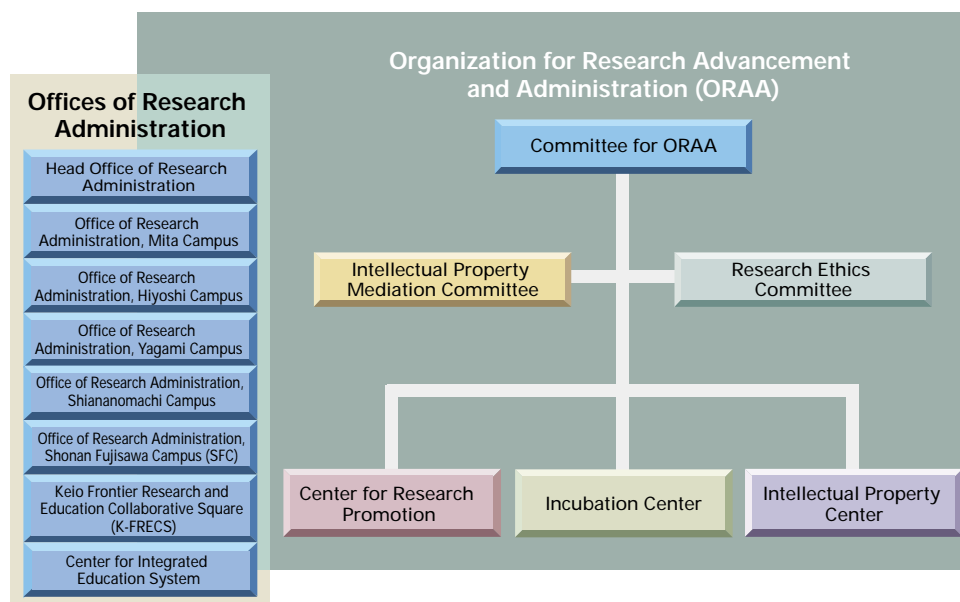


**KEIO UNIVERSITY 2002-2003**  
**Annual Report**  
**on Research Activities**

**Emergence of Integrated Research**  
**– Disclosure and Promotion –**

# Keio University Research Structure

Campus	Faculty / Graduate School	Research Institutes
Mita Campus	Faculty of Letters Faculty of Economics Faculty of Law Faculty of Business and Commerce Graduate School of Letters Graduate School of Economics Graduate School of Law Graduate School of Human Relations Graduate School of Business and Commerce	Institute of Cultural and Linguistic Studies Institute for Media and Communications Research Institute for Economic and Industrial Studies (Sangyo Kenkyujo) Institute of Oriental Classics (Shido Bunko) International Center Teacher Training Center Fukuzawa Memorial Center for Modern Japanese Studies Institute of East Asian Studies Research Center for the Arts and Arts Administration Intellectual Property Center (IPC) Keio Digital Content Research and Service Museum (DRM) Humanities Media Institute
Hiyoshi Campus	Faculty of Letters Faculty of Economics Faculty of Law Faculty of Business and Commerce School of Medicine Faculty of Science and Technology Graduate School of Business Administration	Institute of Physical Education Keio Research Center for Foreign Language Education Health Center Sports Medicine Research Center Keio Research Center for the Liberal Arts
Yagami Campus	Faculty of Science and Technology Graduate School of Science and Technology	Keio Leading-edge Laboratory of Science and Technology
Shinanomachi Campus	School of Medicine Faculty of Nursing and Medical Care Graduate School of Medicine	Center for Integrated Medical Research
Shonan-Fujisawa Campus	Faculty of Policy Management Faculty of Environmental Information Faculty of Nursing and Medical Care Graduate School of Media and Governance	Keio Research Institute at SFC
Tsuruoka Town Campus	—	Institute for Advanced Biosciences
Shin-Kawasaki Town Campus	—	Keio Frontier Research and Education Collaborative Square



### Shonan Fujisawa Campus

5322, Endo, Fujisawa-shi, Kanagawa 252-8520  
Tel +81-466-47-5111

- 10 minutes by bus from Shonandai St. (Odakyu Enoshima-Line, Sagami Tetsudo Izumino-Line, or Yokohama Subway Line); Approximately 40 minutes by train from Yokohama to Shonandai.
- 25 minutes by bus from Tsujido St. (JR Tokaido-Line); Approximately 30 minutes by train from Yokohama to Tsujido.



### Shinanomachi Campus

35, Shinanomachi, Shinjuku-ku, Tokyo 160-8582

Tel +81-3-3353-1211

- 1 minute walk from Shinanomachi St. (JR Sobu Line); Approximately 6 minutes by train from Shinjuku to Shinanomachi
- 5 minutes walk from Kokuritsu-Kyogijyo St. (Oedo Line)

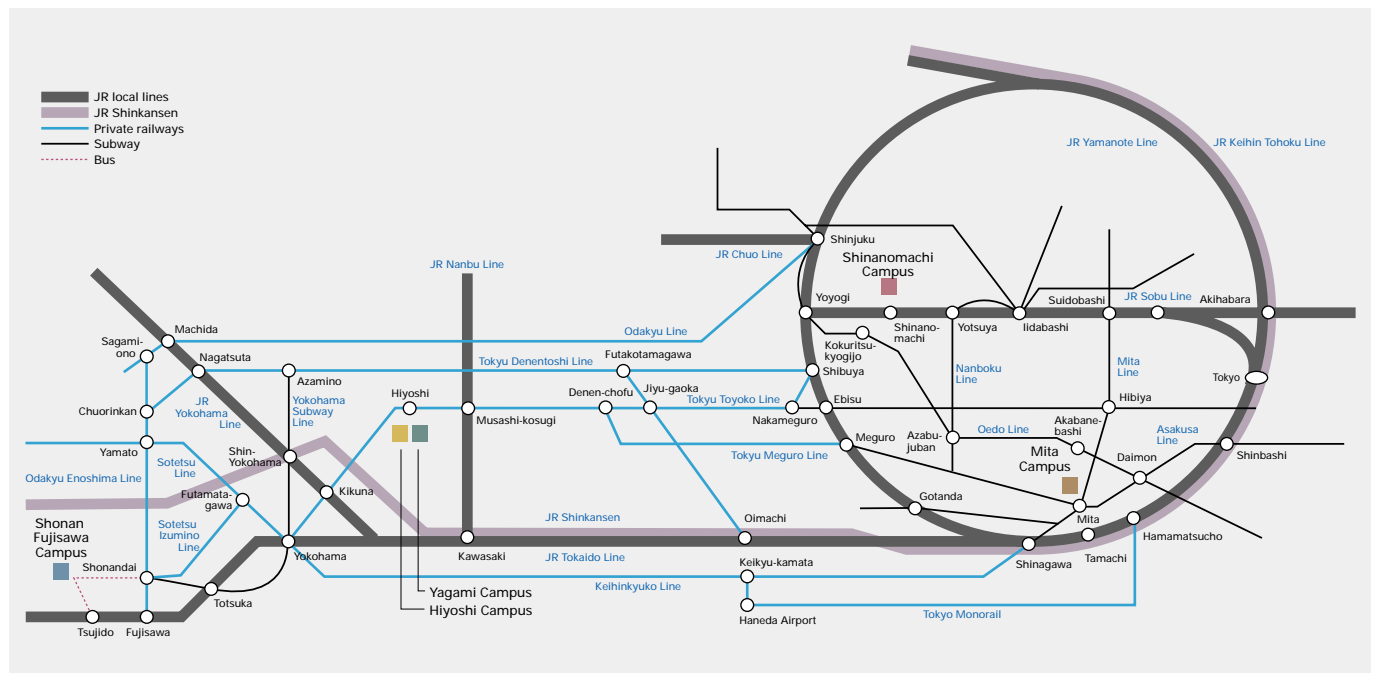


### Mita Campus

2-15-45, Mita, Minato-ku, Tokyo 108-8345

Tel +81-3-3453-4511

- 8 minutes walk from Tamachi St. (JR Yamanote Line or JR Keihin-Tohoku Line); Approximately 10 minutes by train from Tokyo to Tamachi
- Approximately 20 minutes by train from Ueno to Tamachi
- Approximately 15 minutes by train from Shibuya to Tamachi
- 7 minutes walk from Mita St. (Subway)



### Hiyoshi Campus

4-1-1, Hiyoshi, Kohoku-ku, Yokohama-shi, Kanagawa 223-8521

Tel +81-45-563-1111

- 1 minute walk from Hiyoshi St. (Tokyu-Toyoko Line); Approximately 25 minutes by train from Shibuya to Hiyoshi. (20 minutes by express)
- Approximately 20 minutes by train from Yokohama to Hiyoshi. (15 minutes by express)
- Approximately 20 minutes by train from Shin-Yokohama to Kikuna-Hiyoshi.



### Yagami Campus

3-4-1, Hiyoshi, Kohoku-ku, Yokohama-shi, Kanagawa 223-8522

Tel +81-45-563-1141

- 1 minute walk from Hiyoshi St. (Tokyu-Toyoko Line); Approximately 25 minutes by train from Shibuya to Hiyoshi. (20 minutes by express)
- Approximately 20 minutes by train from Yokohama to Hiyoshi. (15 minutes by express)
- Approximately 20 minutes by train from Shin-Yokohama to Kikuna-Hiyoshi.



# Researchers and Research Funds at Keio University in FY 2002

## Definitions

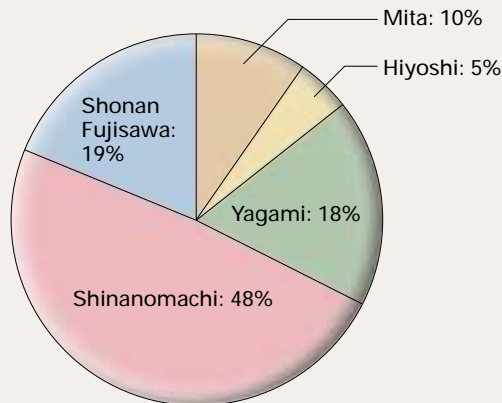
- **Subsidies** Research funds from mainly government and the other public offices for the purpose of subsidizing research expenses.
- **Grants** Research funds from mainly foundations for the purpose of improving research content or achieving research objectives.
- **Consortium** A joint research group formed by Keio University or other relevant research institutions. The group is composed of a number of private enterprises or universities (including Keio University) which participate in the research.
- **General Administrative Expenses** Funds provided to supplement the university's operating expenses for research covered by external funds. GAE are allocated for the administrative expenses of the university, but not for the direct expenses of the research.
- **Indirect Expenses** A fixed proportion of the competitive funds obtained through the researchers which are allocated to the university of the researchers for the administrative expenses, but not for the direct expenses of the research.
- **Specified Contributions** Contributions made for specified research.

