry	2	1	1	1	-	-
Bioassay, bioinformatics and R&D service industry	3	3	2	-	-	-
<input type="checkbox"/> Sales above break-even - 10 or more years						
Biopharmaceutical industry	66	8	12	12	14	33
Biochemical industry	35	13	17	4	2	13
Biofood industry	38	10	13	4	5	13
Bioenvironmental industry	14	5	8	-	-	6
Bioelectronics industry	3	2	2	1	-	-
Bioprocess and equipment industry	17	3	7	2	-	9
Bioenergy and bioresource industry	4	1	1	1	1	1
Bioassay, bioinformatics and R&D service industry	16	9	8	3	-	5
<input type="checkbox"/> Sales - Unknown						
Biopharmaceutical industry	27	4	7	3	1	17
Biochemical industry	13	1	2	-	4	7
Biofood industry	4	-	-	-	-	4
Bioenvironmental industry	2	-	-	-	-	2
Bioprocess and equipment industry	4	2	2	1	1	-
Bioassay, bioinformatics and R&D service industry	3	2	1	1	-	-

< Table 1-4 > Distribution by Establishment Year(I-6) (Unit : number of firms)

	Total	Before 1950	1951~1980	1981~1990	1991~1995	1996~2000	2001~2005	2006~2010	2011~2013	Unknown
<b>Number of companies</b>	<b>975</b>	<b>13</b>	<b>137</b>	<b>106</b>	<b>78</b>	<b>276</b>	<b>214</b>	<b>122</b>	<b>25</b>	<b>4</b>
<input checked="" type="checkbox"/> Sales Situation										
No sales	285	6	54	36	25	61	58	38	7	-
Sales below break-even - 1 year	18	-	1	1	-	6	5	3	2	-
Sales below break-even - 2~3 years	67	1	7	6	4	18	13	15	3	-
Sales below break-even - 4~5 years	94	-	2	7	1	37	24	18	5	-
Sales below break-even - 6~9 years	82	-	6	4	4	30	29	8	1	-
Sales below break-even - 10 or more years	70	1	7	10	8	29	14	-	1	-
Sales below break-even - Unknown	1	-	-	-	-	1	-	-	-	-
Sales above break-even - 2~3 years	17	1	-	-	-	6	3	4	3	-
Sales above break-even - 4~5 years	35	-	5	2	-	7	8	13	-	-
Sales above break-even - 6~9 years	60	1	4	2	2	14	27	9	1	-
Sales above break-even - 10 or more years	193	3	43	32	24	54	28	7	2	-
Sales - Unknown	53	-	8	6	10	13	5	7	-	4
<input checked="" type="checkbox"/> Main type of industry										
Biopharmaceutical industry	322	10	64	49	31	80	48	30	9	1
Biochemical industry	204	2	25	16	11	60	46	37	5	2
Biofood industry	197	1	33	20	12	61	52	16	2	-
Bioenvironmental industry	76	-	8	8	5	21	30	3	-	1
Bioelectronics industry	24	-	-	1	2	9	5	5	2	-
Bioprocess and equipment industry	73	-	1	9	15	19	12	14	3	-
Bioenergy and bioresource industry	28	-	6	2	1	5	5	6	3	-
Bioassay, bioinformatics and R&D service industry	51	-	-	1	1	21	16	11	1	-
<input type="checkbox"/> No sales										
Biopharmaceutical industry	103	5	23	18	9	22	15	9	2	-
Biochemical industry	44	1	8	3	4	11	7	9	1	-
Biofood industry	59	-	18	8	5	11	14	3	-	-
Bioenvironmental industry	23	-	2	3	-	4	11	3	-	-
Bioelectronics industry	8	-	-	1	-	3	4	-	-	-
Bioprocess and equipment industry	24	-	-	1	6	5	3	7	2	-
Bioenergy and bioresource industry	13	-	3	1	-	2	2	4	1	-
Bioassay, bioinformatics and R&D service industry	11	-	-	1	1	3	2	3	1	-
<input type="checkbox"/> Sales below break-even - 1 year										
Biopharmaceutical industry	9	-	-	1	-	3	3	1	1	-
Biochemical industry	2	-	-	-	-	1	-	1	-	-
Biofood industry	4	-	1	-	-	2	1	-	-	-
Bioelectronics industry	1	-	-	-	-	-	-	-	1	-
Bioassay, bioinformatics and R&D service industry	2	-	-	-	-	-	1	1	-	-
<input type="checkbox"/> Sales below break-even - 2~3 years										
Biopharmaceutical industry	17	-	3	3	-	7	2	2	-	-
Biochemical industry	23	1	2	1	1	6	4	7	1	-
Biofood industry	11	-	1	2	1	1	2	3	1	-
Bioenvironmental industry	4	-	-	-	-	2	2	-	-	-
Bioelectronics industry	3	-	-	-	1	-	-	2	-	-
Bioprocess and equipment industry	3	-	-	-	-	1	2	-	-	-
Bioenergy and bioresource industry	5	-	1	-	1	-	1	1	1	-
Bioassay, bioinformatics and R&D service industry	1	-	-	-	-	1	-	-	-	-
<input type="checkbox"/> Sales below break-even - 4~5 years										
Biopharmaceutical industry	22	-	1	1	1	8	4	5	2	-
Biochemical industry	22	-	1	3	-	6	5	5	2	-
Biofood industry	19	-	-	1	-	12	4	2	-	-
Bioenvironmental industry	11	-	-	1	-	5	5	-	-	-
Bioelectronics industry	4	-	-	-	-	1	1	1	1	-
Bioprocess and equipment industry	8	-	-	1	-	4	-	3	-	-
Bioenergy and bioresource industry	2	-	-	-	-	1	1	-	-	-
Bioassay, bioinformatics and R&D service industry	6	-	-	-	-	-	4	2	-	-

	Total	Before 1950	1951~1980	1981~1990	1991~1995	1996~2000	2001~2005	2006~2010	2011~2013	Unknown
<b>Number of companies</b>	<b>975</b>	<b>13</b>	<b>137</b>	<b>106</b>	<b>78</b>	<b>276</b>	<b>214</b>	<b>122</b>	<b>25</b>	<b>4</b>
<input type="checkbox"/> Sales below break-even - 6~9 years										
Biopharmaceutical industry	22	-	3	2	1	10	4	2	-	-
Biochemical industry	23	-	-	-	-	11	9	3	-	-
Biofood industry	17	-	1	1	1	5	8	1	-	-
Bioenvironmental industry	10	-	2	-	2	1	5	-	-	-
Bioelectronics industry	1	-	-	-	-	1	-	-	-	-
Bioprocess and equipment industry	3	-	-	1	-	-	1	-	1	-
Bioassay, bioinformatics and R&D service industry	6	-	-	-	-	2	2	2	-	-
<input type="checkbox"/> Sales below break-even - 10 or more years										
Biopharmaceutical industry	26	1	4	5	3	8	4	-	1	-
Biochemical industry	10	-	1	-	1	6	2	-	-	-
Biofood industry	22	-	2	3	2	8	7	-	-	-
Bioenvironmental industry	5	-	-	2	-	3	-	-	-	-
Bioelectronics industry	2	-	-	-	-	2	-	-	-	-
Bioprocess and equipment industry	4	-	-	-	2	2	-	-	-	-
Bioassay, bioinformatics and R&D service industry	1	-	-	-	-	-	1	-	-	-
<input type="checkbox"/> Sales below break-even - Unknown										
Biofood industry	1	-	-	-	-	1	-	-	-	-
<input type="checkbox"/> Sales above break-even - 2~3 years										
Biopharmaceutical industry	5	1	-	-	-	1	1	1	1	-
Biochemical industry	3	-	-	-	-	1	-	1	1	-
Biofood industry	3	-	-	-	-	2	1	-	-	-
Bioenvironmental industry	1	-	-	-	-	-	1	-	-	-
Bioelectronics industry	1	-	-	-	-	-	-	1	-	-
Bioprocess and equipment industry	3	-	-	-	-	2	-	1	-	-
Bioenergy and bioresource industry	1	-	-	-	-	1	-	-	1	-
Bioassay, bioinformatics and R&D service industry	1	-	-	-	-	-	-	-	1	-
<input type="checkbox"/> Sales above break-even - 4~5 years										
Biopharmaceutical industry	13	-	3	1	-	3	2	4	-	-
Biochemical industry	11	-	2	1	-	2	3	3	-	-
Biofood industry	5	-	-	-	-	1	1	3	-	-
Bioenvironmental industry	1	-	-	-	-	-	1	-	-	-
Bioelectronics industry	1	-	-	-	-	-	-	1	-	-
Bioprocess and equipment industry	2	-	-	-	-	-	1	1	-	-
Bioenergy and bioresource industry	1	-	-	-	-	1	-	-	-	-
Bioassay, bioinformatics and R&D service industry	2	-	-	-	-	-	-	2	-	-
<input type="checkbox"/> Sales above break-even - 6~9 years										
Biopharmaceutical industry	12	-	1	1	1	5	4	-	-	-
Biochemical industry	18	-	2	-	-	2	10	4	-	-
Biofood industry	14	1	-	-	-	4	6	2	1	-
Bioenvironmental industry	5	-	1	1	-	-	3	-	-	-
Bioelectronics industry	1	-	-	-	-	-	-	1	-	-
Bioprocess and equipment industry	5	-	-	-	1	1	2	1	-	-
Bioenergy and bioresource industry	2	-	-	-	-	-	1	1	-	-
Bioassay, bioinformatics and R&D service industry	3	-	-	-	-	2	1	-	-	-
<input type="checkbox"/> Sales above break-even - 10 or more years										
Biopharmaceutical industry	66	3	23	13	8	8	6	3	2	-
Biochemical industry	35	-	5	7	5	12	5	1	-	-
Biofood industry	38	-	10	5	3	11	7	2	-	-
Bioenvironmental industry	14	-	3	1	2	6	2	-	-	-
Bioelectronics industry	3	-	-	-	1	2	-	-	-	-
Bioprocess and equipment industry	17	-	-	5	5	4	3	-	-	-
Bioenergy and bioresource industry	4	-	2	1	-	1	-	-	-	-
Bioassay, bioinformatics and R&D service industry	16	-	-	-	-	10	5	1	-	-
<input type="checkbox"/> Sales - Unknown										
Biopharmaceutical industry	27	-	3	4	8	5	3	3	-	1
Biochemical industry	13	-	4	1	-	2	1	3	-	2
Biofood industry	4	-	-	-	-	3	1	-	-	-
Bioenvironmental industry	2	-	-	-	1	-	-	-	-	1
Bioprocess and equipment industry	4	-	1	1	1	-	-	1	-	-
Bioassay, bioinformatics and R&D service industry	3	-	-	-	-	3	-	-	-	-

< Table 1-5 > Distribution by total number of workers' size(II-3) (Unit : number of firms, people)

Number of companies	Total	Less than 50	50~299	300~999	More than 1,000	Un-known	Average	CEO's gender			Employees' gender		
								Male	Female	Unknown	Male	Female	Unknown
<b>Number of companies</b>	<b>975</b>	<b>585</b>	<b>257</b>	<b>80</b>	<b>43</b>	<b>10</b>	<b>366</b>	<b>866</b>	<b>82</b>	<b>27</b>	<b>257,757</b>	<b>75,618</b>	<b>19,700</b>
<input checked="" type="checkbox"/> Sales Situation													
No sales	285	151	84	30	18	2	300	257	17	11	56,838	19,290	8,815
Sales below break-even - 1 year	18	13	3	2	-	-	88	16	2	-	998	518	62
Sales below break-even - 2~3 years	67	48	16	1	2	-	135	57	9	1	7,213	1,596	230
Sales below break-even - 4~5 years	94	81	11	1	1	-	61	85	8	1	4,147	1,183	366
Sales below break-even - 6~9 years	82	66	11	3	2	-	163	75	7	-	8,480	4,772	154
Sales below break-even - 10 or more years	70	49	13	6	2	-	110	64	6	-	5,239	2,405	48
Sales below break-even - Unknown	1	1	-	-	-	-	43	1	-	-	-	-	43
Sales above break-even - 2~3 years	17	11	6	-	-	-	57	15	2	-	623	352	-
Sales above break-even - 4~5 years	35	28	5	2	-	-	60	28	7	-	1,545	565	6
Sales above break-even - 6~9 years	60	41	14	3	2	-	121	53	7	-	4,101	1,780	1,387
Sales above break-even - 10 or more years	193	73	81	26	13	-	594	179	14	-	92,981	15,816	5,778
Sales - Unknown	53	23	13	6	3	8	2,350	36	3	14	75,592	27,341	2,811
<input checked="" type="checkbox"/> Main type of industry													
Biopharmaceutical industry	322	131	121	51	14	5	221	291	21	10	44,615	16,461	9,024
Biochemical industry	204	142	37	9	14	2	1,069	178	19	7	174,009	38,690	3,271
Biofood industry	197	128	42	13	13	1	254	177	18	2	28,323	15,761	5,796
Bioenvironmental industry	76	61	12	1	1	1	63	69	6	1	3,475	719	514
Bioelectronics industry	24	16	5	3	-	-	111	20	3	1	1,311	956	386
Bioprocess and equipment industry	73	51	19	2	-	1	60	62	6	5	2,694	1,124	511
Bioenergy and bioresource industry	28	20	6	1	1	-	101	24	3	1	2,214	515	99
Bioassay, bioinformatics and R&D service industry	51	36	15	-	-	-	51	45	6	-	1,116	1,392	99
<input type="checkbox"/> No sales													
Biopharmaceutical industry	103	42	41	18	2	-	210	98	5	-	14,166	4,642	2,853
Biochemical industry	44	26	10	3	5	-	595	40	3	1	22,643	3,098	456
Biofood industry	59	22	18	8	10	1	551	54	3	2	17,024	10,466	4,484
Bioenvironmental industry	23	19	4	-	-	-	28	21	1	1	337	111	196
Bioelectronics industry	8	5	2	1	-	-	157	5	2	1	434	435	386
Bioprocess and equipment industry	24	19	4	-	-	1	35	18	1	5	359	171	286
Bioenergy and bioresource industry	13	9	3	-	1	-	150	10	2	1	1,633	222	93
Bioassay, bioinformatics and R&D service industry	11	9	2	-	-	-	41	11	-	-	242	145	61
<input type="checkbox"/> Sales below break-even - 1 year													
Biopharmaceutical industry	9	7	1	1	-	-	90	8	1	-	501	313	-
Biochemical industry	2	2	-	-	-	-	14	2	-	-	19	8	-
Biofood industry	4	2	1	1	-	-	144	4	-	-	385	127	62
Bioelectronics industry	1	1	-	-	-	-	18	-	1	-	8	10	-
Bioassay, bioinformatics and R&D service industry	2	1	1	-	-	-	73	2	-	-	85	60	-
<input type="checkbox"/> Sales below break-even - 2~3 years													
Biopharmaceutical industry	17	8	8	-	1	-	240	15	2	-	3,278	805	-
Biochemical industry	23	17	4	1	1	-	175	19	3	1	3,269	543	208
Biofood industry	11	8	3	-	-	-	52	11	-	-	426	138	12
Bioenvironmental industry	4	4	-	-	-	-	12	2	2	-	29	18	-
Bioelectronics industry	3	3	-	-	-	-	25	3	-	-	45	30	-
Bioprocess and equipment industry	3	3	-	-	-	-	17	2	1	-	38	13	-
Bioenergy and bioresource industry	5	4	1	-	-	-	35	5	-	-	128	49	-
Bioassay, bioinformatics and R&D service industry	1	1	-	-	-	-	10	-	1	-	-	-	10
<input type="checkbox"/> Sales below break-even - 4~5 years													
Biopharmaceutical industry	22	15	7	-	-	-	52	20	1	1	594	407	142
Biochemical industry	22	19	1	1	1	-	157	20	2	-	2,909	518	37
Biofood industry	19	19	-	-	-	-	13	16	3	-	148	72	35
Bioenvironmental industry	11	10	1	-	-	-	19	10	1	-	72	26	110
Bioelectronics industry	4	2	2	-	-	-	90	4	-	-	289	72	-
Bioprocess and equipment industry	8	8	-	-	-	-	16	8	-	-	58	42	27
Bioenergy and bioresource industry	2	2	-	-	-	-	26	2	-	-	37	15	-
Bioassay, bioinformatics and R&D service industry	6	6	-	-	-	-	14	5	1	-	40	31	15



	Total	Capital		
		Number of respondent companies	Sum	Average
Number of companies	975	876	12,633,376	14,422
Biochemical industry	2	2	9,092	4,546
Biofood industry	2	2	3,200	1,600
	1	1	2,000	2,000
	1	1	9,100	9,100
Bioelectronics industry	1	1	231	231
Bioassay, bioinformatics and R&D service industry	1	1	3,984	3,984
	1	1	900	900
<input type="checkbox"/> Sales below break-even - 2~3 years				
Biopharmaceutical industry	8	6	11,983	1,997
	8	8	35,392	4,424
	1	1	815,317	815,317
Biochemical industry	17	12	9,614	801
	4	4	14,168	3,542
	1	1	10,550	10,550
	1	1	171,377	171,377
Biofood industry	8	7	2,031	290
	3	3	15,677	5,226
Bioenvironmental industry	4	4	1,502	376
Bioelectronics industry	3	2	2,547	1,274
Bioprocess and equipment industry	3	2	1,450	725
Bioenergy and bioresource industry	4	3	6,944	2,315
	1	1	3,325	3,325
Bioassay, bioinformatics and R&D service industry	1	1	560	560
<input type="checkbox"/> Sales below break-even - 4~5 years				
Biopharmaceutical industry	15	14	29,181	2,084
	7	7	52,426	7,489
Biochemical industry	19	16	5,768	361
	1	1	3,000	3,000
	1	1	20,000	20,000
	1	1	127,247	127,247
Biofood industry	19	17	20,679	1,216
Bioenvironmental industry	10	10	8,880	888
	1	1	3,121	3,121
Bioelectronics industry	2	2	336	168
	2	1	3,419	3,419
Bioprocess and equipment industry	8	8	3,667	458
Bioenergy and bioresource industry	2	2	4,376	2,188
Bioassay, bioinformatics and R&D service industry	6	4	2,134	534
<input type="checkbox"/> Sales below break-even - 6~9 years				
Biopharmaceutical industry	15	13	28,664	2,205
	4	4	12,020	3,005
	3	3	98,696	32,899
Biochemical industry	20	18	28,802	1,600
	1	1	12,653	12,653
	2	2	169,346	84,673
Biofood industry	16	12	21,738	1,812
	1	1	15,606	15,606
Bioenvironmental industry	7	6	2,947	491
	3	3	5,815	1,938
Bioelectronics industry	1	1	753	753
Bioprocess and equipment industry	2	2	1,139	570
	1	1	11,285	11,285
Bioassay, bioinformatics and R&D service industry	5	5	3,143	629
	1	1	3,856	3,856
<input type="checkbox"/> Sales below break-even - 10 or more years				
Biopharmaceutical industry	12	11	18,769	1,706
	7	6	61,268	10,211
	5	5	51,206	10,241
	2	2	42,693	21,347
Biochemical industry	9	8	30,430	3,804
	1	1	2,266	2,266
Biofood industry	18	18	20,093	1,116
	4	4	32,972	8,243
Bioenvironmental industry	5	3	600	200
Bioelectronics industry	1	-	-	-
	1	1	4,344	4,344

	Total	Capital		
		Number of respondent companies	Sum	Average
Number of companies	975	876	12,633,376	14,422
Bioprocess and equipment industry	3	2	501	250
	1	1	2,167	2,167
Bioassay, bioinformatics and R&D service industry	1	-	-	-
<input type="checkbox"/> Sales below break-even - Unknown				
Biofood industry	1	1	1,775	1,775
<input type="checkbox"/> Sales above break-even - 2~3 years				
Biopharmaceutical industry	1	1	1,392	1,392
	4	4	31,943	7,986
Biochemical industry	2	2	250	125
	1	1	3,000	3,000
Biofood industry	3	1	600	600
Bioenvironmental industry	1	1	100	100
Bioelectronics industry	1	1	100	100
Bioprocess and equipment industry	2	1	2,480	2,480
	1	1	1,000	1,000
Bioenergy and bioresource industry	1	1	2,800	2,800
<input type="checkbox"/> Sales above break-even - 4~5 years				
Biopharmaceutical industry	9	9	33,346	3,705
	3	3	59,825	19,942
	1	1	13,251	13,251
Biochemical industry	9	8	3,992	499
	1	1	2,900	2,900
	1	1	89,463	89,463
Biofood industry	5	5	2,872	574
Bioenvironmental industry	1	1	300	300
Bioprocess and equipment industry	1	1	521	521
	1	1	3,531	3,531
Bioenergy and bioresource industry	1	-	-	-
Bioassay, bioinformatics and R&D service industry	2	1	1	1
<input type="checkbox"/> Sales above break-even - 6~9 years				
Biopharmaceutical industry	4	4	1,884	471
	5	5	12,010	2,402
	2	2	108,903	54,452
	1	1	118,301	118,301
Biochemical industry	14	13	11,116	855
	3	3	38,761	12,920
	1	1	576,000	576,000
Biofood industry	12	10	9,426	943
	2	2	7,777	3,889
Bioenvironmental industry	4	3	1,100	367
	1	1	10,846	10,846
Bioelectronics industry	1	1	225	225
Bioprocess and equipment industry	2	1	600	600
	3	3	1,400	467
Bioenergy and bioresource industry	2	2	7,991	3,996
Bioassay, bioinformatics and R&D service industry	2	1	1,841	1,841
	1	1	2,060	2,060
<input type="checkbox"/> Sales above break-even - 10 or more years				
Biopharmaceutical industry	9	9	16,710	1,857
	32	32	275,078	8,596
	17	16	340,822	21,301
	8	8	340,237	42,530
Biochemical industry	19	18	19,216	1,068
	13	12	321,467	26,789
	2	2	18,258	9,129
	1	1	1,488,993	1,488,993
Biofood industry	18	16	15,062	941
	13	13	143,190	11,015
	4	4	85,434	21,359
	3	3	624,971	208,324

		Total	Capital		
			Number of respondent companies	Sum	Average
Number of companies		975	876	12,633,376	14,422
Bioenvironmental industry	Less than 50	9	9	8,181	909
	50~299	4	4	14,731	3,683
	More than 1,000	1	1	596	596
Bioelectronics industry	Less than 50	1	1	1,305	1,305
	50~299	1	1	3,391	3,391
	300~999	1	1	4,549	4,549
Bioprocess and equipment industry	Less than 50	9	9	3,813	424
	50~299	7	7	11,913	1,702
	300~999	1	1	14,000	14,000
Bioenergy and bioresource industry	Less than 50	1	1	2,183	2,183
	50~299	2	2	58,278	29,139
	300~999	1	1	7,150	7,150
Bioassay, bioinformatics and R&D service industry	Less than 50	7	7	16,602	2,372
	50~299	9	9	20,751	2,306
☐ Sales - Unknown					
Biopharmaceutical industry	Less than 50	9	7	61,294	8,756
	50~299	9	9	52,585	5,843
	300~999	4	4	53,792	13,448
	Unknown	5	-	-	-
Biochemical industry	Less than 50	5	2	15,568	7,784
	50~299	2	2	25,386	12,693
	300~999	1	1	20,542	20,542
	More than 1,000	3	3	1,274,104	424,701
	Unknown	2	-	-	-
Biofood industry	Less than 50	4	1	100	100
Bioenvironmental industry	Less than 50	1	1	1,157	1,157
	Unknown	1	-	-	-
Bioprocess and equipment industry	Less than 50	2	2	3,356	1,678
	50~299	1	1	4,380	4,380
	300~999	1	1	32,694	32,694
Bioassay, bioinformatics and R&D service industry	Less than 50	2	2	2,049	1,024
	50~299	1	1	8,800	8,800

< Table 1-7 > Ratio of Net Worth(Ⅱ-2) (Unit : number of firms, %)

	Total	Ratio of Net worth		
		Number of respondent companies	Average	
Number of companies	975	790	48	
☑ Sales Situation				
No sales	285	231	49	
Sales below break-even - 1 year	18	17	17	
Sales below break-even - 2~3 years	67	48	40	
Sales below break-even - 4~5 years	94	72	42	
Sales below break-even - 6~9 years	82	64	41	
Sales below break-even - 10 or more years	70	56	42	
Sales below break-even - Unknown	1	1	21	
Sales above break-even - 2~3 years	17	13	42	
Sales above break-even - 4~5 years	35	26	56	
Sales above break-even - 6~9 years	60	49	56	
Sales above break-even - 10 or more years	193	176	57	
Sales - Unknown	53	37	45	
☑ Main type of industry				
Biopharmaceutical industry	322	276	49	
Biochemical industry	204	166	49	
Biofood industry	197	148	47	
Bioenvironmental industry	76	63	54	
Bioelectronics industry	24	16	54	
Bioprocess and equipment industry	73	58	49	
Bioenergy and bioresource industry	28	24	33	
Bioassay, bioinformatics and R&D service industry	51	39	35	
☑ Number of employees				
Less than 50	585	424	42	
50~299	257	245	53	
300~999	80	78	60	
More than 1,000	43	43	59	
Unknown	10	-	-	
☐ Sales situation - No sales				
Biopharmaceutical industry	Less than 50	42	30	42
	50~299	41	39	52
	300~999	18	18	62
	More than 1,000	2	2	49
Biochemical industry	Less than 50	26	19	52
	50~299	10	10	48
	300~999	3	3	58
	More than 1,000	5	5	64
Biofood industry	Less than 50	22	13	32
	50~299	18	14	54
	300~999	8	7	51
	More than 1,000	10	10	64
	Unknown	1	-	-
Bioenvironmental industry	Less than 50	19	16	50
	50~299	4	4	37
Bioelectronics industry	Less than 50	5	2	34
	50~299	2	1	25
	300~999	1	1	70
Bioprocess and equipment industry	Less than 50	19	13	51
	50~299	4	4	68
	Unknown	1	-	-
Bioenergy and bioresource industry	Less than 50	9	8	18
	50~299	3	2	40
	More than 1,000	1	1	36
	Unknown	1	-	-
Bioassay, bioinformatics and R&D service industry	Less than 50	9	7	50
	50~299	2	2	69
☐ Sales below break-even - 1 year				
Biopharmaceutical industry	Less than 50	7	7	7
	50~299	1	1	63
	300~999	1	1	57

		Total	Ratio of Net worth	
			Number of respondent companies	Average
Number of companies		975	790	48
Biochemical industry	Less than 50	2	1	-4
Biofood industry	Less than 50	2	2	-60
	50~299	1	1	27
	300~999	1	1	53
Bioelectronics industry	Less than 50	1	1	82
Bioassay, bioinformatics and R&D service industry	Less than 50	1	1	74
	50~299	1	1	6
<input type="checkbox"/> Sales below break-even - 2~3 years				
Biopharmaceutical industry	Less than 50	8	3	-16
	50~299	8	8	51
	More than 1,000	1	1	58
Biochemical industry	Less than 50	17	10	35
	50~299	4	4	51
	300~999	1	1	55
	More than 1,000	1	1	69
Biofood industry	Less than 50	8	6	42
	50~299	3	3	55
Bioenvironmental industry	Less than 50	4	2	49
Bioelectronics industry	Less than 50	3	2	34
Bioprocess and equipment industry	Less than 50	3	2	40
Bioenergy and bioresource industry	Less than 50	4	3	41
	50~299	1	1	-56
Bioassay, bioinformatics and R&D service industry	Less than 50	1	1	94
<input type="checkbox"/> Sales below break-even - 4~5 years				
Biopharmaceutical industry	Less than 50	15	12	41
	50~299	7	7	32
Biochemical industry	Less than 50	19	15	37
	50~299	1	1	74
	300~999	1	1	59
	More than 1,000	1	1	55
Biofood industry	Less than 50	19	13	47
Bioenvironmental industry	Less than 50	10	8	57
	50~299	1	1	49
Bioelectronics industry	Less than 50	2	2	74
	50~299	2	1	52
Bioprocess and equipment industry	Less than 50	8	6	19
Bioenergy and bioresource industry	Less than 50	2	2	1
Bioassay, bioinformatics and R&D service industry	Less than 50	6	2	49
<input type="checkbox"/> Sales below break-even - 6~9 years				
Biopharmaceutical industry	Less than 50	15	9	15
	50~299	4	4	34
	300~999	3	3	63
Biochemical industry	Less than 50	20	17	46
	50~299	1	1	72
	More than 1,000	2	2	71
Biofood industry	Less than 50	16	10	37
	50~299	1	1	29
Bioenvironmental industry	Less than 50	7	6	44
	50~299	3	3	63
Bioelectronics industry	Less than 50	1	1	65
Bioprocess and equipment industry	Less than 50	2	2	55
	50~299	1	1	83
Bioassay, bioinformatics and R&D service industry	Less than 50	5	3	15
	50~299	1	1	29
<input type="checkbox"/> Sales below break-even - 10 or more years				
Biopharmaceutical industry	Less than 50	12	10	42
	50~299	7	6	57
	300~999	5	5	67
	More than 1,000	2	2	60
Biochemical industry	Less than 50	9	6	-2
	50~299	1	1	71
Biofood industry	Less than 50	18	16	43
	50~299	4	4	49
Bioenvironmental industry	Less than 50	5	2	46
Bioelectronics industry	Less than 50	1	-	-
	300~999	1	1	53

		Total	Ratio of Net worth	
			Number of respondent companies	Average
Number of companies		975	790	48
Bioprocess and equipment industry	Less than 50	3	2	3
	50~299	1	1	50
Bioassay, bioinformatics and R&D service industry	Less than 50	1	-	-
<input type="checkbox"/> Sales below break-even - Unknown				
Biofood industry	Less than 50	1	1	21
<input type="checkbox"/> Sales above break-even - 2~3 years				
Biopharmaceutical industry	Less than 50	1	1	60
	50~299	4	4	42
Biochemical industry	Less than 50	2	1	13
	50~299	1	1	17
Biofood industry	Less than 50	3	1	-2
Bioenvironmental industry	Less than 50	1	1	87
Bioelectronics industry	Less than 50	1	1	38
Bioprocess and equipment industry	Less than 50	2	1	34
	50~299	1	1	96
Bioenergy and bioresource industry	Less than 50	1	1	33
<input type="checkbox"/> Sales above break-even - 4~5 years				
Biopharmaceutical industry	Less than 50	9	7	66
	50~299	3	3	32
	300~999	1	1	87
Biochemical industry	Less than 50	9	7	56
	50~299	1	1	88
	300~999	1	1	35
Biofood industry	Less than 50	5	2	42
Bioenvironmental industry	Less than 50	1	1	61
Bioprocess and equipment industry	Less than 50	1	1	49
	50~299	1	1	88
Bioenergy and bioresource industry	Less than 50	1	-	-
Bioassay, bioinformatics and R&D service industry	Less than 50	2	1	11
<input type="checkbox"/> Sales above break-even - 6~9 years				
Biopharmaceutical industry	Less than 50	4	2	42
	50~299	5	5	61
	300~999	2	2	43
	More than 1,000	1	1	40
Biochemical industry	Less than 50	14	13	59
	50~299	3	3	48
	More than 1,000	1	1	60
Biofood industry	Less than 50	12	8	52
	50~299	2	2	67
Bioenvironmental industry	Less than 50	4	3	57
	300~999	1	1	73
Bioelectronics industry	Less than 50	1	-	-
Bioprocess and equipment industry	Less than 50	2	1	86
	50~299	3	3	54
Bioenergy and bioresource industry	Less than 50	2	2	52
Bioassay, bioinformatics and R&D service industry	Less than 50	2	1	60
	50~299	1	1	68
<input type="checkbox"/> Sales above break-even - 10 or more years				
Biopharmaceutical industry	Less than 50	9	7	56
	50~299	32	31	60
	300~999	17	16	66
	More than 1,000	8	8	57
Biochemical industry	Less than 50	19	16	62
	50~299	13	12	68
	300~999	2	2	60
	More than 1,000	1	1	74
Biofood industry	Less than 50	18	12	58
	50~299	13	13	62
	300~999	4	4	43
	More than 1,000	3	3	52