## Research Funds

### 1 Research Funds by Campus

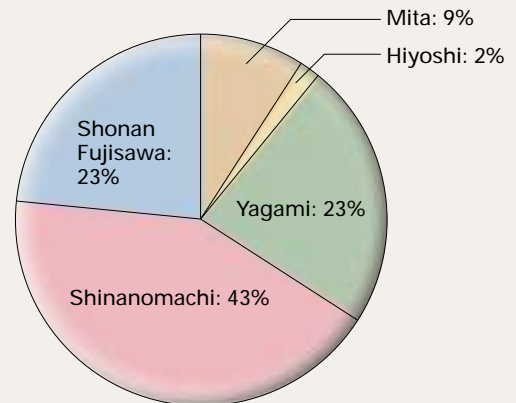
#### Entire University

■ Projects

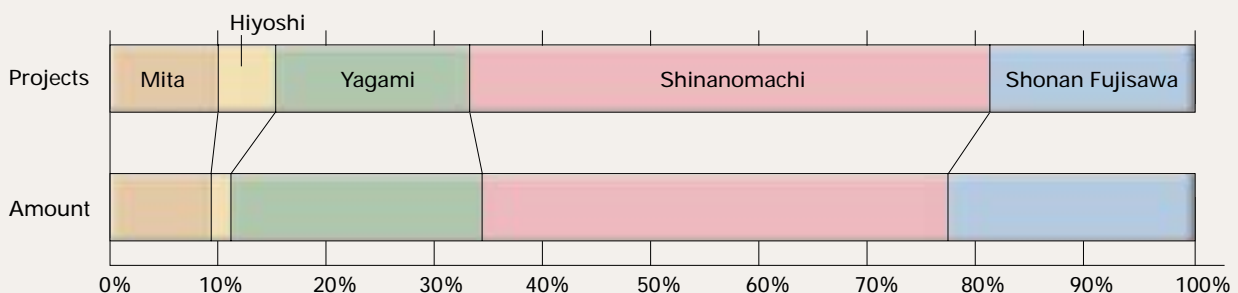


	(number of projects)
Mita	305
Hiyoshi	151
Yagami	569
Shinanomachi	1,530
Shonan Fujisawa	586
<b>Total</b>	<b>3,141</b>

■ Amount



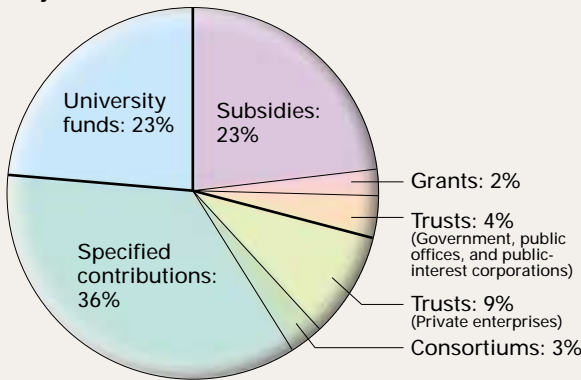
	(thousands of yen)
Mita	¥ 1,282,965
Hiyoshi	213,840
Yagami	3,250,120
Shinanomachi	5,871,639
Shonan Fujisawa	3,248,855
<b>Total</b>	<b>¥13,867,419</b>



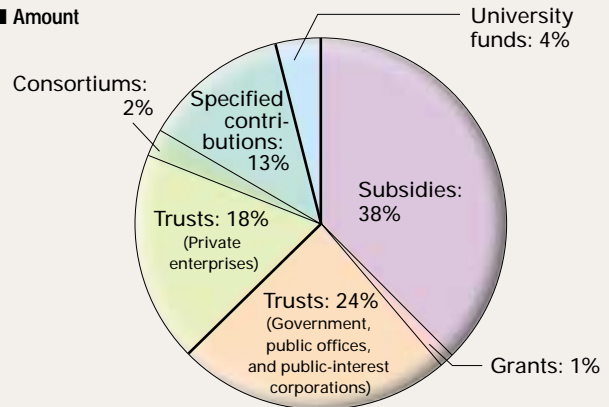
## 2 Research Funds by Source

### Entire University

■ Projects

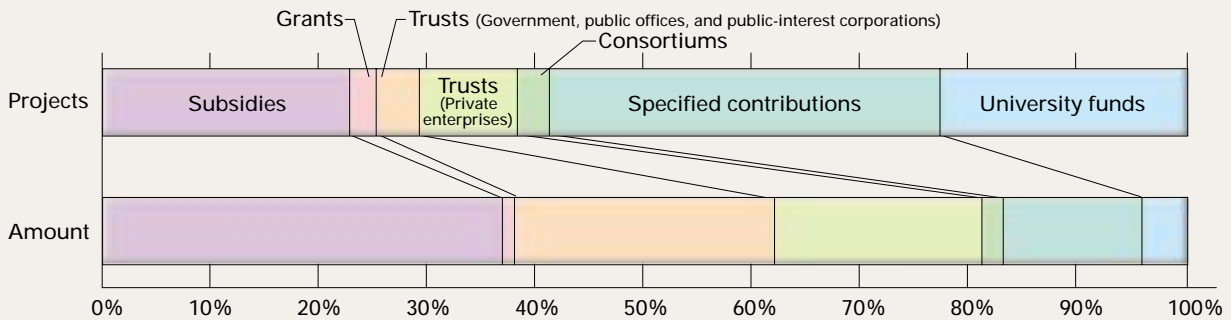


■ Amount



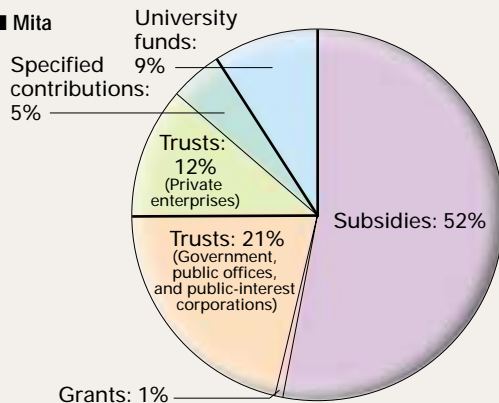
(number of projects)		
Government, public offices, and public-interest corporations	Subsidies	721
	Grants	74
907	Trusts	112
Private enterprises	Trusts	292
1,503	Consortiums	84
	Specified contributions	1,127
Keio University	University funds	731
731	<b>Total</b>	<b>3,141</b>

(thousands of yen)		
Government, public offices, and public-interest corporations	Subsidies	¥ 5,201,760
	Grants	153,611
8,678,576	Trusts	3,323,205
Private enterprises	Trusts	2,557,746
4,667,750	Consortiums	321,248
	Specified contributions	1,788,756
Keio University	University funds	521,093
521,093	<b>Total</b>	<b>¥13,867,419</b>



### Breakdown by Campus

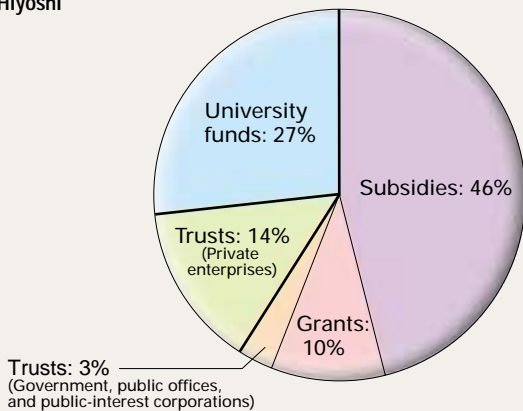
■ Mita



(thousands of yen)		
Government, public offices, and public-interest corporations	Subsidies	¥ 676,412
	Grants	6,540
958,105	Trusts	275,153
Private enterprises	Trusts	149,200
210,116	Consortiums	0
	Specified contributions	60,916
Keio University	University funds	114,744
114,744	<b>Total</b>	<b>¥1,282,965</b>

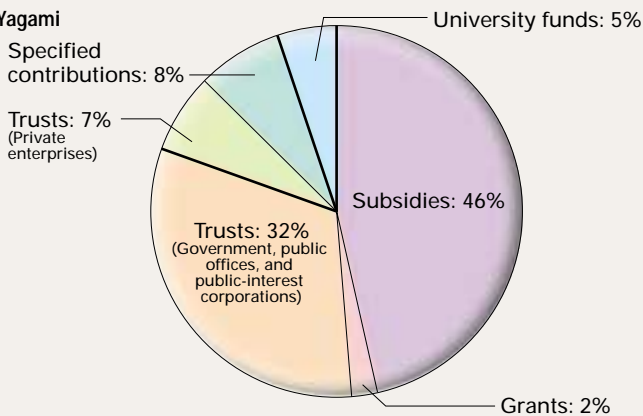
\* Trusts: Funds from commissioned research by government or private sector

### ■ Hiyoshi



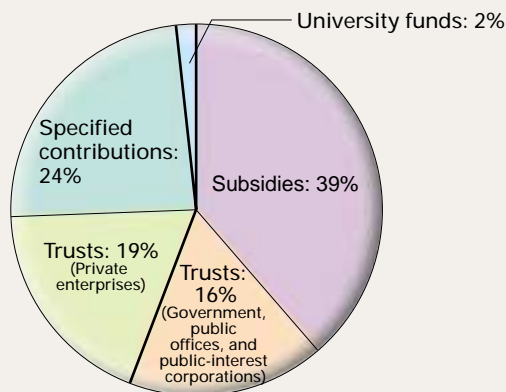
(thousands of yen)		
Government, public offices, and public-interest corporations	Subsidies	¥ 98,750
	Grants	20,630
	Trusts	6,509
125,889		
Private enterprises	Trusts	30,900
30,900	Consortiums	0
	Specified contributions	0
Keio University	University funds	57,051
57,051	Total	¥213,840

### ■ Yagami



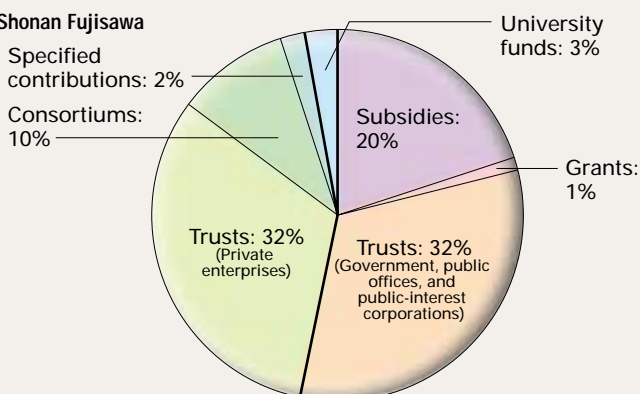
(thousands of yen)		
Government, public offices, and public-interest corporations	Subsidies	¥1,510,780
	Grants	69,281
	Trusts	1,037,877
2,617,938		
Private enterprises	Trusts	224,088
470,943	Consortiums	0
	Specified contributions	246,855
Keio University	University funds	161,239
161,239	Total	¥3,250,120