	Total	Ratio of Net worth	
		Number of respondent companies	Average
<b>Number of companies</b>	<b>975</b>	<b>790</b>	<b>48</b>
<b>Bioenvironmental industry</b>			
Less than 50	9	9	61
50~299	4	4	63
More than 1,000	1	1	50
<b>Bioelectronics industry</b>			
Less than 50	1	1	38
50~299	1	1	94
300~999	1	1	73
<b>Bioprocess and equipment industry</b>			
Less than 50	9	7	50
50~299	7	7	58
300~999	1	1	29
<b>Bioenergy and bioresource industry</b>			
Less than 50	1	1	66
50~299	2	2	82
300~999	1	1	91
<b>Bioassay, bioinformatics and R&amp;D service industry</b>			
Less than 50	7	6	-24
50~299	9	9	36
<input type="checkbox"/> Sales - Unknown			
<b>Biopharmaceutical industry</b>			
Less than 50	9	7	44
50~299	9	9	48
300~999	4	4	65
Unknown	5	-	-
<b>Biochemical industry</b>			
Less than 50	5	2	10
50~299	2	2	15
300~999	1	1	29
More than 1,000	3	3	55
Unknown	2	-	-
<b>Biofood industry</b>			
Less than 50	4	1	47
<b>Bioenvironmental industry</b>			
Less than 50	1	1	35
Unknown	1	-	-
<b>Bioprocess and equipment industry</b>			
Less than 50	2	2	8
50~299	1	1	29
300~999	1	1	46
<b>Bioassay, bioinformatics and R&amp;D service industry</b>			
Less than 50	2	2	59
50~299	1	1	77

< Table 2 > Manpower Status of Bioindustry  
 < Table 2-1 > Manpower Size of Researchers(III-2) (Unit : number of firms, people)

	Total	Bioindustry Workers		Researcher: Doctor		Researcher: Master		Researcher: Bachelor		Researcher: Others		Researcher: Total	
		Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average
<b>Number of companies</b>	<b>975</b>	<b>37,909</b>	<b>39</b>	<b>1,647</b>	<b>2</b>	<b>5,517</b>	<b>6</b>	<b>3,460</b>	<b>4</b>	<b>1,191</b>	<b>1</b>	<b>11,815</b>	<b>12</b>
<input checked="" type="checkbox"/> Sales Situation													
No sales	285	5,106	18	302	1	1,019	4	687	3	162	1	2,170	8
Sales below break-even - 1 year	18	956	53	39	2	111	6	65	4	6	0	221	12
Sales below break-even - 2~3 years	67	1,856	28	91	1	262	4	163	2	94	1	570	9
Sales below break-even - 4~5 years	94	1,735	18	104	1	272	3	200	2	55	1	671	7
Sales below break-even - 6~9 years	82	2,291	28	135	2	332	4	210	3	57	1	734	9
Sales below break-even - 10 or more years	70	2,532	36	159	2	460	7	251	4	23	0	893	13
Sales below break-even - Unknown	1	43	43	3	3	14	14	8	8	2	2	27	27
Sales above break-even - 2~3 years	17	614	36	23	1	66	4	60	4	4	0	153	9
Sales above break-even - 4~5 years	35	940	27	56	2	199	6	163	5	8	0	426	12
Sales above break-even - 6~9 years	60	2,843	47	108	2	346	6	199	3	148	2	801	13
Sales above break-even - 10 or more years	193	18,249	95	577	3	2,310	12	1,345	7	620	3	4,852	25
Sales - Unknown	53	744	14	50	1	126	3	109	3	12	0	297	6
<input checked="" type="checkbox"/> Main type of industry													
Biopharmaceutical industry	322	19,024	59	786	3	2,572	8	1,316	4	511	2	5,185	16
Biochemical industry	204	4,972	24	297	2	1,085	6	627	3	119	1	2,128	10
Biofood industry	197	6,966	35	276	1	906	5	493	3	176	1	1,851	9
Bioenvironmental industry	76	1,385	18	35	0	130	2	169	2	53	1	387	5
Bioelectronics industry	24	1,148	48	36	2	127	6	112	5	18	1	293	12
Bioprocess and equipment industry	73	1,524	21	53	1	187	3	212	3	38	1	490	7
Bioenergy and bioresource industry	28	1,010	36	51	2	113	4	97	3	152	5	413	15
Bioassay, bioinformatics and R&D service industry	51	1,880	37	113	2	397	8	434	9	124	2	1,068	21
<input checked="" type="checkbox"/> Number of employees													
Less than 50	585	7,177	12	495	1	1,215	2	1,100	2	183	0	2,993	5
50~299	257	15,703	61	487	2	1,675	7	1,496	6	395	2	4,053	16
300~999	80	6,979	87	217	3	895	12	388	5	221	3	1,721	22
More than 1,000	43	8,050	187	448	10	1,732	40	476	11	392	9	3,048	71
Unknown	10	-	-	-	-	-	-	-	-	-	-	-	-
<input type="checkbox"/> Sales situation - No sales													
Biopharmaceutical industry													
Less than 50	42	507	12	35	1	101	3	111	3	20	1	267	6
50~299	41	948	23	52	1	177	5	141	4	37	1	407	10
300~999	18	339	19	39	2	184	12	43	3	0	0	269	15
More than 1,000	2	-	-	-	-	-	-	-	-	-	-	-	-
Biochemical industry													
Less than 50	26	238	9	9	0	35	1	34	1	5	0	83	3
50~299	10	357	36	8	1	25	3	34	4	11	1	78	8
300~999	3	3	1	1	1	2	2	-	-	-	-	3	1
More than 1,000	5	147	29	49	10	63	13	20	4	10	2	142	28
Biofood industry													
Less than 50	22	197	9	15	1	30	1	35	2	5	0	85	4
50~299	18	487	27	14	1	43	3	51	3	20	1	128	7
300~999	8	504	63	14	2	65	8	37	5	15	2	131	16
More than 1,000	10	504	50	25	3	155	16	49	5	10	1	239	24
Unknown	1	-	-	-	-	-	-	-	-	-	-	-	-
Bioenvironmental industry													
Less than 50	19	96	5	2	0	17	1	12	1	3	0	34	2
50~299	4	183	46	3	1	7	2	17	4	2	1	29	7
Bioelectronics industry													
Less than 50	5	28	6	4	1	8	2	12	3	1	0	25	5
50~299	2	18	9	1	1	7	4	5	3	-	-	13	7
300~999	1	-	-	-	-	-	-	-	-	-	-	-	-
Bioprocess and equipment industry													
Less than 50	19	112	6	3	0	19	1	21	1	5	0	48	3
50~299	4	81	20	4	1	15	4	11	3	3	1	33	8
Unknown	1	-	-	-	-	-	-	-	-	-	-	-	-
Bioenergy and bioresource industry													
Less than 50	9	66	7	5	1	10	1	15	2	7	1	37	4
50~299	3	87	29	-	-	6	2	14	5	-	-	20	7
More than 1,000	1	76	76	10	10	20	20	6	6	5	5	41	41
Bioassay, bioinformatics and R&D service industry													
Less than 50	9	53	6	5	1	10	1	15	2	-	-	30	3
50~299	2	75	38	4	2	20	10	4	2	-	-	28	14



III. Statistical Tables

	Total	Bioindustry Workers		Researcher: Doctor		Researcher: Master		Researcher: Bachelor		Researcher: Others		Researcher: Total			
		Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average		
Number of companies	975	37,909	39	1,647	2	5,517	6	3,460	4	1,191	1	11,815	12		
☐ Sales below break-even - 1 year															
Bio pharmaceutical industry		Less than 50	7	162	23	14	2	37	5	15	2	2	0	68	10
		50~299	1	77	77	2	2	4	4	22	22	-	-	28	28
		300~999	1	532	532	-	-	-	-	-	-	-	-	-	-
Biochemical industry		Less than 50	2	27	14	1	1	2	1	6	3	-	-	9	5
Biofood industry		Less than 50	2	11	6	1	1	1	1	3	2	-	-	5	3
		50~299	1	28	28	1	1	5	5	5	5	-	-	11	11
		300~999	1	30	30	2	2	21	21	6	6	1	1	30	30
Bioelectronics industry		Less than 50	1	18	18	3	3	4	4	-	-	-	-	7	7
Bioassay, bioinformatics and R&D service industry		Less than 50	1	20	20	3	3	5	5	5	5	-	-	13	13
		50~299	1	51	51	12	12	32	32	3	3	3	3	50	50
☐ Sales below break-even - 2~3 years															
Bio pharmaceutical industry		Less than 50	8	90	11	14	2	34	4	5	1	-	-	53	7
		50~299	8	563	70	14	2	39	5	31	4	6	1	90	11
		More than 1,000	1	167	167	20	20	38	38	10	10	10	10	78	78
Biochemical industry		Less than 50	17	128	8	8	0	22	1	25	1	5	0	60	4
		50~299	4	42	11	4	1	8	3	16	5	2	2	33	8
		300~999	1	180	180	3	3	44	44	17	17	7	7	71	71
		More than 1,000	1	13	13	5	5	8	8	-	-	-	-	13	13
Biofood industry		Less than 50	8	101	13	6	1	20	3	12	2	4	1	42	5
		50~299	3	266	89	2	1	5	2	4	1	3	1	14	5
Bioenvironmental industry		Less than 50	4	23	6	1	0	3	1	6	2	4	1	14	4
Bioelectronics industry		Less than 50	3	75	25	6	2	13	4	10	3	4	1	33	11
Bioprocess and equipment industry		Less than 50	3	38	13	1	0	4	1	4	1	2	1	11	4
Bioenergy and bioresource industry		Less than 50	4	86	22	5	1	12	3	12	3	2	1	31	8
		50~299	1	78	78	1	1	10	10	2	2	2	2	23	23
Bioassay, bioinformatics and R&D service industry		Less than 50	1	6	6	1	1	2	2	1	1	-	-	4	4
☐ Sales below break-even - 4~5 years															
Bio pharmaceutical industry		Less than 50	15	295	20	23	2	55	4	39	3	10	1	127	8
		50~299	7	578	83	9	2	35	6	17	3	52	9	113	16
Biochemical industry		Less than 50	19	173	9	9	1	26	2	38	2	6	0	79	4
		50~299	1	33	33	1	1	9	9	2	2	-	-	12	12
		300~999	1	53	53	4	4	22	22	11	11	-	-	37	37
		More than 1,000	1	30	30	2	2	6	6	2	2	2	2	12	12
Biofood industry		Less than 50	19	214	11	22	1	43	2	26	1	2	0	93	5
Bioenvironmental industry		Less than 50	10	87	9	5	1	16	2	14	1	6	1	41	4
		50~299	1	24	24	3	3	5	5	-	-	-	-	8	8
Bioelectronics industry		Less than 50	2	22	11	1	1	2	1	3	2	-	-	6	3
		50~299	2	50	25	4	2	14	7	14	7	4	2	36	18
Bioprocess and equipment industry		Less than 50	8	81	10	5	1	14	2	16	2	4	1	39	5
Bioenergy and bioresource industry		Less than 50	2	16	8	1	1	1	1	1	1	5	3	8	4
Bioassay, bioinformatics and R&D service industry		Less than 50	6	79	13	15	3	24	4	17	3	4	1	60	10
☐ Sales below break-even - 6~9 years															
Bio pharmaceutical industry		Less than 50	15	255	17	31	2	63	4	26	2	5	0	125	8
		50~299	4	423	106	29	7	45	11	36	9	8	2	118	30
		300~999	3	95	32	5	3	28	14	13	7	1	1	47	16
Biochemical industry		Less than 50	20	300	15	22	1	50	3	43	2	8	0	123	6
		50~299	1	201	201	8	8	43	43	4	4	5	5	60	60
		More than 1,000	2	51	26	13	7	20	10	2	1	1	1	36	18
Biofood industry		Less than 50	16	145	9	9	1	17	1	22	1	1	0	49	3
		50~299	1	102	102	2	2	4	4	2	2	-	-	8	8
Bioenvironmental industry		Less than 50	7	34	5	3	0	9	1	6	1	-	-	18	3
		50~299	3	427	142	1	0	3	1	16	5	26	9	46	15
Bioelectronics industry		Less than 50	1	13	13	1	1	2	2	4	4	-	-	7	7
Bioprocess and equipment industry		Less than 50	2	38	19	1	1	6	3	5	3	1	1	13	7
		50~299	1	126	126	4	4	14	14	24	24	-	-	42	42
Bioassay, bioinformatics and R&D service industry		Less than 50	5	49	10	4	1	17	3	5	1	1	0	27	5
		50~299	1	32	32	2	2	11	11	2	2	-	-	15	15

III. Statistical Tables

	Total	Bioindustry Workers		Researcher: Doctor		Researcher: Master		Researcher: Bachelor		Researcher: Others		Researcher: Total			
		Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average		
Number of companies	975	37,909	39	1,647	2	5,517	6	3,460	4	1,191	1	11,815	12		
☐ Sales below break-even - 10 or more years															
Bio pharmaceutical industry		Less than 50	12	244	20	22	2	43	4	48	4	5	0	118	10
		50~299	7	430	61	63	9	103	15	34	5	4	1	204	29
		300~999	5	377	75	22	4	73	15	39	8	6	1	140	28
		More than 1,000	2	177	89	21	11	112	56	32	16	1	1	166	83
Biochemical industry		Less than 50	9	73	8	4	0	9	1	11	1	1	0	25	3
		50~299	1	113	113	2	2	15	15	10	10	-	-	27	27
Biofood industry		Less than 50	18	269	15	15	1	28	2	26	1	2	0	71	4
		50~299	4	389	97	2	1	30	8	12	3	-	-	44	11
Bioenvironmental industry		Less than 50	5	34	7	1	0	5	1	1	0	-	-	7	1
Bioelectronics industry		Less than 50	1	5	5	2	2	1	1	-	-	-	-	3	3
		300~999	1	339	339	3	3	32	32	33	33	2	2	70	70
Bioprocess and equipment industry		Less than 50	3	25	8	-	-	1	0	3	1	1	0	5	2
		50~299	1	53	53	-	-	7	7	2	2	-	-	9	9
Bioassay, bioinformatics and R&D service industry		Less than 50	1	4	4	2	2	1	1	-	-	-	-	4	4
☐ Sales below break-even - Unknown															
Biofood industry		Less than 50	1	43	43	3	3	14	14	8	8	2	2	27	27
☐ Sales above break-even - 2~3 years															
Bio pharmaceutical industry		Less than 50	1	29	29	-	-	5	5	1	1	-	-	6	6
		50~299	4	321	80	8	2	27	7	12	3	-	-	47	12
Biochemical industry		Less than 50	2	22	11	1	1	-	-	3	2	1	1	5	3
		50~299	1	7	7	2	2	4	4	-	-	-	-	6	6
Biofood industry		Less than 50	3	16	5	-	-	1	0	4	1	-	-	5	2
Bioenvironmental industry		Less than 50	1	27	27	-	-	-	-	4	4	1	1	5	5
Bioelectronics industry		Less than 50	1	-	-	-	-	-	-	-	-	-	-	-	-
Bioprocess and equipment industry		Less than 50	2	44	22	1	1	4	2	7	4	-	-	12	6
		50~299	1	122	122	11	11	25	25	26	26	2	2	64	64
Bioenergy and bioresource industry		Less than 50	1	26	26	-	-	-	-	3	3	-	-	3	3
☐ Sales above break-even - 4~5 years															
Bio pharmaceutical industry		Less than 50	9	152	17	13	1	32	4	25	3	1	0	71	8
		50~299	3	203	68	4	1	49	16	63	21	-	-	116	39
		300~999	1	114	114	3	3	19	19	1	1	-	-	23	23
Biochemical industry		Less than 50	9	95	11	5	1	13	1	9	1	-	-	27	3
		50~299	1	74	74	3	3	5	5	1	1	-	-	9	9
		300~999	1	91	91	19	19	49	49	18	18	5	5	91	91
Biofood industry		Less than 50	5	52	10	3	1	4	1	7	1	1	0	15	3
Bioenvironmental industry		Less than 50	1	18	18	-	-	-	-	7	7	-	-	7	7
Bioprocess and equipment industry		Less than 50	1	32	32	2	2	3	3	-	-	-	-	5	5