### ■ Shinanomachi



(thousands of yen)		
Government, public offices, and public-interest corporations	Subsidies	¥2,263,628
	Grants	23,000
	Trusts	968,802
3,255,430		
Private enterprises	Trusts	1,105,943
2,519,086	Consortiums	3,450
	Specified contributions	1,409,693
Keio University	University funds	97,123
97,123	Total	¥5,871,639

### ■ Shonan Fujisawa



(thousands of yen)		
Government, public offices, and public-interest corporations	Subsidies	¥ 652,190
	Grants	34,160
	Trusts	1,034,864
1,721,214		
Private enterprises	Trusts	1,047,615
1,436,705	Consortiums	317,798
	Specified contributions	71,292
Keio University	University funds	90,936
90,936	Total	¥3,248,855

### 3 Time Period of Research Funds

#### Entire University

■ Number of Projects

Single year

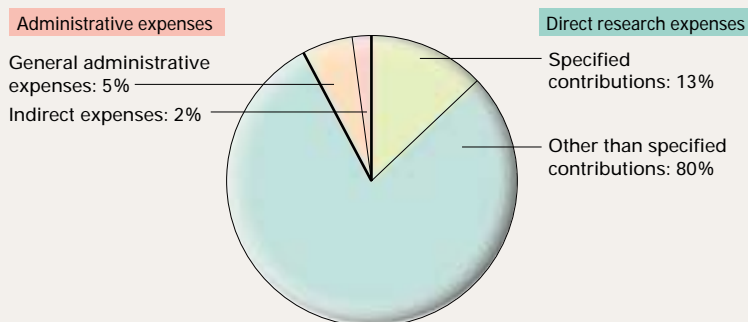
1st year	_____
2nd year	_____
3rd year	_____
4th year	_____
5th year	_____
6th year	_____
7th year	_____
8th year	_____
9th year	_____

	(number of projects)									
Single year	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	Total
2,859	114	100	29	17	11	5	2	1	3	3,141

\* "Single year" refers to the research projects started and completed within FY2002 (from April 2002 to March 2003). "The 1st year" through to "the 9th year" refers to the number of years completed for more-than-one-year funded research projects in FY2002.

### 4 Proportion of Direct Expenses in Total Research Funds

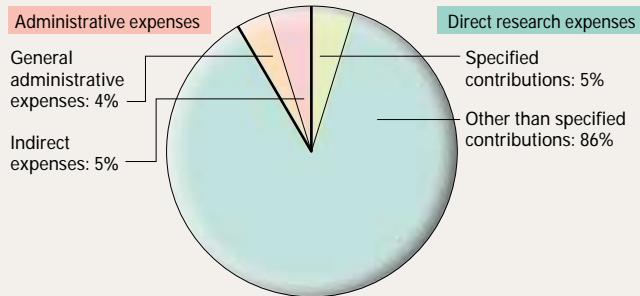
#### Entire University



(thousands of yen)			
Direct research expenses	12,804,201	Specified contributions	¥ 1,774,058
		Other than specified contributions	11,030,143
Administrative expenses	1,063,218	General administrative expenses	755,213
		Indirect expenses	308,005
		<b>Total</b>	<b>¥13,867,419</b>

## Breakdown by Campus

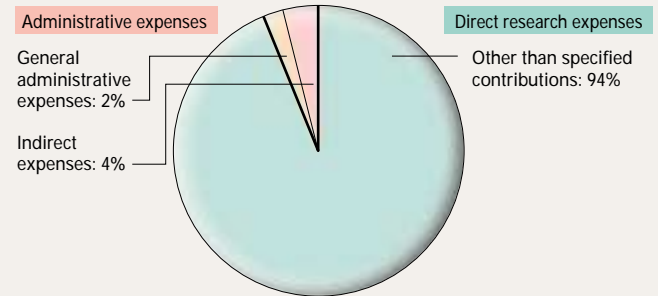
## ■ Mita



(thousands of yen)

Direct research expenses	1,174,910	Specified contributions	¥ 59,416
		Other than specified contributions	1,115,494
Administrative expenses	108,055	General administrative expenses	49,043
		Indirect expenses	59,012
		<b>Total</b>	<b>¥1,282,965</b>

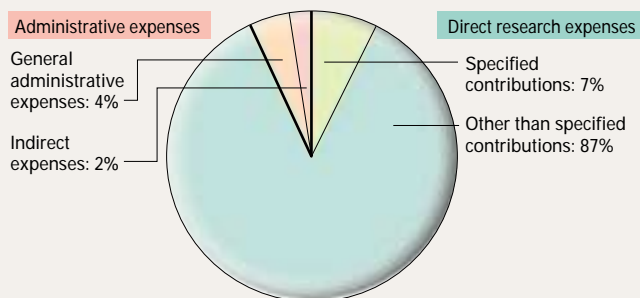
## ■ Hiyoshi



(thousands of yen)

Direct research expenses	200,684	Specified contributions	¥ 0
		Other than specified contributions	200,684
Administrative expenses	13,156	General administrative expenses	4,876
		Indirect expenses	8,280
		<b>Total</b>	<b>¥213,840</b>

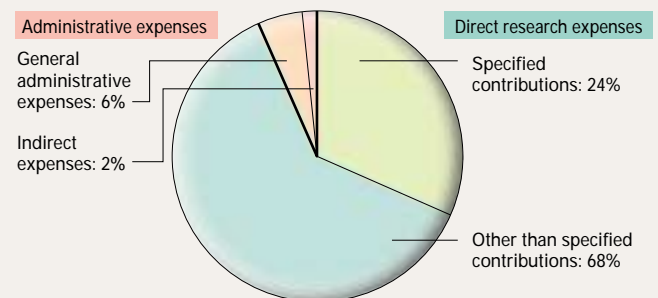
## ■ Yagami



(thousands of yen)

Direct research expenses	3,027,940	Specified contributions	¥ 233,657
		Other than specified contributions	2,794,283
Administrative expenses	222,180	General administrative expenses	141,322
		Indirect expenses	80,858
		<b>Total</b>	<b>¥3,250,120</b>

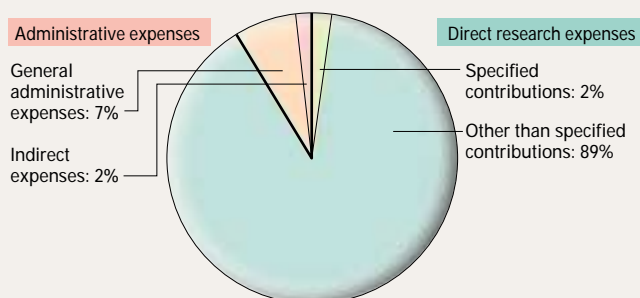
## ■ Shinanomachi



(thousands of yen)

Direct research expenses	5,434,919	Specified contributions	¥1,409,693
		Other than specified contributions	4,025,226
Administrative expenses	436,720	General administrative expenses	327,912
		Indirect expenses	108,808
		<b>Total</b>	<b>¥5,871,639</b>

## ■ Shonan Fujisawa



(thousands of yen)

Direct research expenses	2,965,748	Specified contributions	¥ 71,292
		Other than specified contributions	2,894,456
Administrative expenses	283,107	General administrative expenses	232,060
		Indirect expenses	51,047
		<b>Total</b>	<b>¥3,248,855</b>

\* "Other than specified contributions" includes subsidies, grants, trusts from government institutions, public-interest corporations, trusts from private enterprises, consortiums, and university funds.