III. Statistical Tables

Number of companies	Total	Bioindustry Workers		Production workers: Doctor		Production workers: Master		Production workers: Bachelor		Production workers: Others		Production workers: Total		
		Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	
		975	37,909	39	117	0	873	1	4,224	5	7,654	8	12,868	13
<input type="checkbox"/> Sales below break-even - 1 year														
Bio pharmaceutical industry	Less than 50	7	162	23	-	-	1	0	26	4	5	1	32	5
	50-299	1	77	77	-	-	-	-	6	6	7	7	13	13
	300-999	1	532	532	7	7	87	87	225	225	151	151	470	470
Biochemical industry	Less than 50	2	27	14	-	-	1	1	3	2	8	4	12	6
Biofood industry	Less than 50	2	11	6	-	-	-	-	2	1	-	-	2	1
	50-299	1	28	28	-	-	1	1	8	8	8	8	17	17
	300-999	1	30	30	-	-	-	-	-	-	-	-	-	-
Bioelectronics industry	Less than 50	1	18	18	-	-	-	-	-	-	2	2	2	2
Bioassay, bioinformatics and R&D service industry	Less than 50	1	20	20	-	-	-	-	-	-	-	-	-	-
	50-299	1	51	51	-	-	-	-	-	-	-	-	-	-
<input type="checkbox"/> Sales below break-even - 2-3 years														
Bio pharmaceutical industry	Less than 50	8	90	11	1	0	9	1	6	1	3	0	19	2
	50-299	8	563	70	-	-	2	0	49	6	174	22	225	28
	More than 1,000	1	167	167	-	-	20	20	30	30	15	15	65	65
Biochemical industry	Less than 50	17	128	8	-	-	1	0	20	1	23	1	44	3
	50-299	4	42	11	-	-	1	0	5	2	3	1	9	2
	300-999	1	180	180	-	-	-	-	82	82	10	10	92	92
	More than 1,000	1	13	13	-	-	-	-	-	-	-	-	-	-
Biofood industry	Less than 50	8	101	13	3	0	1	0	13	2	10	1	27	3
	50-299	3	266	89	-	-	1	1	65	33	76	38	142	47
Bioenvironmental industry	Less than 50	4	23	6	3	1	1	0	-	-	-	-	4	1
Bioelectronics industry	Less than 50	3	75	25	-	-	1	0	6	2	12	4	19	6
Bioprocess and equipment industry	Less than 50	3	38	13	-	-	10	3	16	5	-	-	26	9
Bioenergy and bioresource industry	Less than 50	4	86	22	1	0	4	1	9	2	23	6	37	9
	50-299	1	78	78	-	-	1	1	9	9	13	13	23	23
Bioassay, bioinformatics and R&D service industry	Less than 50	1	6	6	-	-	-	-	2	2	-	-	2	2
<input type="checkbox"/> Sales below break-even - 4-5 years														
Bio pharmaceutical industry	Less than 50	15	295	20	1	0	16	1	56	4	35	2	108	7
	50-299	7	578	83	2	0	27	5	39	7	119	20	187	27
Biochemical industry	Less than 50	19	173	9	1	0	4	0	21	1	18	1	44	2
	50-299	1	33	33	-	-	2	2	10	10	9	9	21	21
	300-999	1	53	53	-	-	-	-	16	16	-	-	16	16
	More than 1,000	1	30	30	-	-	3	3	6	6	9	9	18	18
Biofood industry	Less than 50	19	214	11	2	0	4	0	26	1	34	2	66	3
Bioenvironmental industry	Less than 50	10	87	9	-	-	2	0	20	2	17	2	39	4
	50-299	1	24	24	-	-	1	1	12	12	-	-	13	13
Bioelectronics industry	Less than 50	2	22	11	-	-	-	-	2	1	9	5	11	6
	50-299	2	50	25	1	1	2	1	8	4	3	2	14	7
Bioprocess and equipment industry	Less than 50	8	81	10	1	0	5	1	4	1	21	3	31	4
Bioenergy and bioresource industry	Less than 50	2	16	8	-	-	-	-	3	2	5	3	8	4
Bioassay, bioinformatics and R&D service industry	Less than 50	6	79	13	-	-	1	0	-	-	5	1	6	1
<input type="checkbox"/> Sales below break-even - 6-9 years														
Bio pharmaceutical industry	Less than 50	15	255	17	2	0	7	0	41	3	16	1	66	4
	50-299	4	423	106	-	-	5	1	16	4	106	27	127	32
	300-999	3	95	32	1	1	8	4	20	10	16	8	45	15
Biochemical industry	Less than 50	20	300	15	1	0	2	0	43	2	33	2	79	4
	50-299	1	201	201	-	-	3	3	8	8	16	16	27	27
	More than 1,000	2	51	26	1	1	5	3	1	1	8	4	15	8
Biofood industry	Less than 50	16	145	9	2	0	3	0	10	1	27	2	42	3
	50-299	1	102	102	-	-	1	1	30	30	54	54	85	85
Bioenvironmental industry	Less than 50	7	34	5	-	-	1	0	6	1	2	0	9	1
	50-299	3	427	142	-	-	-	-	3	1	51	17	54	18
Bioelectronics industry	Less than 50	1	13	13	-	-	2	2	4	4	-	-	6	6
Bioprocess and equipment industry	Less than 50	2	38	19	-	-	-	-	1	1	10	5	11	6
	50-299	1	126	126	1	1	4	4	13	13	40	40	58	58
Bioassay, bioinformatics and R&D service industry	Less than 50	5	49	10	-	-	1	0	10	2	-	-	11	2
	50-299	1	32	32	1	1	2	2	7	7	-	-	10	10

III. Statistical Tables

Number of companies	Total	Bioindustry Workers		Production workers: Doctor		Production workers: Master		Production workers: Bachelor		Production workers: Others		Production workers: Total		
		Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	
		975	37,909	39	117	0	873	1	4,224	5	7,654	8	12,868	13
<input type="checkbox"/> Sales below break-even - 10 or more years														
Bio pharmaceutical industry	Less than 50	12	244	20	1	0	4	0	38	3	24	2	67	6
	50-299	7	430	61	-	-	15	2	50	7	38	5	103	15
	300-999	5	377	75	-	-	8	2	67	13	62	12	137	27
	More than 1,000	2	177	89	-	-	1	1	7	4	3	2	11	6
Biochemical industry	Less than 50	9	73	8	-	-	1	0	7	1	17	2	25	3
	50-299	1	113	113	-	-	-	-	25	25	54	54	79	79
Biofood industry	Less than 50	18	269	15	-	-	1	0	43	2	78	4	122	7
	50-299	4	389	97	-	-	-	-	17	4	131	33	148	37
Bioenvironmental industry	Less than 50	5	34	7	5	1	-	-	2	0	-	-	7	1
Bioelectronics industry	Less than 50	1	5	5	-	-	-	-	1	1	-	-	1	1
	300-999	1	339	339	-	-	2	2	9	9	118	118	129	129
Bioprocess and equipment industry	Less than 50	3	25	8	-	-	-	-	4	1	3	1	7	2
	50-299	1	53	53	-	-	-	-	2	2	21	21	23	23
Bioassay, bioinformatics and R&D service industry	Less than 50	1	4	4	-	-	-	-	-	-	-	-	-	-
<input type="checkbox"/> Sales below break-even - Unknown														
Biofood industry	Less than 50	1	43	43	1	1	3	3	7	7	5	5	16	16
<input type="checkbox"/> Sales above break-even - 2-3 years														
Bio pharmaceutical industry	Less than 50	1	29	29	-	-	1	1	2	2	1	1	4	4
	50-299	4	321	80	8	2	8	2	40	10	86	22	142	36
Biochemical industry	Less than 50	2	22	11	-	-	-	-	1	1	11	6	12	6
	50-299	1	7	7	-	-	-	-	1	1	-	-	1	1
Biofood industry	Less than 50	3	16	5	1	0	-	-	1	0	-	-	2	1
Bioenvironmental industry	Less than 50	1	27	27	-	-	-	-	3	3	14	14	17	17
Bioelectronics industry	Less than 50	1	-	-	-	-	-	-	-	-	-	-	-	-
Bioprocess and equipment industry	Less than 50	2	44	22	-	-	-	-	6	3	5	3	11	6
	50-299	1	122	122	-	-	-	-	-	-	-	-	-	-
Bioenergy and bioresource industry	Less than 50	1	26	26	-	-	-	-	-	-	12	12	12	12
<input type="checkbox"/> Sales above break-even - 4-5 years														
Bio pharmaceutical industry	Less than 50	9	152	17	1	0	-	-	32	4	11	1	44	5
	50-299	3	203	68	-	-	-	-	26	9	-	-	26	9
	300-999	1	114	114	-	-	12	12	26	26	14	14	52	52
Biochemical industry	Less than 50	9	95	11	-	-	1	0	16	2	11	1	28	3
	50-299	1	74	74	-	-	-	-	10	10	19	19	29	29
	300-999	1	91	91	-	-	-	-	-	-	-	-	-	-
Biofood industry	Less than 50	5	52	10	1	0	1	0	11	2	8	2	21	4
Bioenvironmental industry	Less than 50	1	18	18	-	-	-	-	2	2	-	-	2	2
Bioprocess and equipment industry	Less than 50	1	32	32	-	-	-	-	14	14	8	8	22	22
	50-299	1	57	57	-	-	-	-	6	6	10	10	16	16
Bioenergy and bioresource industry	Less than 50	1	6	6	-	-	-	-	-	-	-	-	-	-
Bioassay, bioinformatics and R&D service industry	Less than 50	2	46	23	-	-	-	-	-	-	-	-	-	-
<input type="checkbox"/> Sales above break-even - 6-9 years														
Bio pharmaceutical industry	Less than 50	4	50	13	-	-	-	-	5	1	3	1	8	2
	50-299	5	421	84	1	0	29	6	60	12	65	13	155	31
	300-999	2	1,012	506	-	-	19	10	35	18	154	77	208	

		Total		Bioindustry Workers		Production workers: Doctor		Production workers: Master		Production workers: Bachelor		Production workers: Others		Production workers: Total	
		Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average
		975	37,909	39	117	0	873	1	4,224	5	7,654	8	12,868	13	
<input type="checkbox"/> Sales above break-even - 10 or more years															
Bio pharmaceutical industry	Less than 50	9	232	26	1	0	7	1	28	3	36	4	72	8	
	50~299	32	3,521	110	9	0	119	4	305	10	1,207	38	1,640	51	
	300~999	17	925	54	4	0	29	2	185	11	159	9	377	22	
	More than 1,000	8	4,831	604	15	2	105	13	386	48	805	101	1,311	164	
Biochemical industry	Less than 50	19	261	14	-	-	7	0	25	1	31	2	63	3	
	50~299	13	895	69	3	0	8	1	42	3	276	21	329	25	
	300~999	2	444	222	-	-	7	4	87	44	175	88	269	135	
	More than 1,000	1	475	475	-	-	-	-	-	-	-	-	-	-	
Biofood industry	Less than 50	18	331	18	1	0	4	0	37	2	64	4	106	6	
	50~299	13	1,204	93	-	-	30	2	106	8	493	38	629	48	
	300~999	4	715	179	-	-	4	1	64	16	117	29	185	46	
	More than 1,000	3	1,090	363	1	0	8	3	195	65	255	85	459	153	
Bioenvironmental industry	Less than 50	9	130	14	-	-	1	0	19	2	12	1	32	4	
	50~299	4	147	37	1	0	3	1	18	5	22	6	44	11	
	More than 1,000	1	96	96	-	-	-	-	21	21	-	-	21	21	
Bioelectronics industry	Less than 50	1	14	14	-	-	-	-	3	3	-	-	3	3	
	50~299	1	92	92	-	-	1	1	8	8	55	55	64	64	
	300~999	1	468	468	-	-	10	10	43	43	258	258	311	311	
Bioprocess and equipment industry	Less than 50	9	237	26	-	-	3	0	6	1	63	7	72	8	
	50~299	7	360	51	-	-	1	0	29	4	44	6	74	11	
	300~999	1	2	2	-	-	-	-	-	-	-	-	-	-	
Bioenergy and bioresource industry	Less than 50	1	23	23	-	-	-	-	3	3	3	3	6	6	
	50~299	2	124	62	-	-	2	1	-	-	24	12	26	13	
	300~999	1	352	352	-	-	1	1	2	2	15	15	18	18	
Bioassay, bioinformatics and R&D service industry	Less than 50	7	104	15	-	-	-	-	14	2	2	0	16	2	
	50~299	9	1,176	131	-	-	-	-	-	-	-	-	-	-	
<input type="checkbox"/> Sales - Unknown															
Bio pharmaceutical industry	Less than 50	9	46	5	-	-	2	0	6	1	5	1	13	1	
	50~299	9	165	18	-	-	-	-	-	-	-	-	-	-	
	300~999	4	389	97	-	-	-	-	-	-	108	36	108	27	
	Unknown	5	-	-	-	-	-	-	-	-	-	-	-	-	
Biochemical industry	Less than 50	5	26	5	-	-	-	-	-	-	1	0	1	0	
	50~299	2	-	-	-	-	-	-	-	-	-	-	-	-	
	300~999	1	8	8	-	-	-	-	1	1	2	2	3	3	
	More than 1,000	3	22	7	-	-	-	-	-	-	-	-	-	-	
	Unknown	2	-	-	-	-	-	-	-	-	-	-	-	-	
Biofood industry	Less than 50	4	23	6	-	-	-	-	-	-	-	-	-	-	
Bioenvironmental industry	Less than 50	1	-	-	-	-	-	-	-	-	-	-	-	-	
	Unknown	1	-	-	-	-	-	-	-	-	-	-	-	-	
Bioprocess and equipment industry	Less than 50	2	12	6	-	-	-	-	-	-	-	-	-	-	
	50~299	1	5	5	-	-	-	-	-	-	-	-	-	-	
	300~999	1	-	-	-	-	-	-	-	-	-	-	-	-	
Bioassay, bioinformatics and R&D service industry	Less than 50	2	8	4	-	-	-	-	-	-	-	-	-	-	
	50~299	1	40	40	-	-	-	-	8	8	20	20	28	28	

< Table 2-3 > Manpower Size of Others such as sales/administrative(III-2)

(Unit : number of firms, people)