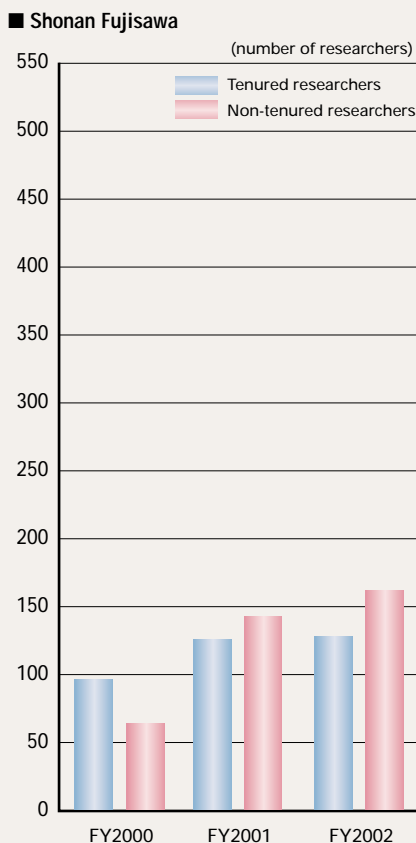
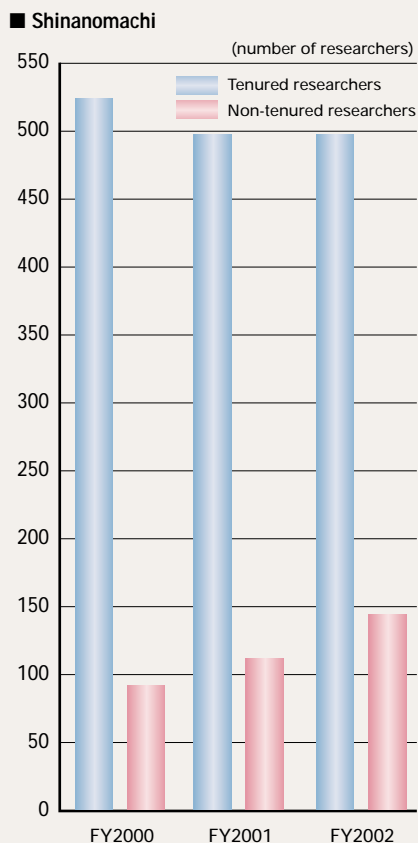
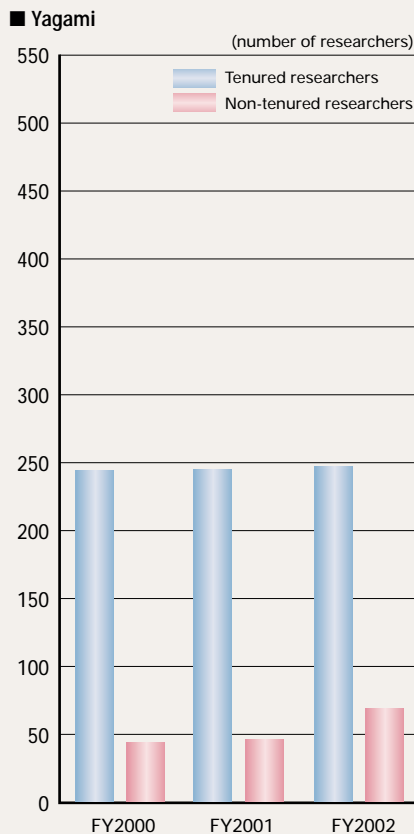
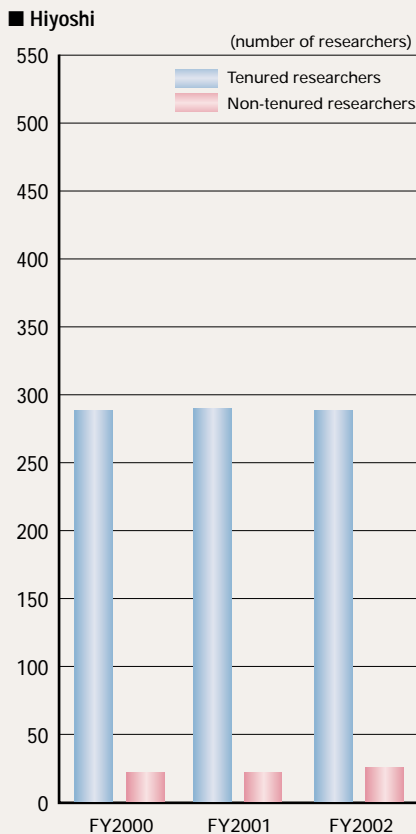
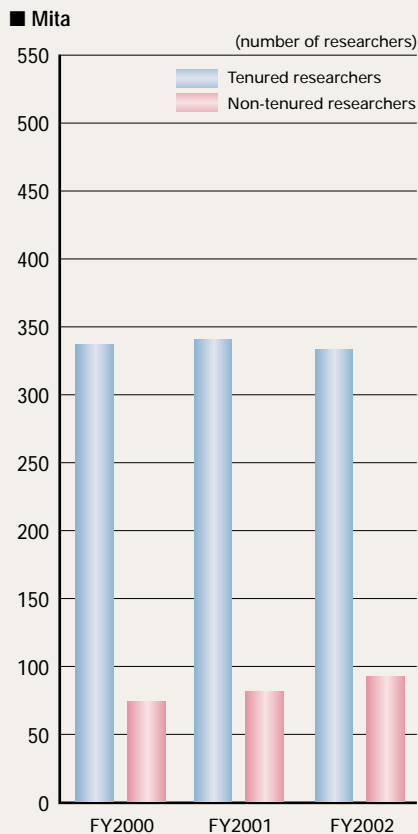
Keio University also conducts research through personnel exchanges and by sharing technology and facilities without the transfer of research funds. In FY2002, 50 research topics were being studied by 42 researchers on 3 campuses.

Campus	Number of topics	Number of representatives
Yagami	25	23
Shinanomachi	15	13
Shonan Fujisawa	10	6
<b>Total</b>	<b>50</b>	<b>42</b>



# Researchers

## 1 Number of Tenured and Non-tenured Researchers



Tenured Researchers			
	FY2000	FY2001	FY2002
Mita	336	339	332
Hiyoshi	287	289	292
Yagami	243	244	249
Shinanomachi	523	497	497
Shonan Fujisawa	97	125	127

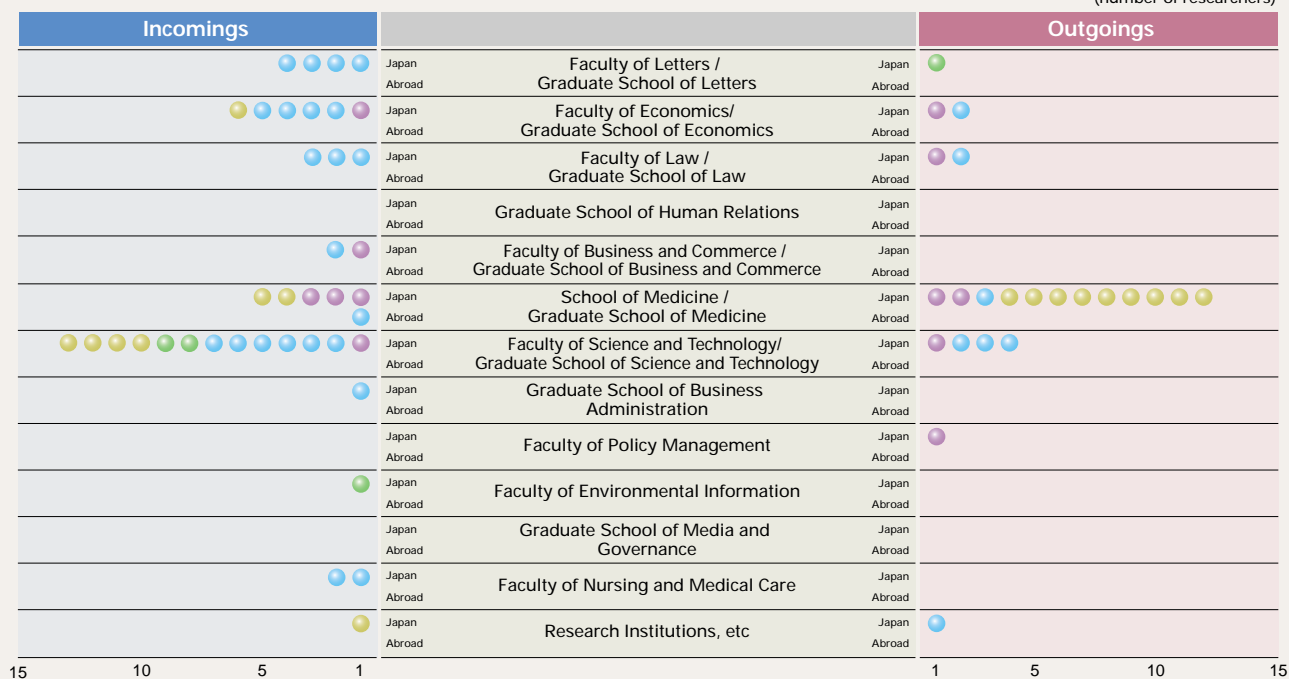
Non-tenured Researchers			
	FY2000	FY2001	FY2002
Mita	73	81	92
Hiyoshi	21	21	25
Yagami	43	48	68
Shinanomachi	91	111	143
Shonan Fujisawa	63	142	161

\* "Researchers" refers to university teaching staff (professors, associate professors, lecturers and assistants)  
 \* Figures for FY2000 as of April 1.  
 Figures for FY2001 and FY2002 as of May 1.

## 2 Number of Incomings and Outgoings of Tenured Researchers

● Government institution ● University ● Private enterprise ● Other

(number of researchers)



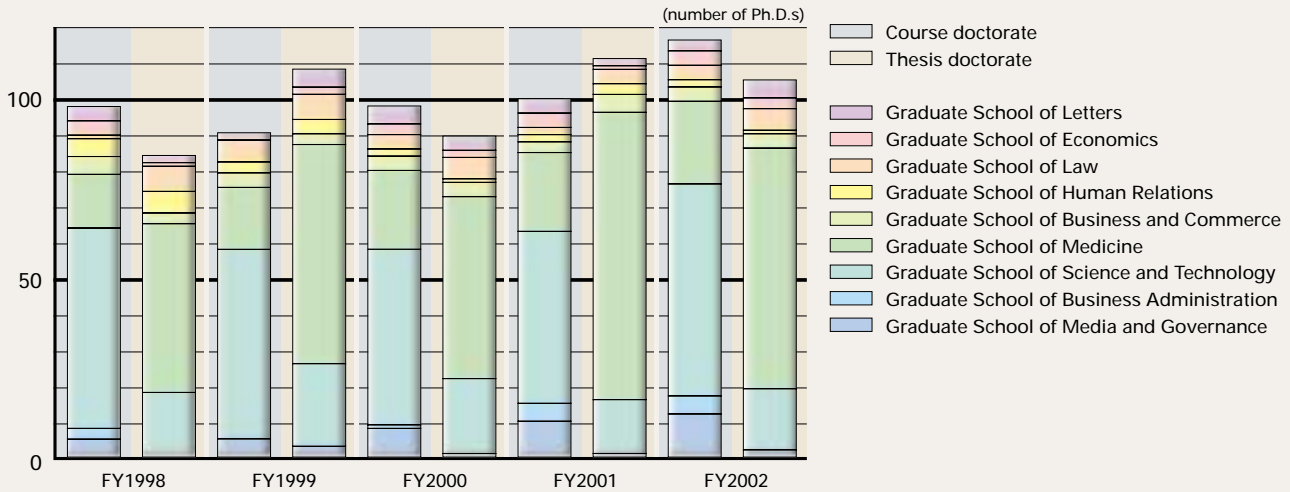
(number of researchers)

Researchers from/to		Government institution		University		Private enterprise		Other		Total	
		Japan	Abroad	Japan	Abroad	Japan	Abroad	Japan	Abroad	Japan	Abroad
Faculty of Letters / Graduate School of Letters	Incomings	0	0	4	0	0	0	0	0	4	0
	Outgoings	0	0	0	0	1	0	0	0	1	0
Faculty of Economics/ Graduate School of Economics	Incomings	1	0	4	0	0	0	1	0	6	0
	Outgoings	1	0	1	0	0	0	0	0	2	0
Faculty of Law / Graduate School of Law	Incomings	0	0	3	0	0	0	0	0	3	0
	Outgoings	1	0	1	0	0	0	0	0	2	0
Graduate School of Human Relations	Incomings	0	0	0	0	0	0	0	0	0	0
	Outgoings	0	0	0	0	0	0	0	0	0	0
Faculty of Business and Commerce / Graduate School of Business and Commerce	Incomings	1	0	1	0	0	0	0	0	2	0
	Outgoings	0	0	0	0	0	0	0	0	0	0
School of Medicine / Graduate School of Medicine	Incomings	3	0	0	1	0	0	2	0	5	1
	Outgoings	2	0	1	0	0	0	9	0	12	0
Faculty of Science and Technology/ Graduate School of Science and Technology	Incomings	1	0	6	0	2	0	4	0	13	0
	Outgoings	1	0	3	0	0	0	0	0	4	0
Graduate School of Business Administration	Incomings	0	0	1	0	0	0	0	0	1	0
	Outgoings	0	0	0	0	0	0	0	0	0	0
Faculty of Policy Management	Incomings	0	0	0	0	0	0	0	0	0	0
	Outgoings	1	0	0	0	0	0	0	0	1	0
Faculty of Environmental Information	Incomings	0	0	0	0	1	0	0	0	1	0
	Outgoings	0	0	0	0	0	0	0	0	0	0
Graduate School of Media and Governance	Incomings	0	0	0	0	0	0	0	0	0	0
	Outgoings	0	0	0	0	0	0	0	0	0	0
Faculty of Nursing and Medical Care	Incomings	0	0	2	0	0	0	0	0	2	0
	Outgoings	0	0	0	0	0	0	0	0	0	0
Research Institutions, etc	Incomings	0	0	0	0	0	0	1	0	1	0
	Outgoings	0	0	1	0	0	0	0	0	1	0
Total	Incomings	6	0	21	1	3	0	8	0	38	1
	Outgoings	6	0	7	0	1	0	9	0	23	0