		Total		Bioindustry Workers		Others: Doctor		Others: Master		Others: Bachelor		Others: Others		Others: Total	
		Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average
		975	37,909	39	418	0	1,361	1	7,923	8	3,524	4	13,226	14	
<input type="checkbox"/> Sales Situation															
No sales		285	5,106	18	28	0	123	0	575	2	267	1	993	3	
Sales below break-even - 1 year		18	956	53	10	1	24	1	127	7	26	1	187	10	
Sales below break-even - 2~3 years		67	1,856	28	7	0	36	1	433	7	76	1	552	8	
Sales below break-even - 4~5 years		94	1,735	18	20	0	58	1	279	3	125	1	482	5	
Sales below break-even - 6~9 years		82	2,291	28	29	0	69	1	516	6	298	4	912	11	
Sales below break-even - 10 or more years		70	2,532	36	51	1	84	1	456	7	189	3	780	11	
Sales below break-even - Unknown		1	43	43	-	-	-	-	-	-	-	-	-	-	
Sales above break-even - 2~3 years		17	614	36	97	6	27	2	107	7	29	2	260	15	
Sales above break-even - 4~5 years		35	940	27	10	0	34	1	197	6	33	1	274	8	
Sales above break-even - 6~9 years		60	2,843	47	32	1	208	3	692	12	290	5	1,222	20	
Sales above break-even - 10 or more years		193	18,249	95	134	1	696	4	4,269	22	2,171	11	7,270	38	
Sales - Unknown		53	744	14	-	-	2	0	272	7	20	1	294	6	
<input type="checkbox"/> Main type of industry															
Bio pharmaceutical industry		322	19,024	59	259	1	762	3	4,482	15	1,978	7	7,481	23	
Biochemical industry		204	4,972	24	29	0	133	1	814	4	234	1	1,210	6	
Biofood industry		197	6,966	35	51	0	216	1	1,125	6	614	3	2,006	10	
Bioenvironmental industry		76	1,385	18	11	0	26	0	359	5	201	3	597	8	
Bioelectronics industry		24	1,148	48	10	0	42	2	178	8	59	3	289	12	
Bioprocess and equipment industry		73	1,524	21	11	0	52	1	325	5	170	2	558	8	
Bioenergy and bioresource industry		28	1,010	36	5	0	24	1	185	7	132	5	346	12	
Bioassay, bioinformatics and R&D service industry		51	1,880	37	42	1	106	2	455	9	136	3	739	14	
<input type="checkbox"/> Number of employees															
Less than 50		585	7,177	12	104	0	222	0	1,308	2	425	1	2,059	4	
50~299		257	15,703	61	211	1	599	2	3,693	15	1,567	6	6,070	24	
300~999		80	6,979	87	55	1	341	5	1,510	21	524	7	2,430	30	
More than 1,000		43	8,050	187	48	1	199	5	1,412	33	1,008	23	2,667	62	
Unknown		10	-	-	-	-	-	-	-	-	-	-	-	-	
<input type="checkbox"/> Sales situation - No sales															
Bio pharmaceutical industry	Less than 50	42	507	12	6	0	5	0	56	1	41	1	108	3	
	50~299	41	948	23	12	0	71	2	188	5	36	1	307	7	
	300~999	18	339	19	3	0	9	1	17	1	6	0	35	2	
	More than 1,000	2	-	-	-	-	-	-	-	-	-	-	-	-	
Biochemical industry	Less than 50	26	238	9	-	-	2	0	44	2	19	1	65	3	
	50~299	10	357	36	1	0	6	1	70	8	12	1	89	9	
	300~999	3	3	1	-	-	-	-	-	-	-	-	-	-	
	More than 1,000	5	147	29	-	-	-	-	-	-	-	-	-	-	
Biofood industry	Less than 50	22	197	9	4	0	7	0	21	1	5	0	37	2	
	50~299	18	487	27	1	0	13	1	28	2	95	6	137	8	
	300~999	8	504	63	-	-	-	-	-	-	-	-	-	-	
	More than 1,000	10	504	50	-	-	-	-	-	-	-	-	-	-	
	Unknown	1	-	-	-	-	-	-	-	-	-	-	-	-	
Bioenvironmental industry	Less than 50	19	96	5	-	-	2	0	5	0	15	1	22	1	
	50~299	4	183	46	-	-	1	0	33	8	12	3	46	12	
Bioelectronics industry	Less than 50	5	28	6	-	-	-	-	2	1	-	-	2	0	
	50~299	2	18	9	-	-	-	-	-	-	-	-	-	-	
	300~999	1	-	-	-	-	-	-	-	-	-	-	-	-	
Bioprocess and equipment industry	Less than 50	19	112	6	-	-	4	0	17	1	4	0	25	1	
	50~299	4	81	20	-	-	-	-	-	-	17	4	17	4	
	Unknown	1	-	-	-	-	-	-	-	-	-	-	-	-	
Bioenergy and bioresource industry	Less than 50	9	66	7	-	-	2	0	5	1	2	0	9	1	
	50~299	3	87	29	-	-	-	-	24	8	-	-	24	8	
	More than 1,000	1	76	76	-	-	-	-	-	-	-	-	-	-	
Bioassay, bioinformatics and R&D service industry	Less than 50	9	53	6	1	0	1	0	20	3	1	0	23	3	
	50~299	2	75	38	-	-	-	-	45	23					



	Total	Bioindustry		Others: Doctor		Others: Master		Others: Bachelor		Others: Others		Others: Total	
		Workers	Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	Total
<b>Number of companies</b>	<b>975</b>	<b>37,909</b>	<b>39</b>	<b>418</b>	<b>0</b>	<b>1,361</b>	<b>1</b>	<b>7,923</b>	<b>8</b>	<b>3,524</b>	<b>4</b>	<b>13,226</b>	<b>14</b>
<input type="checkbox"/> Sales above break-even - 10 or more years													
<b>Biopharmaceutical industry</b>													
Less than 50	9	232	26	2	0	4	0	58	6	15	2	79	9
50~299	32	3,521	110	11	0	137	4	873	27	406	13	1,427	45
300~999	17	925	54	3	0	20	1	297	17	43	3	363	21
More than 1,000	8	4,831	604	36	5	152	19	1,224	153	964	121	2,376	297
<b>Biochemical industry</b>													
Less than 50	19	261	14	1	0	13	1	63	3	19	1	96	5
50~299	13	895	69	3	0	48	4	244	19	45	3	340	26
300~999	2	444	222	2	1	8	4	48	24	21	11	79	40
More than 1,000	1	475	475	-	-	-	-	-	-	-	-	-	-
<b>Biofood industry</b>													
Less than 50	18	331	18	11	1	17	1	74	4	21	1	123	7
50~299	13	1,204	93	4	0	43	3	238	18	119	9	404	31
300~999	4	715	179	6	2	45	11	251	63	179	45	481	120
More than 1,000	3	1,090	363	5	2	35	12	117	39	41	14	198	66
<b>Bioenvironmental industry</b>													
Less than 50	9	130	14	1	0	7	1	34	4	12	1	54	6
50~299	4	147	37	-	-	-	-	65	16	-	-	65	16
More than 1,000	1	96	96	-	-	-	-	-	-	-	-	-	-
<b>Bioelectronics industry</b>													
Less than 50	1	14	14	-	-	2	2	2	2	4	4	8	8
50~299	1	92	92	1	1	4	4	9	9	4	4	18	18
300~999	1	468	468	4	4	14	14	50	50	13	13	81	81
<b>Bioprocess and equipment industry</b>													
Less than 50	9	237	26	4	0	25	3	59	7	33	4	121	13
50~299	7	360	51	1	0	4	1	101	14	76	11	182	26
300~999	1	2	2	-	-	-	-	-	-	-	-	-	-
<b>Bioenergy and bioresource industry</b>													
Less than 50	1	23	23	1	1	-	-	4	4	2	2	7	7
50~299	2	124	62	3	2	5	3	15	8	47	24	70	35
300~999	1	352	352	1	1	15	15	87	87	49	49	152	152
<b>Bioassay, bioinformatics and R&amp;D service industry</b>													
Less than 50	7	104	15	4	1	3	0	18	3	-	-	25	4
50~299	9	1,176	131	30	3	95	11	338	38	58	6	521	58
<input type="checkbox"/> Sales - Unknown													
<b>Biopharmaceutical industry</b>													
Less than 50	9	46	5	-	-	-	-	13	2	7	1	20	2
50~299	9	165	18	-	-	1	0	23	5	-	-	24	3
300~999	4	389	97	-	-	-	-	221	74	-	-	221	55
Unknown	5	-	-	-	-	-	-	-	-	-	-	-	-
<b>Biochemical industry</b>													
Less than 50	5	26	5	-	-	-	-	2	0	3	1	5	1
50~299	2	-	-	-	-	-	-	-	-	-	-	-	-
300~999	1	8	8	-	-	-	-	-	-	-	-	-	-
More than 1,000	3	22	7	-	-	-	-	-	-	-	-	-	-
Unknown	2	-	-	-	-	-	-	-	-	-	-	-	-
<b>Biofood industry</b>													
Less than 50	4	23	6	-	-	1	0	10	3	-	-	11	3
<b>Bioenvironmental industry</b>													
Less than 50	1	-	-	-	-	-	-	-	-	-	-	-	-
Unknown	1	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bioprocess and equipment industry</b>													
Less than 50	2	12	6	-	-	-	-	2	1	-	-	2	1
50~299	1	5	5	-	-	-	-	-	-	-	-	-	-
300~999	1	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bioassay, bioinformatics and R&amp;D service industry</b>													
Less than 50	2	8	4	-	-	-	-	1	1	-	-	1	1
50~299	1	40	40	-	-	-	-	-	-	10	10	10	10

< Table 3 > Investment Status of Bioindustry (Unit : number of firms, million Won)

	Total	Total R&D Investment		R&D Investment in Bioindustry		Total Facility Investment		Facility Investment in Bioindustry		
		Total	Average	Total	Average	Total	Average	Total	Average	
<b>Number of companies</b>	<b>975</b>	<b>4,748,242</b>	<b>4,870</b>	<b>1,247,405</b>	<b>1,279</b>	<b>431,309</b>	<b>442</b>	<b>199,015</b>	<b>204</b>	
<input checked="" type="checkbox"/> Sales Situation										
No sales	285	597,143	2,095	236,542	830	80,207	281	47,955	168	
Sales below break-even - 1 year	18	48,089	2,672	14,965	831	3,433	191	1,560	87	
Sales below break-even - 2~3 years	67	132,694	1,981	44,905	670	28,392	424	4,616	69	
Sales below break-even - 4~5 years	94	51,328	546	36,291	386	26,512	282	11,766	125	
Sales below break-even - 6~9 years	82	148,283	1,808	69,248	844	20,535	250	6,381	78	
Sales below break-even - 10 or more years	70	200,017	2,857	111,279	1,590	18,077	258	8,753	125	
Sales below break-even - Unknown	1	-	-	-	-	-	-	-	-	
Sales above break-even - 2~3 years	17	11,333	667	6,923	407	17,545	1,032	7,480	440	
Sales above break-even - 4~5 years	35	42,478	1,214	22,676	648	3,697	106	2,620	75	
Sales above break-even - 6~9 years	60	318,973	5,316	254,726	4,245	108,681	1,811	40,032	667	
Sales above break-even - 10 or more years	193	3,169,455	16,422	430,118	2,229	121,741	631	65,823	341	
Sales - Unknown	53	28,449	537	19,732	372	2,489	47	2,029	38	
<input checked="" type="checkbox"/> Main type of industry										
<b>Biopharmaceutical industry</b>	322	1,629,210	5,060	941,166	2,923	284,084	882	150,693	468	
Biochemical industry	204	2,534,754	12,425	97,081	476	57,297	281	12,898	63	
Biofood industry	197	307,419	1,561	95,996	487	49,735	252	15,806	80	
Bioenvironmental industry	76	20,506	270	10,589	139	3,621	48	1,929	25	
Bioelectronics industry	24	27,636	1,152	22,878	953	3,660	153	1,361	57	
Bioprocess and equipment industry	73	96,631	1,324	22,859	313	17,864	245	6,348	87	
Bioenergy and bioresource industry	28	57,467	2,052	20,246	723	3,328	119	2,389	85	
Bioassay, bioinformatics and R&D service industry	51	74,619	1,463	36,590	717	11,720	230	7,591	149	
<input checked="" type="checkbox"/> Number of employees										
Less than 50	585	184,482	315	118,433	202	31,797	54	22,715	39	
50~299	257	569,398	2,216	442,243	1,721	142,343	554	87,742	341	
300~999	80	590,651	7,383	318,525	3,982	54,388	680	10,326	129	
More than 1,000	43	3,403,711	79,156	368,204	8,563	202,781	4,716	78,232	1,819	
Unknown	10	-	-	-	-	-	-	-	-	
<input type="checkbox"/> Sales situation - No sales										
<b>Biopharmaceutical industry</b>										
Less than 50	42	7,828	186	5,563	132	237	6	236	6	
50~299	41	180,727	4,408	172,922	4,218	37,359	911	36,343	886	
300~999	18	98,912	5,495	25,811	1,434	11,726	651	2,547	142	
More than 1,000	2	21,994	10,997	100	50	-	-	-	-	
<b>Biochemical industry</b>										
Less than 50	26	7,331	282	3,700	142	758	29	385	15	
50~299	10	4,780	478	1,377	138	850	85	130	13	
300~999	3	7,658	2,553	400	133	1,000	333	40	13	
More than 1,000	5	159,800	31,960	5,500	1,100	5,000	1,000	3,000	600	
<b>Biofood industry</b>										
Less than 50	22	2,846	129	1,141	52	897	41	297	14	
50~299	18	3,962	220	1,830	102	1,030	57	410	23	
300~999	8	15,590	1,949	2,936	367	4,320	540	775	97	
More than 1,000	10	36,500	3,650	4,600	460	13,500	1,350	2,300	230	
Unknown	1	-	-	-	-	-	-	-	-	
<b>Bioenvironmental industry</b>										
Less than 50	19	1,388	73	648	34	-	-	-	-	
50~299	4	1,029	257	954	239	1	0	1	0	
<b>Bioelectronics industry</b>										
Less than 50	5	100	20	10	2	100	20	10	2	
50~299	2	1,750	875	500	250	500	250	300	150	
300~999	1	-	-	-	-	-	-	-	-	
<b>Bioprocess and equipment industry</b>										
Less than 50	19	1,168	61	460	24	1,213	64	400	21	
50~299	4	2,689	672	2,489	622	-	-	-	-	
Unknown	1	-	-	-	-	-	-	-	-	
<b>Bioenergy and bioresource industry</b>	</									