\* Cumulative total for FY2002

### 3 Fostering Young Researchers

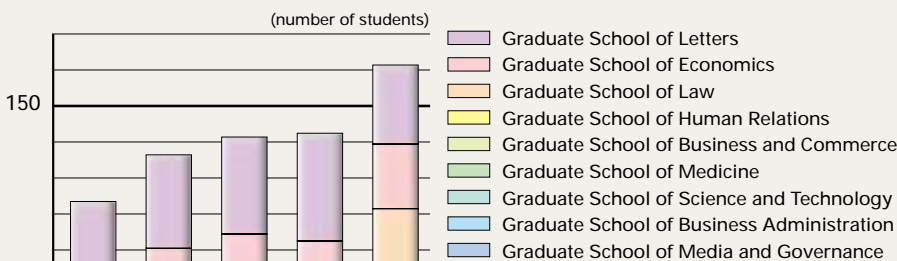
#### 3-1 Number of Doctorate Degrees Awarded



	(number of Ph.D.s)				
	FY1998	FY1999	FY2000	FY2001	FY2002
Graduate School of Letters	6	7	9	6	8
Graduate School of Economics	5	2	5	5	7
Graduate School of Law	8	13	10	6	10
Graduate School of Human Relations	11	7	3	5	3
Graduate School of Business and Commerce	8	7	8	8	8
Graduate School of Medicine	62	80	73	102	90
Graduate School of Science and Technology	74	75	70	63	76
Graduate School of Business Administration	3	0	1	5	5
Graduate School of Media and Governance	5	8	9	11	14

\*The figures for course doctorates and thesis doctorates are as of March 31.

#### 3-2 Number of Doctoral Students Completing Coursework

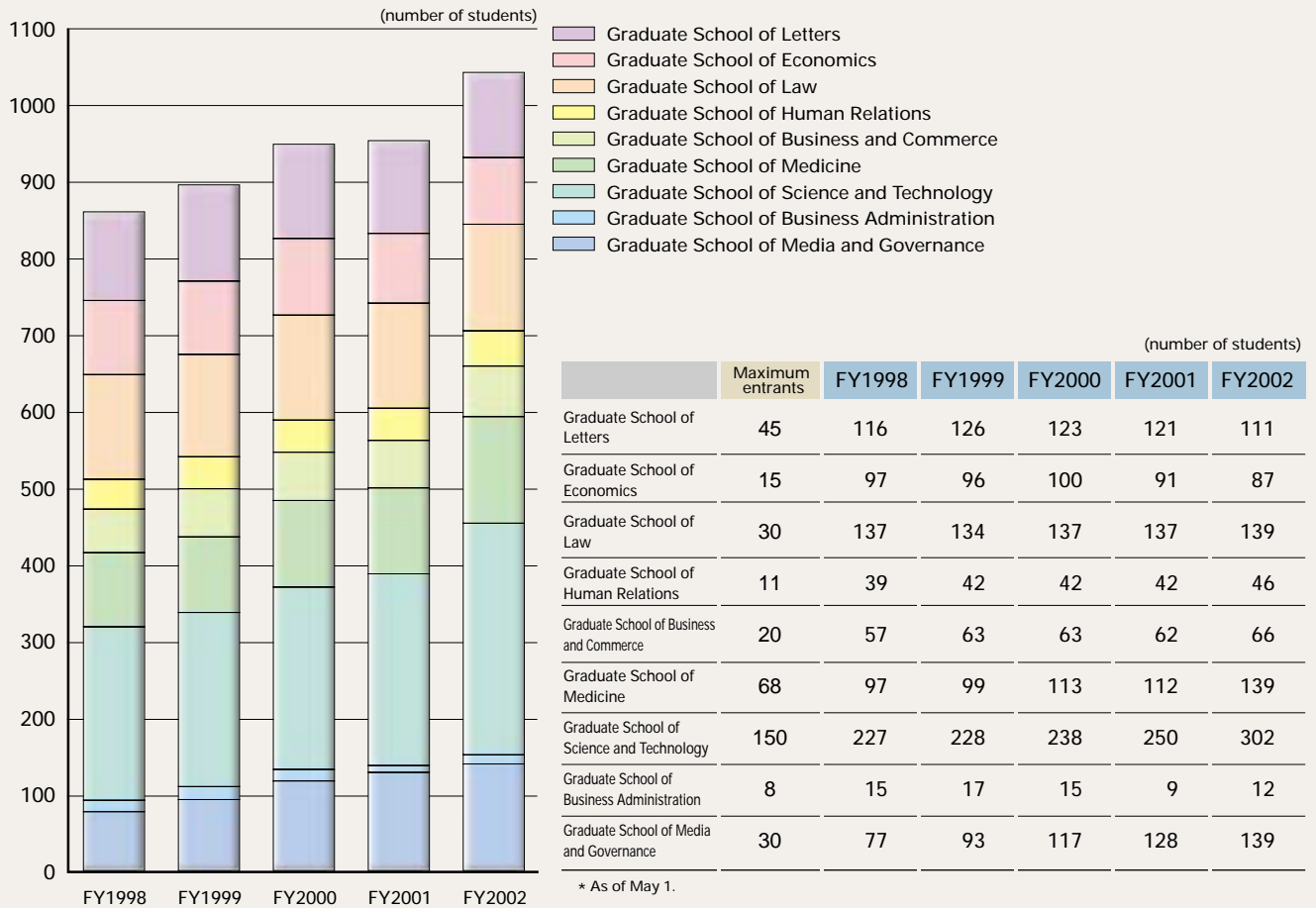


	(number of students)				
	FY1998	FY1999	FY2000	FY2001	FY2002
Graduate School of Letters	22	26	27	30	22
Graduate School of Economics	17	18	20	21	18
Graduate School of Law	18	13	18	17	26
Graduate School of Human Relations	8	13	9	10	17
Graduate School of Business and Commerce	8	14	11	14	19
Graduate School of Medicine	22	15	16	11	21
Graduate School of Science and Technology	23	24	23	20	22
Graduate School of Business Administration	0	5	6	1	1
Graduate School of Media and Governance	5	8	11	18	15

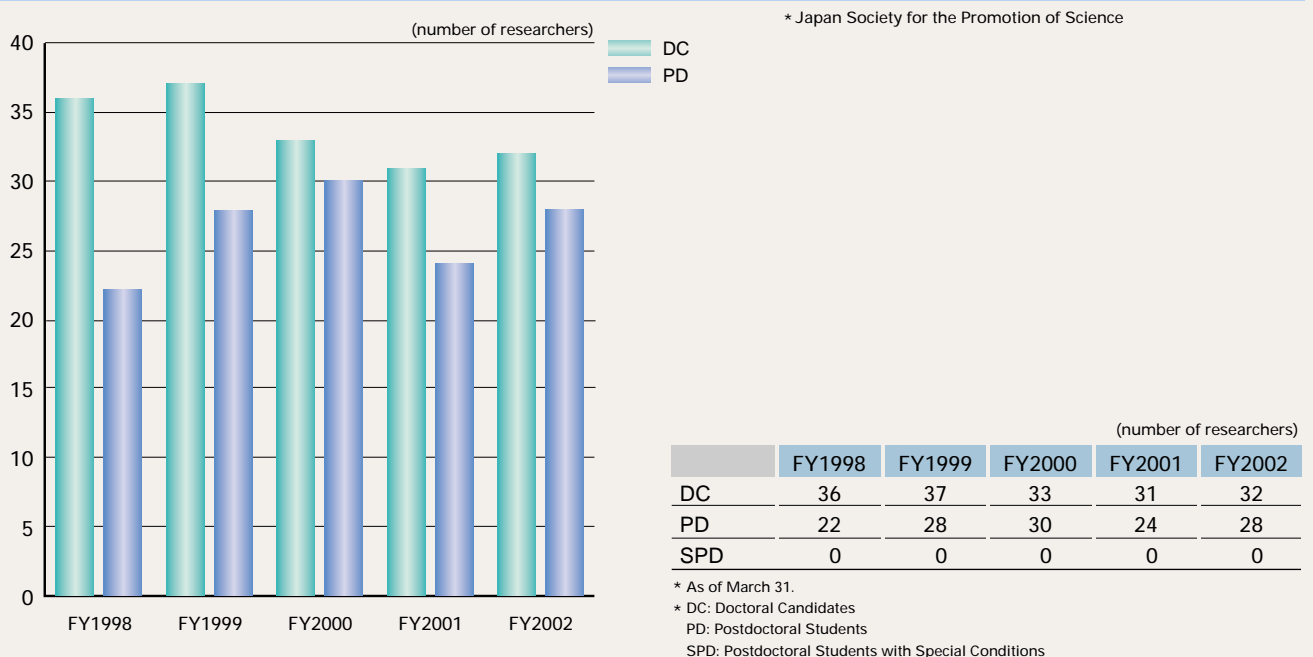
\* Completion of coursework refers to leaving the university by satisfying all requirements other than the thesis dissertation or examination in a post doctorate course or doctorate course. This differs from normal means of leaving the university.

\* Figures for students completing coursework are limited to FY2002.