III. Statistical Tables

		Total	Total R&D Investment		R&D Investment in Bioindustry		Total Facility Investment		Facility Investment in Bioindustry	
			Total	Average	Total	Average	Total	Average	Total	Average
Number of companies		975	4,748,242	4,870	1,247,405	1,279	431,309	442	199,015	204
□ Sales below break-even - 1 year										
Biopharmaceutical industry	Less than 50	7	5,348	764	5,348	764	484	69	444	63
	50~299	1	2,532	2,532	2,532	2,532	1,640	1,640	236	236
	300~999	1	187	187	187	187	-	-	-	-
Biochemical industry	Less than 50	2	88	44	65	33	28	14	15	8
Biofood industry	Less than 50	2	614	307	614	307	-	-	-	-
	50~299	1	80	80	10	10	-	-	-	-
	300~999	1	1,850	1,850	20	20	100	100	10	10
Bioelectronics industry	Less than 50	1	113	113	113	207	207	207	207	207
Bioassay, bioinformatics and R&D service industry	Less than 50	1	203	203	-	-	-	-	-	-
	50~299	1	37,074	37,074	6,076	6,076	974	974	648	648
□ Sales below break-even - 2~3 years										
Biopharmaceutical industry	Less than 50	8	4,489	561	3,846	481	35	4	35	4
	50~299	8	12,830	1,604	9,810	1,226	635	79	395	49
	More than 1,000	1	54,366	54,366	20,000	20,000	10,000	10,000	2,000	2,000
Biochemical industry	Less than 50	17	1,830	108	1,185	70	495	29	345	20
	50~299	4	4,993	1,248	1,220	305	112	28	51	13
	300~999	1	5,000	5,000	2,000	2,000	2,500	2,500	1,000	1,000
	More than 1,000	1	39,882	39,882	1,950	1,950	14,000	14,000	200	200
Biofood industry	Less than 50	8	2,185	273	1,885	236	70	9	60	8
	50~299	3	2,353	784	250	83	-	-	-	-
Bioenvironmental industry	Less than 50	4	493	123	493	123	30	8	30	8
Bioelectronics industry	Less than 50	3	1,116	372	1,076	359	200	67	200	67
Bioprocess and equipment industry	Less than 50	3	1,100	367	400	133	45	15	30	10
Bioenergy and bioresource industry	Less than 50	4	1,117	279	530	133	260	65	260	65
	50~299	1	690	690	10	10	10	10	10	10
Bioassay, bioinformatics and R&D service industry	Less than 50	1	250	250	250	250	-	-	-	-
□ Sales below break-even - 4~5 years										
Biopharmaceutical industry	Less than 50	15	10,734	716	10,719	715	2,143	143	943	63
	50~299	7	14,972	2,139	10,500	1,500	10,659	1,523	6,362	909
	300~999	1	450	450	80	80	-	-	-	-
Biochemical industry	Less than 50	19	2,427	128	1,903	100	245	13	95	5
	50~299	1	450	450	80	80	-	-	-	-
	300~999	1	3,570	3,570	400	400	7,541	7,541	700	700
	More than 1,000	1	-	-	-	-	-	-	-	-
Biofood industry	Less than 50	19	5,034	265	4,180	220	2,693	142	2,676	141
Bioenvironmental industry	Less than 50	10	1,403	140	1,231	123	197	20	165	17
	50~299	1	620	620	620	620	-	-	-	-
Bioelectronics industry	Less than 50	2	170	85	120	60	30	15	30	15
	50~299	2	7,406	3,703	4,078	2,039	2,194	1,097	185	93
Bioprocess and equipment industry	Less than 50	8	3,010	376	1,510	189	305	38	105	13
Bioenergy and bioresource industry	Less than 50	2	-	-	-	-	-	-	-	-
Bioassay, bioinformatics and R&D service industry	Less than 50	6	1,532	255	950	158	505	84	505	84
□ Sales below break-even - 6~9 years										
Biopharmaceutical industry	Less than 50	15	9,401	627	7,938	529	1,118	75	518	35
	50~299	4	8,493	2,123	6,606	1,652	6,039	1,510	1,657	414
	300~999	3	12,071	4,024	12,071	4,024	7,314	2,438	230	77
Biochemical industry	Less than 50	20	13,534	677	12,627	631	2,692	135	2,535	127
	50~299	1	7,637	7,637	7,637	7,637	-	-	-	-
	300~999	1	-	-	-	-	-	-	-	-
	More than 1,000	2	83,167	41,584	14,000	7,000	300	150	300	150
Biofood industry	Less than 50	16	3,671	229	1,915	120	270	17	137	9
	50~299	1	632	632	632	632	-	-	-	-
Bioenvironmental industry	Less than 50	7	330	47	160	23	300	43	280	40
Bioelectronics industry	Less than 50	3	1,800	600	1,000	333	-	-	-	-
	50~299	1	-	-	-	-	-	-	-	-
Bioprocess and equipment industry	Less than 50	2	468	234	277	139	126	63	126	63
	50~299	1	3,163	3,163	3,163	3,163	98	98	98	98
Bioenergy and bioresource industry	Less than 50	5	1,666	333	1,072	214	278	56	-	-
Bioassay, bioinformatics and R&D service industry	Less than 50	1	2,250	2,250	150	150	2,000	2,000	500	500

III. Statistical Tables

		Total	Total R&D Investment		R&D Investment in Bioindustry		Total Facility Investment		Facility Investment in Bioindustry	
			Total	Average	Total	Average	Total	Average	Total	Average
Number of companies		975	4,748,242	4,870	1,247,405	1,279	431,309	442	199,015	204
□ Sales below break-even - 10 or more years										
Biopharmaceutical industry	Less than 50	12	8,720	727	6,225	519	105	9	105	9
	50~299	7	67,952	9,707	63,448	9,064	3,651	522	3,448	493
	300~999	5	36,990	7,398	12,483	2,497	1,303	261	458	92
	More than 1,000	2	67,515	33,758	14,094	7,047	9,473	4,737	1,600	800
Biochemical industry	Less than 50	9	1,018	113	845	94	55	6	55	6
Biofood industry	50~299	1	1,423	1,423	300	300	200	200	100	100
	300~999	1	7,368	7,368	7,368	7,368	-	-	-	-
Bioenvironmental industry	Less than 50	5	70	14	60	12	50	10	50	10
	50~299	1	100	100	100	100	-	-	-	-
Bioelectronics industry	Less than 50	1	7,368	7,368	7,368	7,368	-	-	-	-
	50~299	1	100	100	100	100	-	-	-	-
Bioprocess and equipment industry	Less than 50	3	577	192	317	106	50	17	50	17
	50~299	1	715	715	715	715	35	35	14	14
Bioassay, bioinformatics and R&D service industry	Less than 50	1	100	100	100	100	10	10	10	10
□ Sales below break-even - Unknown										
Biofood industry	Less than 50	1	-	-	-	-	-	-	-	-
□ Sales above break-even - 2~3 years										
Biopharmaceutical industry	Less than 50	1	480	480	480	480	-	-	-	-
	50~299	4	3,203	801	3,203	801	2,732	683	2,732	683
Biochemical industry	Less than 50	2	400	200	300	150	282	141	217	109
	50~299	1	1,200	1,200	-	-	1,000	1,000	-	-
Biofood industry	Less than 50	3	30	10	20	7	-	-	-	-
	50~299	1	286	286	71	71	-	-	-	-
Bioenvironmental industry	Less than 50	1	-	-	-	-	-	-	-	-
	50~299	1	5,525	5,525	2,700	2,700	13,000	13,000	4,000	4,000
Bioelectronics industry	Less than 50	2	60	30	-	-	-	-	-	-
	50~299	1	5,525	5,525	2,700	2,700	13,000	13,000	4,000	4,000
Bioenergy and bioresource industry	Less than 50	1	149	149	149	149	531	531	531	531
□ Sales above break-even - 4~5 years										
Biopharmaceutical industry	Less than 50	9	3,483	387	2,956	328	1,863	207	961	107
	50~299	3	7,465	2,488	6,900	2,300	-	-	-	-
	300~999	1	1,102	1,102	809	809	24	24	24	24
Biochemical industry	Less than 50	9	1,055	117	760	84	530	59	362	40
	50~299	1	397	397	397	397	102	102	102	102
	300~999	1	24,914	24,914	7,000	7,000	-	-	-	-
Biofood industry	Less than 50	5	1,106	221	948	190	42	8	35	7
Bioenvironmental industry	Less than 50	1	100	100	50	50	-	-	-	-
Bioprocess and equipment industry	Less than 50	1	568	568	568	568	1,136	1,136	1,136	1,136
	50~299	1	2,238	2,238	2,238	2,238	-	-	-	-
Bioenergy and bioresource industry	Less than 50	1	-	-	-	-	-	-	-	-
Bioassay, bioinformatics and R&D service industry	Less than 50	2	50	25	50	25	-	-	-	-
□ Sales above break-even - 6~9 years										
Biopharmaceutical industry	Less than 50	4	1,425	356	1,425	356	131	33	131	33
	50~299	5	15,806	3,161	15,806	3,161	24,806	4,961	2,967	593
	300~999	2	199,255	99,628	195,948	97,974	362	181	332	166
	More than 1,000	1	77,626	77,626	31,479	31,479	79,300	79,300	35,700	35,700
Biochemical industry	Less than 50	14	5,229	374	4,073	291	526	38	349	25
	50~299	3	4,172	1,391	397	132	102	34	20	7
	More than 1,000	1	-	-	-	-	-	-	-	-
Biofood industry	Less than 50	12	967	81	947	79	222	19	217	18
	50~299	2	2,211	1,106	1,211	606	2,087	1,044	150	75
Bioenvironmental industry	Less than 50	4	384	96	217	54	-	-	-	-
	50~299	1	5,774	5,774	358	358	40	40	-	-
Bioelectronics industry	Less than 50	1	100	100	100	100	50	50	50	50
Bioprocess and equipment industry	Less than 50	2	480	240	430	215	37	19	37	19
	50~299	3	704	235	-	-	-	-	-	-
Bioenergy and bioresource industry	Less than 50	2	4,480	2,240	1,975	988	1,018	509	79	40
Bioassay, bioinformatics and R&D service industry	Less than 50	2	360	180	3					



























































< Table 5-2 > Size of Import by Category among  
Classification Scheme of Bioindustry (III-7) (Unit : million Won)

Industry	Industry Name	Category No.	Category Name	Domestic Sales	Export	Total
5	Bioelectronics industry	5010	DNA chips	8,653	1,342	9,995
		5020	Protein chips	100	-	100
		5030	Cell chips	-	-	-
		5040	Biosensors	25,775	116,754	142,529
		5050	BioMEMS	-	-	-
		5000	Other bioelectronics	172	633	805
		Subtotal		34,700	118,729	153,429
		6	Bioprocess and equipment industry	6010	Bioreactors	1,400
6020	Biomedical and diagnostic apparatuses			15,073	11,032	26,105
6030	Bioprocess and analysis equipments			19,748	22,706	42,454
6040	Plant and process design			10,600	-	10,600
6000	Other bioprocess and equipments			4,798	21,535	26,334
Subtotal				51,619	55,600	107,220
7	Bioenergy and bioresource industry	7010	Biofuel	412,253	-	412,253
		7020	Artificial seeds and seedlings	120,890	37,230	158,120
		7030	Experimental animals	25,233	-	25,233
		7040	Transgenic animals and plants	821	-	821
		7000	Other bioenergy and bioresources	46,748	-	46,748
		Subtotal		605,945	37,230	643,175
8	Bioassay, bioinformatics and R&D service industry	8010	Bioinformatics services	246	-	246
		8020	Gene analysis services	33,126	30,406	63,532
		8030	Protein analysis services	2,377	284	2,661
		8040	R&D services	19,511	2,996	22,507
		8050	Biosafety and efficacy evaluation services	85,752	7,589	93,341
		8060	Diagnosis and preservation services	27,259	22	27,281
		8000	Other bioassays, bioinformatics services	80	-	80
		Subtotal		168,351	41,297	209,648
Total				4,194,817	3,398,692	7,593,509

Industry	Industry Name	Category No.	Category Name	Import
1	Biopharmaceutical industry	1010	Antibiotics	16,030
		1020	Anticancer medications	225,172
		1030	Vaccines	361,477
		1040	Hormones	144,836
		1050	Immunotherapeutics	50,242
		1060	Hemotherapeutics	211,005
		1070	Growth factors	-
		1080	New therapeutics	31,485
		1090	Diagnostic kits	30,418
		1100	Animal medications	23,692
		1000	Other biopharmaceuticals	128,302
Subtotal		1,222,661		
2	Biochemical industry	2010	Biopolymers	-
		2020	Industrial enzymes and reagents	15,810
		2030	Enzymes and reagents for research	42,395
		2040	Biocosmetics and home & personal care chemicals	4,285
		2050	Biological agrochemicals and fertilizers	432
		2000	Other biochemicals	18,191
Subtotal		81,114		
3	Biofood industry	3010	Functional health foods	12,304
		3020	Amino acids	10,140
		3030	Food additives	2,727
		3040	Fermented foods	-
		3050	Feed additives	5,653
		3000	Other biofoods	316
Subtotal		31,140		
4	Bioenvironmental industry	4010	Microbial treatment agents	-
		4020	Microbe-immobilized materials and equipments	-
		4030	Bioenvironmental agents and systems	-
		4040	Measuring apparatus for environmental pollution(service for pollution assessment)	226
		4000	Other bioenvironmental productions and services	-
		Subtotal		226

Industry	Industry Name	Category No.	Category Name	Import
5	Bioelectronics industry	5010	DNA chips	260
		5020	Protein chips	-
		5030	Cell chips	-
		5040	Biosensors	500
		5050	BioMEMS	-
		5000	Other bioelectronics	-
			Subtotal	760
6	Bioprocess and equipment industry	6010	Bioreactors	300
		6020	Biomedical and diagnostic apparatuses	1,600
		6030	Bioprocess and analysis equipments	51,566
		6040	Plant and process design	-
		6000	Other bioprocess and equipments	1,271
			Subtotal	54,737
7	Bioenergy and bioresource industry	7010	Biofuel	2
		7020	Artificial seeds and seedlings	8,524
		7030	Experimental animals	-
		7040	Transgenic animals and plants	-
		7000	Other bioenergy and bioresources	-
	Subtotal	8,525		
8	Bioassay, bioinformatics and R&D service industry	8010	Bioinformatics services	400
		8020	Gene analysis services	-
		8030	Protein analysis services	-
		8040	R&D services	1,082
		8050	Biosafety and efficacy evaluation services	-
		8060	Diagnosis and preservation services	-
		8000	Other bioassays, bioinformatics services	-
			Subtotal	1,482
Total				1,400,645

## Appendix : Explanation on Classification Scheme

## 1. Bioindustry

### 1. Biopharmaceutical industry

Field of study concerning biopharmaceuticals, medical drugs or medical equipment produced using biotechnology in the R&D or production process to diagnosis, prevent and cure diverse diseases of human or animals. It is an industry that produces the following products.

#### 1010 Antibiotics

Base material or related medicine that inhibits or kills the growth and proliferation of microorganisms

**Exception** 1110) Animal medications

#### 1020 Anticancer medications

Base material or medicine that is used in cure for malignant tumor

#### 1030 Vaccines

Antigen used to automatically increase immunity of a person or animal in the prevention of infectious diseases (Substance that prevents or cures diseases selectively by artificially stimulating the immune system)

#### 1040 Hormones

Base material and related medicine that is made of hormones, its variants or analogs to cure special diseases using physiological characteristics of hormones

#### 1050 Immunotherapeutics

Base material and related medicine that is used to adjust bioimmune activities such as protein substances

#### 1060 Hemotherapeutics

Serum protein products which were separated from blood or biotechnologically manufactured materials and medical products, which are used to treat pathologic conditions of patients (symptoms caused by deficiency in serum protein, etc.)

#### 1070 Growth factors

Polypeptides which facilitate cell division, growth or differentiation, and their modified substances or analogues (including their mimicking agents or peptides which have only the active fraction)

#### 1080 New therapeutics(ex. gene therapeutics, cell therapy, cloned organs, etc.)

New therapeutic agents which have different way of treatment compared to existing agents (Gene therapeutics, cell therapy products, cloned organs and therapeutic antibodies are included in this category at present.)

<Reference>

Gene therapeutics - Agents of normal genes which are transduced in patients to treat diseases caused by genetic abnormalities

Cell therapyproducts - Medical products of living autologous, allogenic or xenogenic cells which are processed to be modified their biological characteristics by in vitro proliferation, selection or other methods

Cloned organs - Artificial organ substitutes which are not mechanical attachments or implants but organs produced by cell culture

Therapeutic antibodies- Antibodies of major immunologic mechanisms which are produced in vitro to protect human body from foreign pathogenic organisms

## 1090 Diagnostic kits

Kits and reagents which are used to diagnose the actual condition of diseases

**Exception** Reagents used in research are classified as '2030) Enzymes and reagents for research'

## 1100 Animal medications

Therapeutic products which are used to diagnose, treat and prevent diseases of animals (including probiotics)

**Exception** 3050) Feed additives

## 1000 Other biopharmaceuticals

Other biomedical products which are not classified above (including ingredients and intermediates which are not classified above)

**Exception** 3020) Amino acids

**2. Biochemical industry**

Industrial activities which produce compounds or substitutes of existing chemical products using bio-purification technology or biotechnology in R&D or manufacturing process [excluding products which are used mainly in medical purpose]

## 2010 Biopolymers

Materials (structural constituents), biocompatible polymers and biodegradable resins (functional packaging materials) which are made from proteins, nucleic acids or polyssacharides

**Exception** 1090) New therapeutics

## 2020 Industrial enzymes and reagents

Enzymes which are extracted from industrially valuable organisms or produced by biotechnology, and other industrial reagents

## 2030 Enzymes and reagents for research

Reagents, buffer solutions, polymerases, reagent kits, DNA vectors and gene expression systems

## 2040 Bocosmetics and home &amp; personal care chemicals

Household items such as a soap, detergents and functional cosmetics

## 2050 Biological agrochemicals and fertilizers

Microbial agents which are used to exterminate or control weeds, pests or microorganisms which inhibit growth of crops, and microbial agents which enrich nutrients in soil to enhance growth of crops

**Exception** For agricultural pesticides and fertilizers produced by a bioprocess using non-microbial or non-biological agents, refer to '2000) Other biochemicals'.

## 2000 Other biochemicals

Other biochemicals which are not classified above (including macromolecular monomers, solvents and others)

**3. Biofood industry**

Industrial activities which produce foods, beverages, animal foods and animal/vegetable fat and oil using bio-purification technology or biotechnology in R&D or manufacturing process [excluding products which

are used mainly in medical purpose]

#### 3010 Functional health foods

which functionally useful ingredients for human body and biotechnology are used in its manufacturing (limited to foods which Commissioner of Korea Food and Drug Administration admitted that they have functionality according to 「The Law for Functional Health Foods」 )

#### 3020 Amino acids

Aminoacids used in drugs, foods and feed additives

#### 3030 Food additives

Substances which are added in foods such as seasonings, food preservatives, nucleotides, peptides and lipids (including starch, organic acids and functional sugar, etc.)

**Exception** 3010) Functional health foods  
3020) Amino acids

#### 3040 Fermented foods

Products which went through fermentation process such as fermented sauces, alcoholic beverages, pickled vegetables and fermented livestock foods

**Exception** 3010) Functional health foods

#### 3050 Feed additives

Various kinds of feed additives, nutrients and feedstuffs for animal raising or fish farming

**Exception** For animal drugs including probiotics, refer to '1100 animal drugs'.

#### 3000 Other biofoods

Other biofoods which were not classified above (including ingredients and intermediates which were not classified above)

### 4. Bioenvironmental industry

Industrial activities which produce substances or systems for environmental cleanup, environmental remediation and reducing/preventing environmental pollution using bioderivatives or biotechnology in R&D or manufacturing process, or industrial activities which build up pollution diagnosis and assessment services or facilities using these products, providing following products or services

#### 4010 Microbial treatment agents

Microorganism agents for the purpose of environmental cleanup (waste/wastewater treatment, etc.), reducing/preventing environmental pollution (biodesulfurization, biocracking, biocollection, biopulping, etc.) and environmental remediation, including construction and installation services associated with selling such products

#### 4020 Microbe-immobilized materials and equipments

Immobilized materials and equipments for the purpose of environmental cleanup (waste/wastewater treatment, foul smell/VOC treatment, etc.) such as a microorganism-utilizing filter, including construction and installation services associated with selling such products

#### 4030 Bioenvironmental agents and systems

Materials, equipments and systems for the purpose of

waste/wastewater treatment, foul smell/VOC treatment, environmental remediation and resource recycling, including construction and installation services associated with selling such products

**Exception** 4010) Microbial treatment agents

4020) Microbe-immobilized materials and equipments

4040 Measuring apparatus for environmental pollution(service for pollution assessment)

Equipments which measure water quality, soil pollution level and air pollution level (including construction and installation services associated with selling such products), and pollution source diagnosis and pollution level measuring services on demand of customers

**Exception** 5040) Biosensors

4000 Other bioenvironmental productions and services

Other bioenvironmental products which were not classified above (including ingredients and intermediates which were not classified above) and associates services

## 5. Bioelectronics industry

Industrial activities which produce components/materials of medical or analytical purpose using nano/electronic technology, bio information or biotechnology in R&D or manufacturing process, producing following products

5010 DNA chips

Detecting devices which fix DNAs

5020 Protein chips

Detecting devices which fix proteins

5030 Cell chips

Detecting devices which fix cells and devices which analyze cellular phenomena

5040 Biosensors

Detecting devices which utilize various kinds of biofunctions

5050 BioMEMS

Micro electromechanical systems(MEMS) for the purpose of medical or R&D use such as biotechnology, health examination or drug administration

5000 Other bioelectronics

Other bioelectronic components/materials which are not classified above

**Example** Biocomputers, neurochips, carbohydrate chips

## 6. Bioprocess and equipment industry

Industrial activities which produce devices, equipments and plants for the purpose of using bioderivatives or biotechnologies in R&D or manufacturing process, providing following products or services [including biomedical devices and diagnostic devices]

6010 Bioreactors

Devices which produce valuable substances using biological reactions

**Example** Fermentation bath, cell incubators, enzyme reaction

incubators

#### 6020 Biomedical and diagnostic apparatuses

Devices which examine and diagnose physical or physiologic functions for medical purpose

Exception

1080) Newtherapeutics, diagnostic reagents and kits  
2010) Biopolymers  
5040) Biosensors, BioMEMS

#### 6030 Bioprocess and analysis equipments

Experimental and R&D devices such as separation/purification devices, synthesis/cloning devices, sequence analyzing devices, and other interpretation/analysis devices

#### 6040 Plant and process design

System constructing and plant designing services using bioprocess technology and devices, equipments

#### 6000 Other bioprocess and equipments

Bioprocess devices and experimental devices which are not classified above (including ingredients and components which are not classified above)

### 7. Bioenergy and bioresource industry

Industrial activities which develop energy by utilizing organisms or biotechnology in R&D or manufacturing process, and industrial activities which dig out and produce organisms which have novel functions and then cultivate or raise them

#### 7010 Biofuel

Alternative fuel materials which are produced under conversion process from biomass

#### 7020 Artificial seeds and seedlings

Seeds, improved seeds, mushroom strains and energy crops for forestry or agricultural use

#### 7030 Experimental animals

Experimental animals including transgenic animals such as insects, mice and rats

#### 7040 Transgenic animals and plants

Transgenic animals and plants

Exception

7020) Artificial seeds and seedlings  
7030) Experimental animals

#### 7000 Other bioenergy and bioresources

Other bioenergy (biogas) and organisms (including microbial strains and cell strains)

Exception

For developmental services, refer to subsections of "8. Bioassay, bioinformatics and R&D service industry"

### 8. Bioassay, bioinformatics and R&D service industry

Industrial activities of biotechnology which conduct R&D by proxy or provide analysis/assessment consulting services and associated bioinformatics, providing services described below [Activities manufacturing class 1~7 products on consignment of other companies are referred to as production activities of relevant products]

## 8010 Bioinformatics services

Services which provide customers with solutions based on bioinformatics and predictions

**Example** Bioinformatics database services, statistical analysis of bioexperimental data, oligomer designing, antibody designing and cell strain designing

## 8020 Gene analysis services

Services which utilize genetic analysis

**Example** Genetic sequence analysis, parentage test, GMO diagnosis, microorganism identification, DNA genotyping, SNP analysis

## 8030 Protein analysis services

Services which utilize protein analysis

**Example** Protein sequence/structure analysis, protein expression pattern analysis

## 8040 R&amp;D services(ex. drug development services, etc.)

Activities which conduct R&D essential for product development by proxy using biotechnology. Services and technical consulting excluding providing bioinformations (In sales survey of a company, sales which come from technology transfer in biotechnological field correspond to this category)

**Example** New drug development

## 8050 Biosafety and efficacy evaluation services

Preclinical study or clinical study services

## 8060 Diagnosis and preservation services

Disease diagnosis services and cell line preservation services using biotechnology

**Example** Cord blood preservation service

**Exception** 8010) Bioinformatics services  
8020) Gene analysis services  
8030) Disease diagnosis services which utilize one of protein analysis services

## 8000 Other bioassays, bioinformatics services

Other bioassays, bioinformatics services which are not classified above

**Example** Services which provide information on standardization (GMP, FDA certification, IQ, OQ, PQ), technology and management consulting services



## 2. Biotechnology

### A. Genetic engineering

Technology which changes the genetic characteristics of target organisms by gene manipulation or transplantation

#### A1. Gene manipulation

Technology which directly deal with genes such as gene identification, modification, separation, recombination, synthesis, amplification and transfer

- Corresponding List**
- A101. Genetic material development
  - A102. Gene separation
  - A103. Gene cloning
  - A104. Gene transformation
  - A105. Gene screening
  - A106. Genetic mutation
  - A107. Gene targeting
  - A108. DNA synthesis
  - A109. DNA amplification

#### A2. Gene expression and regulation

Technologies which modify the mode, degree or rate of expression of genetic information by intervening in replication, transcription and translation of genetic information

- Corresponding List**
- A201. Host cell development
  - A202. Gene overexpression
  - A203. Secretory expression
  - A204. Gene replication and transcriptional regulation
  - A205. Signal transduction analysis
  - A206. Oncogenesis
  - A207. Gene expression profile analysis
  - A208. High throughput gene expression
  - A209. RNA interference

### A3. Gene application

Technologies which develop new molecules, nuclei or individuals

- Corresponding List**
- A301. Transgenic animals
  - A302. Transgenic plants
  - A303. Transgenic microorganisms
  - A304. Molecular evolution
  - A305. Genome shuffling

#### A4. Gene therapy

Technologies which are used in the whole therapeutic process from development of therapeutic genes to transferring them into human body and expression

- Corresponding List**
- A401. Ex vivo therapy
  - A402. Gene therapy vector development and production
  - A403. Evaluation of gene transfer and expression
  - A404. Therapeutic gene development
  - A405. Germline gene therapy
  - A406. In vivo model for gene therapy
  - A407. Oncolytic virus therapy
  - A408. RNA interference
  - A409. DNA vaccine

#### A0. Genetic engineering, n.e.s.

### B. Protein engineering

Technologies which analyze structure and function of proteins and design, create or apply specific proteins

#### B1. Protein structure analysis

Technologies which analyze sequence, mass, planar structure and conformation of proteins

**Corresponding List**

- B101. Protein mass spectrometry
- B102. Protein sequence analysis
- B103. Protein 3D structure analysis
- B104. High throughput structural determination
- B105. Protein linkage maps
- B106. Protein-protein interaction mapping

**B2. Protein function analysis**

Technologies which analyze functions of proteins such as their stability, recognition and response

**Corresponding List**

- B201. Protein stability analysis
- B202. Protein folding analysis
- B203. Protein recognition mechanism analysis
- B204. Protein reaction analysis
- B205. Inhibitor screening and development
- B206. Protein linkage map analysis
- B207. Protein-protein interaction mapping

**B3. Complex protein engineering**

Technologies which are utilized in protein modification, manipulation of antibodies and receptors, and protein designing

**Corresponding List**

- B301. Antibody engineering
- B302. Protein modification
- B303. Receptor engineering
- B304. Protein design
- B305. Complex protein formation

**B4. Peptide engineering**

Technologies which are utilized in synthesis, purification, designing, analysis of structure and function of peptides

**Corresponding List**

- B401. Peptide synthesis and purification

- B402. Peptide design
- B403. Peptide structure and function analysis
- B404. Activated peptide utilization
- B405. Multidimensional peptide separation

**B5. Protein application**

Technologies which develop or utilize enzymes or combinatorial biocatalysts using proteins

**Corresponding List**

- B501. Novel enzyme screening
- B502. Artificial enzyme production and utilization
- B503. Protein refolding
- B504. Combinatorial biocatalysis
- B505. Enzyme therapy

**B0. Protein engineering, n.e.s.****C. Other macromolecule engineering**

Technologies which analyze structure and functions of biomacromolecules such as carbohydrate or lipid, and which develop valuable materials by modifying or utilizing these biomacromolecules

**C1. Lipid engineering**

Technologies which artificially synthesize lipids or separate them from its natural state, analyze their structure and functions, and develop valuable materials such as functional lipids by physically or biochemically modifying or processing them

**Corresponding List**

- C101. Functional lipid development

**C2. Carbohydrate engineering**

Technologies which artificially synthesize carbohydrates or separate them from

its natural state, analyze their structure and functions, and develop valuable materials such as functional carbohydrates by physically or biochemically modifying or processing them

**Corresponding List** C201. Polysaccharide chemistry  
C202. Neoglycan technology  
C203. Functional carbohydrate development

C0. Other macromolecule engineering, n.e.s.

#### D. Cell and tissue engineering

Technologies which are utilized to maintain, improve and recover organic functions by manufacturing and using new cells which can express valuable genetic characteristics or by producing artificial tissues or organs

D1. Stem cell therapy

Technologies which induce undifferentiated stem cells to differentiate into specific cells or tissues in appropriate in vitro condition and utilize them to treat injured tissues or organs

**Corresponding List** D101. Embryonic stem cell utilization  
D102. Adult stem cell utilization  
D103. Stem cell differentiation induction  
D104. Regenerative medicine

D2. Bioenvironment regulation

Technologies which create *in vitro* conditions physically and chemically similar to conditions of living bodies to maximize specific functions of cells or organs

**Corresponding List** D201. Biological and chemical bioenvironment  
D202. Physical, mechanical bioenvironment mimics  
D203. Cell and biomaterials interface

D204. Hybrid tissue engineering

D3. Functional biomaterial development

Technologies which develop structurally and chemically modified functional biocompatible materials which can induce specific activities by interaction with cells and tissues in organisms

**Corresponding List** D301. New biomaterial development  
D302. Biocompatibility enhancing technology  
D303. Functional supporter development  
D304. Biocompatibility material development

D4. Cell engineering

Comprehensive cellular technologies including technologies which create new cells such as hybrid cells or recombinant cells, and cell separating and culturing technologies

**Corresponding List** D401. Cell assays  
D402. Cell microencapsulation  
D403. Cell manipulation  
D404. Nuclear transfer

D5. Tissue engineering

Technologies which are utilized in maintaining, developing and recovering biofunctions by manufacturing artificial tissues or organs using cells, organs and biocompatible materials

**Corresponding List** D501. Tissue assays  
D502. Tissue microencapsulation  
D503. Tissue manipulation  
D504. Tissue culture

D0. Cell and tissue engineering, n.e.s.

## E. System biology and bioinformatics

Technologies which study on comprehensive characteristics of living organisms by analyzing and integrating their constituents and interactions, and technologies which obtain and utilize valuable information by processing and handling living organism-originated information

### E1. Gene sequence analysis

Technologies which analyze the whole genetic information of an individual by using DNA sequencer or other devices

- Corresponding List**
- E101. SNP(single nucleotide polymorphism) analysis
  - E102. cDNA library construction
  - E103. Gene-expression profile analysis
  - E104. DNA chip development and application
  - E105. High throughput screening
  - E106. Full-length cDNA cloning
  - E107. Whole genome sequence technology

### E2. Functional genomics

Technologies which investigate genetic functions to obtain information required for diagnosis and prognosis prediction of diseases and for developing medicines

- Corresponding List**
- E201. Proteome related technology
  - E202. Genetic functional network analysis
  - E203. Comparative genomics
  - E204. Pharmacogenomics
  - E205. Toxicogenomics
  - E206. Gene targeting
  - E207. Transcriptomics
  - E208. Genotyping
  - E209. Haplotype profiling
  - E210. Genome-wide gene trapping
  - E211. Inverse genomics

### E3. Proteomics

Technologies which investigate structure and function of specific proteins and interaction between proteins to understand cellular behavior and gene expression

- Corresponding List**
- E301. Protein display
  - E302. Protein informatics
  - E303. Cellular proteomics
  - E304. Disease-related expression profiling
  - E305. Pharmacoproteomics
  - E306. Protein chip development and application

### E4. Bioinformatics

Technologies which obtain and utilize valuable information by analyzing and processing bioinformation of organisms using computer

- Corresponding List**
- E401. Biological database construction
  - E402. Data mining system development
  - E403. Biological system modeling and simulation
  - E404. Base sequence analysis and design
  - E405. Structure/function prediction
  - E406. Biological network analysis

### E0. System biology and bioinformatics, n.e.s.

## F. Metabolic engineering

Technologies which improve production of target metabolites or produce new metabolites by analyzing and modifying the metabolism pathway or its regulatory system

### F1. Metabolite production

Technologies which industrially produce primary metabolites essential for cell growth (nucleic acids, aminoacids, vitamins, etc.) and secondary metabolites which are biosynthesized after cell growth (antibiotics, dyes, etc.)