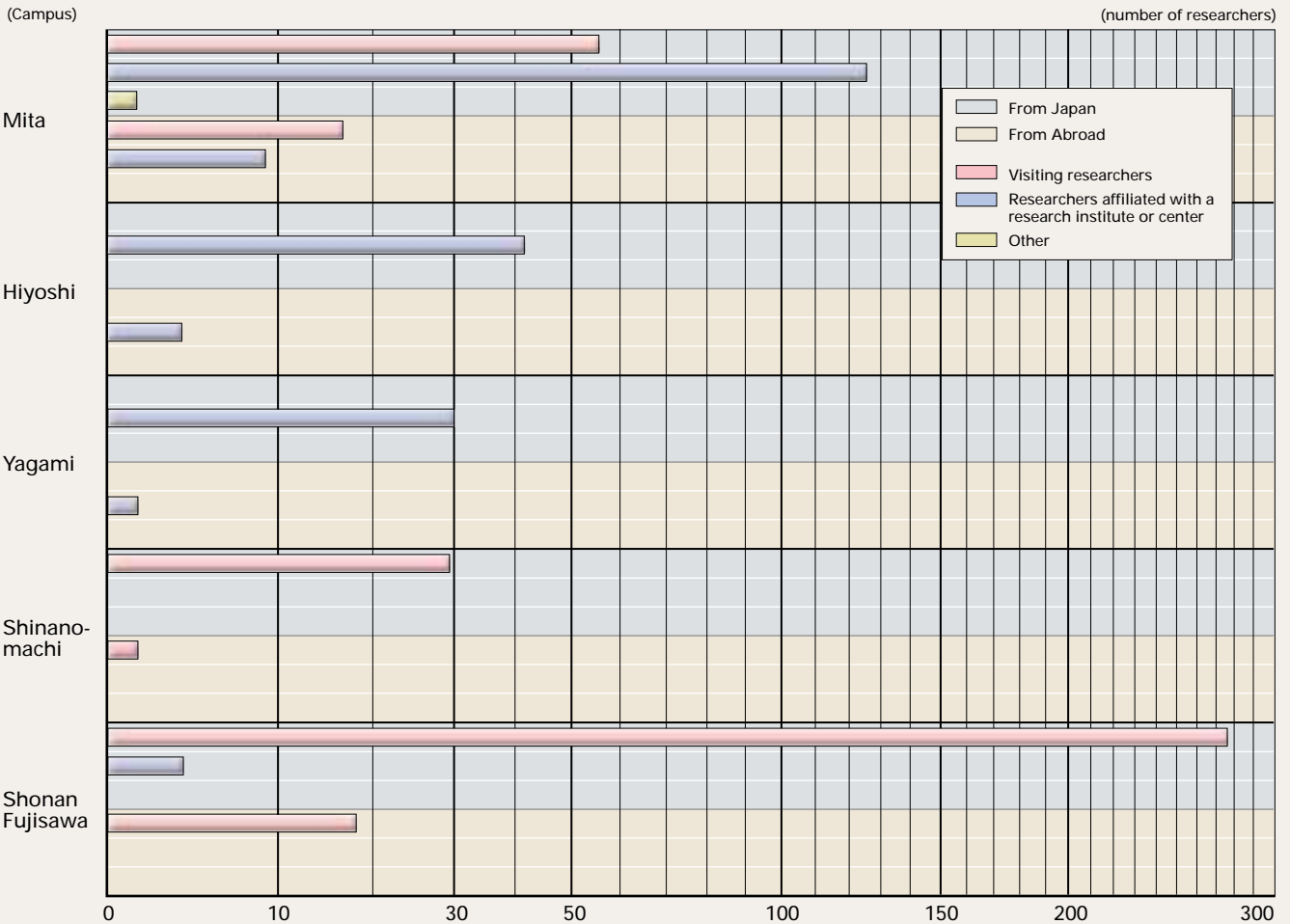
## 3-3 Number of Students Registered in Doctoral Courses



## 3-4 Number of Researchers Fellowships Awarded by JSPS\*

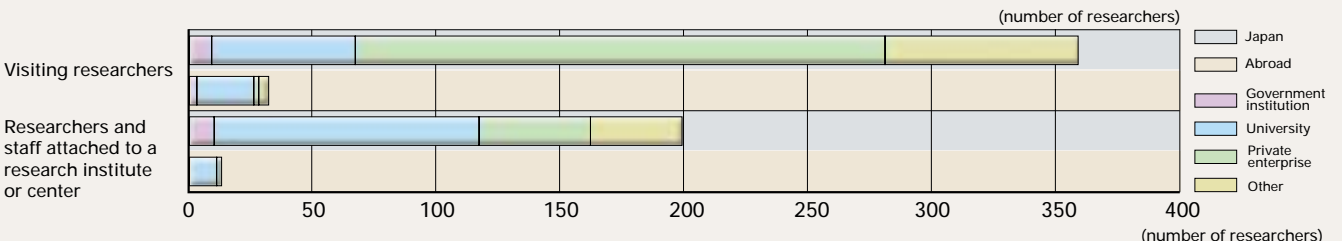


**4** Number of Researchers Accepted by Research Institutions of Keio University in FY2002



Campus	Visiting researchers		Researchers and staff affiliated with a research institute or center		Others		Total	
	Japan	Abroad	Japan	Abroad	Japan	Abroad	Japan	Abroad
Mita	54	15	125	9	1	0	180	24
Hiyoshi	0	0	41	3	0	0	41	3
Yagami	0	0	30	1	0	0	30	1
Shinanomachi	29	1	0	0	0	0	29	1
Shonan Fujisawa	276	16	3	0	0	0	279	16

\* Researchers at Tsuruoka Town Campus are included in the figures for the Shonan Fujisawa Campus



Home institution	Government institution		University		Private enterprise		Other		Total	
	Japan	Abroad	Japan	Abroad	Japan	Abroad	Japan	Abroad	Japan	Abroad
Visiting researchers	9	3	58	23	214	2	78	4	359	32
Researchers and staff affiliated with a research institute or center	10	0	107	11	45	2	37	0	199	13

\* If a researcher belongs to more than one institution, only one of them is recognized as the home institution, with priority given to government, university, private enterprise and other, in that order.  
 \* "Government institution" includes public institutes attached to ministries and agencies or municipal offices.  
 \* "Other" includes non-profit organizations and postdoctoral researchers who do not belong to any institution.

# The 21st Century COE Program

Since its foundation in 1858, Keio University has been at the forefront of education and research in Japan. For 146 years, Keio has consistently fulfilled its mission to contribute back to society through its academic and research achievements in fields such as industry and medicine. Keio has also made substantial contributions through fostering the leaders of society and creating new areas of knowledge.

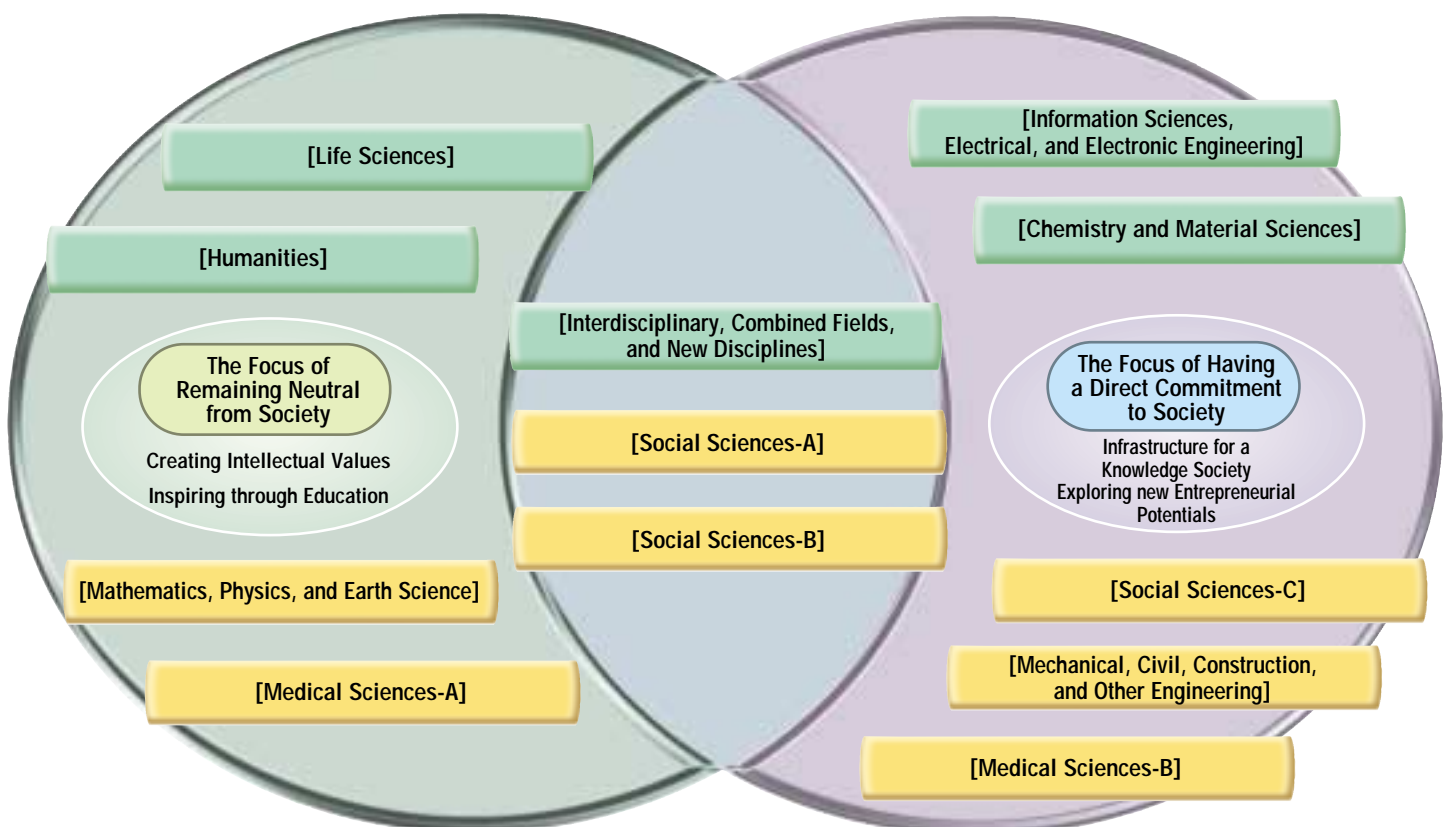
Keio University continues to be a driving force in creating the future of Japan and the global community.

The university's application to participate in the 21st Century COE Program for FY2002 and FY2003 is an opportunity to advance its fundamental mission through two main focuses: neutrality and a firm commitment to society. The 21st Century COE Program opens up new possibilities to focus upon the creation of significant intellectual values and human resource development, while remaining impartial and unaffected by the short-term trends of society. Keio University will reinforce its commitment to society by actively contributing to discussions of current social issues.

Keio University aims to become a leader in the global society of the 21st Century through the creation of dynamic development and integration of these two focus points at an international level, based upon a unique elliptical model.