- Corresponding List**
- F101. Primary metabolite production (amino acid, organic acid, alcohol, etc.)
  - F102. Secondary metabolite production(antibiotics, etc.)
  - F103. Production of other bioproducts (nucleic acid, lipid, protein, carbohydrate, etc.)

## F2. Applications of metabolic engineering

Technologies which are utilized in improving production of target metabolites, producing new metabolites or biological degradation of non-organic materials by analyzing, modifying and redesigning the metabolic pathways and their regulatory systems

- Corresponding List**
- F201. Enhanced production of existing metabolites
  - F202. Production of novel metabolites
  - F203. Optimizing the substrate utilization
  - F204. Designing pathways for degradation of xenobiotics
  - F205. Engineering of metabolic pathways and cellular system for improving mid and downstream bioprocesses

## F3. Understanding the metabolism and metabolic pathway

Technologies which analyze and informationize metabolic flux, metabolic regulatory system and metabolic networks

- Corresponding List**
- F301. Metabolic flux analysis
  - F302. Metabolic flux regulation analysis
  - F303. Metabolic network analysis
  - F304. Metabolic profiling
  - F305. Isotopomer analysis

## F0. Metabolic engineering, n.e.s.

- Corresponding List**
- F001. Integration of genome, transcriptome, proteome, metabolome and fluxome
  - F002. In silico metabolic engineering

## G. Bioprocess

Processing technologies such as culturing, biotransformation, recovery and purification which utilize organisms or bioderivatives for production of valuable materials or products

### G1. Fermentation engineering

Microbial culturing technologies which are utilized to maximize the production of valuable materials

- Corresponding List**
- G101. Strain improvement
  - G102. High cell density culture
  - G103. Recombinant microorganism culture engineering
  - G104. Algae cell culture engineering
  - G105. Cell immobilization

### G2. Cell culture engineering

Technologies utilized in optimal culturing of cell strains derived from animals, plants and insects

- Corresponding List**
- G201. Plant cell culture engineering
  - G202. Animal cell culture engineering
  - G203. Cell line development
  - G204. Plant tissue culture engineering
  - G205. Insect cell culture
  - G206. Media optimization

### G3. Biotransformation

Technologies which convert precursor materials to other valuable materials by utilizing biocatalysts

- Corresponding List**
- G301. Enzyme reaction engineering
  - G302. Enzyme stabilization
  - G303. Enzyme immobilization
  - G304. Chirotechnology

### G4. Bioseparation engineering

Technologies which are utilized to optimally recover and purify valuable materials produced by bioprocesses

- Corresponding List**
- G401. Filtration
  - G402. Centrifugation
  - G403. Extraction
  - G404. Adsorption
  - G405. Chromatography
  - G406. Membrane separation
  - G407. Precipitation / crystallization
  - G408. Freeze drying
  - G409. Electrophoresis
  - G410. Cell separation

### G5. Industrialization

Technologies which design, analyze, optimize and manage manufacturing processes to produce living organisms or bioderivatives in industrial scale

- Corresponding List**
- G501. Scaleup technology
  - G502. Bioreactor design and fabrication
  - G503. Process design
  - G504. Process control and optimization
  - G505. Sterilization
  - G506. Cost analysis
  - G507. Process validation

- G508. Quality assurance / control
- G509. cGMP(current Good Manufacturing Practices)
- G510. GLP(Good Laboratory Practice)

### G0. Bioprocess, n.e.s.

- Corresponding List**
- G001. Bioleaching
  - G002. Cryopreservation

## H. Bioresource production and utilization

Technologies which produce and preserve bioresources such as animals, plants and microorganisms efficiently, and produce valuable products by separating and processing materials obtained from these bioresources

### H1. Plant resource utilization technology

Technologies associated with genetic resource preserving, genetic modification, molecular breeding, cultivation, pest control, and processing and storage of agricultural products, for efficient production of plant resources

- Corresponding List**
- H101. Nuclear fusion
  - H102. Cultivation and breeding
  - H103. Transgenic plant development and molecular breeding
  - H104. Plant transformation analysis and detection
  - H105. Plant cell differentiation
  - H106. Plant gene resources analysis and preservation
  - H107. Disease and parasite protection
  - H108. Farm product quality control and storage

## H2. Animal resource utilization technology

Technologies which produce products which assist preservation, breeding, growth and efficient production of animal resources, or technologies which produce valuable products by utilizing byproducts of animal resource production

### Corresponding List

- H201. Nuclear fusion
- H202. Animal resource utilization
- H203. Animal breeding, development and proliferation
- H204. Transgenic animal development
- H205. Animal disease control
- H206. Experimental animal development and production
- H207. Experimental animal management and utilization
- H208. Animal feed production
- H209. Animal byproduct processing technology
- H210. Animal cell cloning technology

## H3. Microbial resource utilization technology

Technologies which separate, identify and manage valuable microorganic resources or technologies which produce valuable materials by using these resources

### Corresponding List

- H301. Nuclear fusion
- H302. Screening and Identification of microbial resource
- H303. isolation
- H304. Probiotic development and utilization

## H4. Insect resource utilization technology

Technologies which produce valuable materials by preserving or utilizing insect resources such as insect bodies, insect cells or insect-associated microorganisms

### Corresponding List

- H401. Functional insect and its material utilization
- H402. Utilization of insect organ and insect cell line
- H403. Preservation of insect resource and search for its application

## H404. Utilization of insect based microorganism

## H5. Marine/fresh water organism technology

Technologies which are utilized in producing valuable materials or environmental conservation by preserving, separating, breeding and utilizing bioresources associated with marine lives or limnobios

### Corresponding List

- H501. Aquatic animal breeding and development
- H502. Aquatic farming
- H503. Excellent individual preservation
- H504. Aquatic microorganism utilization
- H505. Aquatic plant breeding and utilization
- H506. Aquatic organism resources screening
- H507. Aquatic environment preservation

## H6. Food engineering

Technologies which produce and manage foods or food materials by discovering, assessing, processing and packaging bioresources which can be utilized as general foods or functional health foods.

### Corresponding List

- H601. Food processing and packaging
- H602. Functional food material production
- H603. Food pollutant detection and management
- H604. Fermentation foods and enzyme utilization
- H605. Food quality and nutrition evaluation
- H606. Food additives development

## H7. Biomaterializing technology

Technologies which produce valuable materials or assess their functions by discovering, assessing, separating, purifying, biocatalyzing and biomimicking biomaterials derived from bioresources

### Corresponding List

- H701. Metabolism enhancing biomaterial screening
- H702. Biomaterial production and utilization
- H703. Biomaterial functionality evaluation

- H704. Biomaterial separation and purification
- H705. Biomimetry
- H706. Molecular high throughput screening

#### H8. Biodiversity conservation

Technologies which preserve and manage genetic, species and ecosystemic diversity

- Corresponding List**
- H801. Genetic diversity preservation and management
  - H802. Species diversity preservation and management
  - H803. Ecosystem diversity preservation and management
  - H804. Cryopreservation

#### H0. Bioresource production and utilization, n.e.s.

- Corresponding List**
- H001. Bioproduct engineering
  - H002. Life support system for closed environment

### I. Environmental biotechnology and bioenergy technology

Biotechnologies which are applied to environmental area and bioenergy area such as measuring, processing and remedying pollution

#### I1. Clean technology

Technologies of production and management which utilize eco-friendly alternative materials and processes which can reduce energy or resource consumption or discharge of reduce environmental pollutants

- Corresponding List**
- I101. Process-related clean technology
  - I102. Biological agrochemicals development
  - I103. Biodegradable material production
  - I104. Bio-based solvent technology

#### I2. Environmental pollution control and management technology

Management and reducing technologies which can reduce discharge of environmental pollutants to natural environments such as water, air and earth, or can restore polluted natural environment

- Corresponding List**
- I201. Air pollution control and treatment
  - I202. Water pollution control and treatment
  - I203. Soil pollution control and remediation
  - I204. Waste treatment
  - I205. Environmental pollutants measurement and analysis
  - I206. Environmental assessment and control
  - I207. Ecosystem restoration

#### I3. Bioenergy technology

Technologies which produce and utilize energy-related products including electricity, fuel (liquid, solid and gaseous), heat, chemicals and other materials by using renewable resources such as biomass

- Corresponding List**
- I301. Bioethanol production using starch biomass
  - I302. Bioethanol production using lignocellulosic biomass
  - I303. Biodiesel production
  - I304. Biogas production
  - I305. Biogas utilization
  - I306. Biohydrogen production
  - I307. Biobutanol production

#### I0. Environmental biotechnology and bioenergy technology, n.e.s.



## J. Nanobiotechnology

Technologies which control and apply biomolecules by fusing nanotechnology and biotechnology in nano scale

### J1. Nano-biodevice fabrication

Technologies which compose and produce biodevices by controlling organisms or bioderivatives in nano scale

#### Corresponding List

- J101. Nano-DNA chip fabrication
- J102. Nano-protein chip fabrication
- J103. Nano chip production and application
- J104. Nano-bioelectronic device fabrication
- J105. Nano-biosensor system
- J106. Nano-bioactuator fabrication
- J107. Nano-biosignal analysis

### J2. Nanobiomaterial technology

Technologies which produce medical and industrial materials by controlling, designing and processing organisms or bioderivatives in nano scale to utilize their biocontrol functions

#### Corresponding List

- J201. Biomaterial self-assembly
- J202. Biomaterial production for nanobiochip
- J203. Hybrid nanomaterial manufacturing
- J204. Bio-nanoparticle manufacturing
- J205. Bio-nanomaterial thin film fabrication

### J3. Nano drug delivery system

Technologies and systems which regulate drug releasing rate by controlling particles in nano scale or improve drug delivery to target area

#### Corresponding List

- J301. Nanomaterial for drug delivery

- J302. Nanostructure manipulation and property analysis
- J303. Nano-carrier manufacturing
- J304. Molecular target discovery

### J4. BioNEMS(Nanoelectromechanical systems), nano-LOC(lab-on-a-chip)

Technologies which produce biochips by utilizing microprocessing techniques in nano scale, and technologies which design, fabricate and produce biochips which materialize various kinds of laboratory procedures such as combination, reaction, separation and analysis

#### Corresponding List

- J401. Nano-fluidic
- J402. Nano-processing
- J403. Nano-lithography
- J404. Surface, interface control
- J405. Nanoscale particle manipulation
- J406. Nanoflow visualization & diagnosis

### J0. Nanobiotechnology, n.e.s.

## K. Bioelectronics engineering

Technologies which construct, produce and utilize biodevices on the basis of detecting functions of organisms or bioderivatives

### K1. Biosensor fabrication

Technologies which design, construct and produce devices which detect and quantify specific materials by artificially materializing detecting functions of organisms or bioderivatives

#### Corresponding List

- K101. Biomaterial immobilization
- K102. Sensor array fabrication
- K103. Biomolecule recognition analysis
- K104. Sensor system design
- K105. Signal detection and transducing
- K106. Remote transmission

## K2. Bioelectronic device fabrication

Technologies which design, construct and produce devices which detect specific materials and have data processing and storing functions by artificially materializing electron delivery and storage functions of organisms or bioderivatives

- Corresponding List**
- K201. Biofilm fabrication
  - K202. Device fabrication
  - K203. Biomemory fabrication
  - K204. Biocomputing

## K3. Biochip fabrication

Technologies which fabricate chips which analyze functions of genes, proteins and cells by immobilization of organisms or bioderivatives on solid board with high density

- Corresponding List**
- K301. DNA chip fabrication and application
  - K302. Protein chip fabrication and application
  - K303. Cell chip fabrication and application
  - K304. High throughput screening
  - K305. Array fabrication
  - K306. Biodata mining
  - K307. Instrument manufacturing for biochip

## K4. Microfluidics

Technologies which investigate the fluidic phenomenon in microstructures related to collecting, treating, separating and transferring materials in biochips and lab-on-a-chip

- Corresponding List**
- K401. Plastic microfabrication
  - K402. Microfluidic transport
  - K403. Low Reynolds number flow
  - K404. Multiscale flow simulation
  - K405. Microflow driving & manipulation
  - K406. Micro/nanoscale particle manipulation
  - K407. Microflow visualization & diagnosis

## K0. Bioelectronics, n.e.s.

## L. Biosafety and efficacy evaluation

Technologies which evaluate potential risks or biologic efficacy of biotechnologies and biotechnological products

### L1. Safety evaluation

Technologies related to evaluation methods and tools of risks of biotechnologies and biotechnological products

- Corresponding List**
- L101. Medicine, cosmetics safety evaluation
  - L102. Food and food additives safety evaluation
  - L103. Chemical material safety evaluation
  - L104. Biological agrochemicals safety evaluation
  - L105. Microbiological safety evaluation
  - L106. GMO safety evaluation
  - L107. Clinical trial
  - L108. Toxicity evaluation

### L2. Safety management

Management technologies which reduce or block potential risks of

biotechnologies and biotechnological products

- Corresponding List**
- L201. Safety management
  - L202. HACCP(hazard analysis critical control points)
  - L203. Safety management of GMO

L3. Environmental assessment

Technologies related to establishment and evaluation of methods for minimizing or avoiding influence on environment and technologies related to evaluation of influence on natural/life environment, social/economic environment and culture before initiating works which have potential influence on environment

- Corresponding List**
- L301. Environmental assessment of natural disaster
  - L302. Environmental assessment of chemicals
  - L303. Environmental assessment of radioactive materials
  - L304. Environmental assessment of synthetic resins and petroleum products
  - L305. Environmental assessment of magnetism
  - L306. Evaluation and management of GMO
  - L307. Biodegradability evaluation

L4. Biohazard management

Technologies which prevent, manage and restore disasters which are caused by leakage of toxic materials, pathogens and biotechnological organisms or man-made changes on ecosystem to cause serious influence on mankind and ecosystem

- Corresponding List**
- L401. Safety management of chemicals
  - L402. Safety management of radioactive materials
  - L403. Biohazard management caused by natural disaster
  - L404. Biological remediation restoration using microorganisms
  - L405. Biohazard management caused by bio-weapons

L5. Efficacy evaluation

Technologies which evaluate efficacy of materials which enhance or inhibit activities of human body, organisms or bioderivatives

- Corresponding List**
- L501. *In vitro* assay
  - L502. *In vivo* assay
  - L503. Pharmacokinetic evaluation
  - L504. Preclinical trial
  - L505. Clinical trial I
  - L506. Clinical trial II
  - L507. Clinical trial III
  - L508. Clinical trial IV

L0. Biosafety and efficacy evaluation, n.e.s.

## M. Other biotechnology

M1. Combinational biology

Technologies which secure molecular diversity from genetic information on the basis of genetic recombination and select potential candidate materials of specific activities, and secure their genetic information

- Corresponding List**
- M101. Shape library construction
  - M102. Hybrid polyketide antibiotics development

M2. Drug delivery

Technologies which minimize adverse reactions of drugs and maximize effects and efficacy of drugs by regulating drug release rate or facilitating drug delivery to target area

- Corresponding List**
- M201. Controlled release formulation
  - M202. Biomaterials for drug delivery
  - M203. Structure manipulation and property analysis
  - M204. Carrier development
  - M205. Molecular target discovery

### M3. Immunotherapy

Technologies which treat diseases using in vivo immune system by producing, modifying and activating materials and cells related to in vivo immunity

#### Corresponding List

- M301. Immunomodulator
- M302. Immunotherapeutics
- M303. Targeted immunotherapy

### M0. Biotechnology, n.e.s.

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