\* Please refer to the Japan Society for the Promotion of Science website for more information about the 21st Century COE Program: <http://www.jsps.go.jp/j-21coe/>

\* Links to each of the 9 fields and 12 programs at Keio University are available at the following URL: [http://www.21coe.keio.ac.jp/index\\_en.html](http://www.21coe.keio.ac.jp/index_en.html)



## FY2002

### Life Sciences

#### Understanding and Control of Life Function via Systems Biology

■Program Leader

**Hiroshi Yanagawa**

(Graduate School of Science and Technology, Professor)

The program constitutes the international center for education and research to advance knowledge in SYSTEMS BIOLOGY by promoting interdisciplinary research and training among engineering, biology, and medicine assisted by informatics sciences (genome, proteome and metabolome), with the ultimate goal of understanding and regulation of life function.

### Information Sciences, Electrical, and Electronic Engineering

#### Optical and Electronic Device Technology for Access Network

■Program Leader

**Toshiaki Makabe**

(Graduate School of Science and Technology, Professor)

The mission of this program is to promote excellent-caliber academic research in the area of optical and electronic device technology for access network, and foster young researchers with wide/deep knowledge and high-level research skills, who will be able to be leaders in the creation of innovative device/information technology on a global scale.

### Interdisciplinary, Combined Fields, and New Disciplines

#### Next Generation Media and Intelligent Social Infrastructure

■Program Leader

**Hideyuki Tokuda**

(Graduate School of Media and Governance, Professor)

We will establish an international research and educational center to investigate next generation information infrastructure, digital media applications, and their social implications. Our goal is to develop a new architecture for intelligent social infrastructure in the 21st Century.

### Humanities

#### Toward an Integrated Methodology for the Study of the Mind

■Program Leader

**Taro Nishimura**

(Graduate School of Letters, Professor)

A global research & education center will be established with the aim of studying the development and mechanism of the mind. Work at the center will combine the latest research findings in such fields as brain science, neuroscience and behavioral genetics with the body of knowledge that has been accumulated in such humanities fields as philosophy, linguistics, image theory, and informatics. As well as developing an integrated methodology, the center will serve to foster the next generation of researchers, who will have mastered the application of this integrated methodology in multiple fields.

### Chemistry and Material Sciences

#### Function Creation Oriented Life-Conjugated Chemistry

■Program Leader

**Haruma Kawaguchi**

(Graduate School of Science and Technology, Professor)

We define "life-conjugated chemistry (LCC)" as "the chemistry to improve the quality of life, including safety, health, medical care, comfort, etc." This program aims to establish a center of excellence for research and education on LCC, in which efforts are focused on the creation of innovative functional molecules and materials and the education of students who practice LCC.

## FY2003

### ■ Mathematics, Physics, and Earth Science

#### Integrative Mathematical Sciences: Progress in Mathematics Motivated by Natural and Social Phenomena

■Program Leader

**Yoshiaki Maeda**

(Graduate School of Science and Technology, Professor)

The Integrative Mathematical Sciences program is designed to open up new horizons in mathematics by bridging the gaps between pure mathematics and application-oriented mathematics, and to investigate new concepts and leadership methods for mathematical sciences. The core of the research and educational program is built on pure mathematics, as supported by data science and experimental mathematics. Data science serves as the interface to various data-intensive phenomena, and experimental mathematics supports the experimental aspect of mathematical sciences.

The main objective of our program is to promote the construction of international educational and research centers through integrating these three aspects of mathematical sciences. To facilitate our efforts further, the Center for Integrative Mathematical Sciences at Keio will be established under the auspices of the President at the earliest possible opportunity.

As well as our research projects, we have a strong mandate to encourage Ph.D. students and young researchers internationally. For this purpose, we have already started weekly interdisciplinary seminars and colloquia to enhance interdisciplinary exchanges.

Another important aspect of our COE programs is domestic and international collaborations in mathematical sciences with educational and research institutions overseas. We also invite researchers to give lecture series for graduate students, both to inform the students of progress in recent important problems in mathematics, and to encourage research collaborations with the COE program. We also plan to organize an international workshop each year.

### ■ Medical Sciences-A

#### Basic study and clinical application of human stem cell biology and immunology: Approaches based on the development of experimental animal models

■Program Leader

**Hideyuki Okano**

(Graduate School of Medicine, Professor)

The Keio University Graduate School of Medicine boasts an excellent staff in two academic fields: (1) stem cell biology and regenerative medicine, and (2) immunology and autoimmune disease research using animal models of human diseases. The COE takes maximum advantage of the traditional joint research system approaches based on the development of experimental animal models since the founding of the school, and while ensuring ethicality and safety based on the achievements of basic medicine, the basic and clinical staffs collaborate in endeavoring to elucidate the pathophysiology of incurable diseases and to develop new treatment methods. It will form a "self-renewing" educational center that will foster and turn out many researchers with a broad perspective. The COE will be characterized by I) incorporation of basic biology, taking advantage of *Drosophila* genetics, into the medical area, II) development of in vivo experimental medicine using human cells and original animal models of human disease, and III) application of the results by the university hospital that possesses state-of-the-art clinical capabilities. It will also establish an evaluation system that will enable the maintenance of high-level studies by introducing research projects at the Research Park.

### ■ Social Sciences-A

#### Designing toward the Ordering of Political Society in a Multi-cultural and Pluri-generational World

■Program Leader

**Yoshiaki Kobayashi**

(Graduate School of Law, Professor)

With the globalization that has been progressing in recent years, clashes in the area of multiculturalism have made themselves apparent in many states and societies. On the consideration that these problems cannot be resolved at the level of political leadership alone; the program proposed will establish mechanisms to clarify the ways citizens' attitudes is promoted, developed and changed, and to consider the direction in which multicultural communities are moving.

The eventual aim is to establish a "multi-cultural citizen's attitudes research center" and to establish an enlarged "citizens' attitudes data archive", targeted at a variety of countries. Together they will constitute Japan's first internationally-oriented human research network. Research plans: to increase data and related analyses regarding citizens' attitudes in a multicultural world; establishing the causes of conflicts, while carrying on investigation into conditions that will make it harder for such conflicts to arise. Research will be undertaken into the outlook for political society in the twenty-first century: the differences in attitudes of political society within multiculturalism in particular comparison between the generation responsible for contemporary society and the generation who will bear that responsibility in the future. Education-related plans: providing research funds for younger researchers on a competitive basis, as well as organising graduate students to participate in surveys relating to the main area of proposed research, giving instruction on the implementation of citizens' attitudes surveys and related analyses. Moreover, in order to make known the results of research undertaken in foreign languages, along with the publication of a foreign-language review, it is proposed to subsidize travel expenses for those presenting at international conferences.

Through these research and educational approaches, we aim to establish a program of global research and education, not only carrying out opinion surveys into citizens' attitudes, but effecting research and education of the highest international standard into the topic of global civil governance.



## ■ Social Sciences-B

### Development of a Theory of Market Quality and an Empirical Analysis Using Panel Data

■ Program Leader

**Naoyuki Yoshino**

(Graduate School of Economics, Professor)

Since the early 1990s, the Japanese economy has been in a long recession. Our 21st century center of excellence program is premised on the belief that the fundamental cause of this long lasting recession is the lack of high quality markets within the Japanese economy. We believe that improving the quality of Japanese markets is the key to revitalizing the economy. Motivated by this belief, our program aims to reveal the determinants of market quality by combining theoretical and empirical analyses with a broad range of historical and institutional case studies.

On the one hand, the importance of "quality" has been emphasized in various facets of managerial sciences. On the other hand, issues related to quality have not been fully examined in economics, perhaps due to difficulties associated with quantifying a "quality." In particular, market quality has never been presented as a subject for serious economic analysis. Gathering leading economists and managerial scientists at Keio University, our program intends to shed light on this new research subject and hopes to develop a new school of thought guiding economic policymaking.

In order to conduct sound quantitative analyses of market quality, high quality data is indispensable. In order to build such data, in our program, we design and build longitudinal panel data; longitudinal panel data tracks, for a large number of economic agents, activities of each agent over a long span of time. Unfortunately in Japan, unlike in the U.S. and Europe, the accumulation of longitudinal data, in particular on consumption, remains poor. We are determined to make continuous and long lasting efforts to become a leading center of longitudinal panel data in Japan.

Data that we can confirm to be reliable will be made usable for public. We are certain that these data will greatly contribute not only to understanding market quality but also to research in various fields of social science beyond our research theme.

## ■ Social Sciences-C

### Policy Innovation Initiative

■ Program Leader

**Moriyuki Oe**

(Graduate School of Media and Governance, Professor)

The purpose of this program is to establish a network of research and training organizations in Japan and Asia. This network will enable researchers and practitioners to cooperate in finding the "problems" in need of solutions, in identifying and developing the resources to be mobilized for the solutions, and in generating consensus in the methods of solving the problems. We also aim at realigning existing methods of inquiry in a manner conducive to finding and solving the "problems" attendant upon the rapidly increasing pressures of globalization, demographic change, and environmental change. Our purpose is to develop a new mode of analysis and practice for effective policy formation and to form a new policy innovation "community" where scientific and practical knowledge can be joined.

As enunciated in the 1994 Human Development Report of the UNDP, "freedom from fear and freedom from want" represent the essence of human security. We join in this formation of policy imperatives. The specific issues requiring innovative policies for promoting "human security" are diverse. Common to all these issues are the threats and the unmistakable condition of insecurity each poses to the individuals, to the communities, and to the regions involved, regardless of their stages of economic development.

## ■ Mechanical, Civil, Construction, and Other Engineering

### System Design : Paradigm Shift from Intelligence to Life

■ Program Leader

**Kazuo Yoshida**

(Graduate School of Science and Technology, Professor)

This COE aims at establishing a global collaborative and educational research center of excellence based on the system design engineering which was initiated by KEIO University. In this COE, an important role will be played in the mechanical and architectural fields of engineering by leading in the 21st century the paradigm shift to life for the engineering developed historically from high-performance technology to intelligence technology in the 20th century. In order to create harmony in the world of the natural entities and artifact-systems interacting each other, this COE focuses on the characteristics of life as a system as well as various life functions and creates a new design methodology of mechanical and architectural systems which are enabled to be interactive among inner components and outer systems by embedding design information including rules of interaction into artifact-systems.

In order to achieve the objective of this COE, the system design engineering will be further developed as a backbone of the COE and several product innovations with respect to architecture, robotics, energy/bio systems and so on will be explored. This COE program will provide graduate school students and young researchers a good opportunity to challenge research through unique educational programs such as overseas internship and curriculum of leading-edge design school.

## ■ Medical Sciences-B

### Establishment of individualized cancer therapy based on comprehensive development of minimally invasive and innovative therapeutic methods

■ Program Leader

**Masaki Kitajima**

(Graduate School of Medicine, Professor)

In this COE program, we will attempt to establish individualized cancer therapies based on the comprehensive development of minimally invasive and innovative therapeutic methods through translational research. Research will be conducted in three main areas: 1) development of diagnostic methods enabling individualized treatment, including genetic diagnosis and new RI imaging; 2) development of minimally invasive treatments, including endoscopic and robotic surgery; and 3) development of new cancer treatments, including immunotherapy, gene therapy and molecular target therapy. This research will be mainly performed at the Keio University Center for Integrated Medical Research, which has several new research facilities like the Laboratory Animals Center, RI Center and Central Research Laboratory, as well as at Keio University Hospital. To conduct this program efficiently, strong collaboration between the basic and clinical departments of the Keio University Graduate School of Medicine and the Graduate School of Science and Technology as well as between Keio University and outside academia and industry will be required. The center's Shinanomachi Research Park will provide research space for collaborations. Updated cancer research information on basic and clinical topics will be made available to graduate students, young researchers and medical doctors to enhance their research capabilities. International symposia and worldwide teleconferences will help to provide a global perspective on learning. Through these efforts, we will attempt to establish a world renowned cancer center that can quickly translate basic research into clinical applications while training the next-generation of researchers and medical doctors needed for the future advancement of cancer medicine.

# Technology Licensing and Support of Venture Businesses

Research results produced at Keio University are valued intellectual assets, and the university actively promotes and supports the protection and utilization of them. The Intellectual Property Center was established in November 1998 as a Technology Licensing Organization (TLO). Naturally, research conducted by individual scholars and staff at Keio has resulted in contributions to society, reflecting the "spirit of practical learning" as Yukichi Fukuzawa, the university's founder advocated, but in order to further strengthen ties and cooperation between the university and society, Keio University has become a rights holder to protect the intellectual assets, promote implementation of the research results to business and to support and expand operations.

## 1. Flow of Technology Licensing Flow



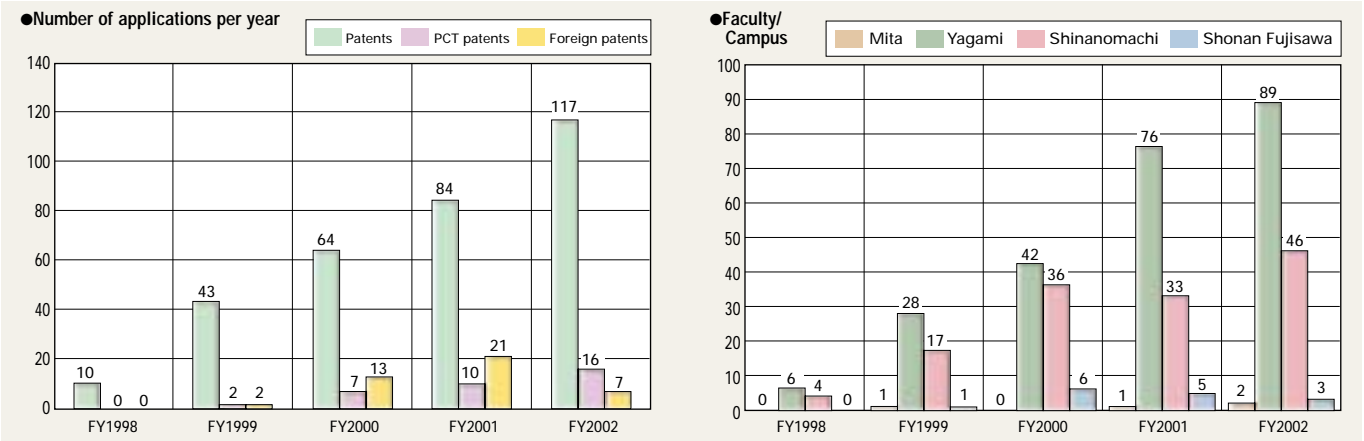
## 2. Patent Applications

Types of intellectual assets are diverse including inventions, programs and creations, but can generally be categorized into two types, the "patent type" and the "non-patent type." The Intellectual Property Center supports licensing of both types, but has given high priority to the intellectual property for the "patent type" for which the acquisition of rights is necessary for licensing. A total of over 396 patent applications have been filed (318 in Japan, 78 overseas) since the center's establishment. The Faculty of Medicine and the Faculty of Science and Technology have been particularly active in patent application in the fields of bio and medical technologies, with bio/medical making up 50 percent of the total, information/communication/electronics and control/measurement

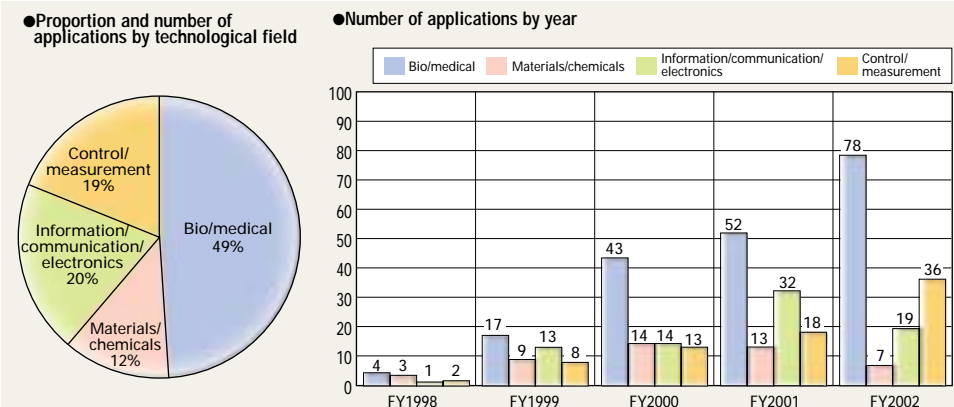
each making up 20 percent, and materials/chemicals making up 10 percent.

One of the characteristics of FY2002 was the increase in joint patent applications with foundations and private enterprises. Joint applications only made up 20 to 30 percent in the past for Shinanomachi Campus, but this figure jumped up to 43 percent in FY2002, indicating that research at the Faculty of Science and Technology in collaboration with KLL (Keio Leading-edge Laboratory of Science and Technology) and Shinanomachi Research Park in the Faculty of Medicine have begun to bear fruit. 18 patents had been obtained as the university continues to apply for evaluation of licensed items as of fiscal FY2002.

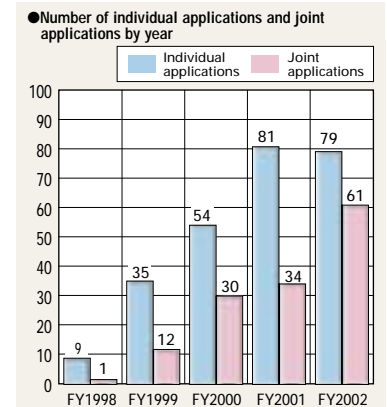
### (1) Patent Applications



### (2) Proportion and Number of Applications by year



### (3) Number of Joint Patent Applications

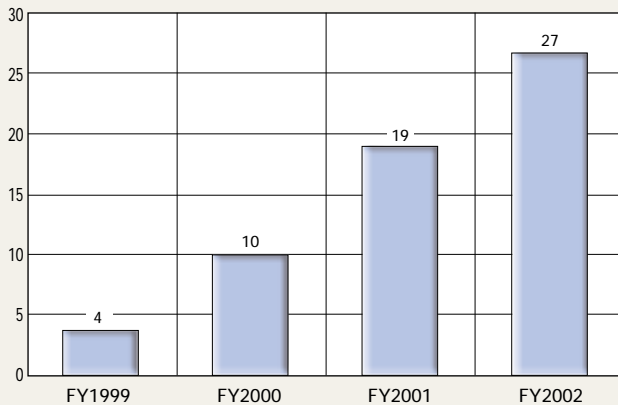


### 3. Licensing

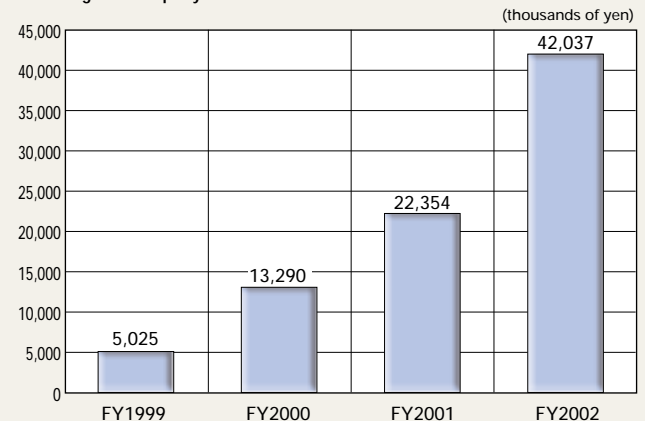
A total of 60 cases of patent licensing have been made since the Intellectual Property Center was founded. Most of the companies that entered into these contracts were of a small or medium size. Licensing

revenues have increased as so did the number of cases, reaching 42 million yen in FY2002 for a cumulative total of 83 million yen.

●Licensing Performance by Year



●Licensing revenue per year



### 4. Support of Venture Companies

#### Framework for Support of Venture Companies

The following frameworks are laid out in order to find and grow the university's seeds, create new businesses, and stimulate further research activities.

##### (1) Keio Venture Forum

This forum aims at introducing Keio's seeds to industry, while also providing advice and support for establishing venture businesses. The forum provides services to companies, such as venture capitalists, trading companies and incubators, which have made cooperative agreements with Keio University. The university actively creates an external network through the venture forum.

##### (2) Entrepreneur Assistance Fund (effective as of November 1, 2003)

Keio University has recently created an investment fund of up to one million yen, or equivalent to 30 percent or less of the total capital of a research and development-based venture company by utilizing intellectual property for which Keio University holds the rights, in order to facilitate start-ups of such new businesses. The fund can be made available to any venture company satisfying the following four requirements.

- The company must be a limited company or a stock corporation.
- The company's primary business must be research and development based on intellectual property held by Keio University.
- The intellectual property used must have been produced as a result of research by the university's tenured staff or full-time student, and the inventor (staff or student) must invest an appropriate amount of money and participate in the business as one of the founders.
- The inventor must not only invest in the business but also be involved in research or development of the company. The Operating Committee for the Entrepreneur Assistance Fund makes a final decision on each investment possibility upon recommendation from the Intellectual Property Center.

##### (3) Licensing to Venture Companies Originating from Keio University

This is a scheme that takes into consideration the financial circumstances faced by venture companies, and accepts licensing fees through equity such as stock and stock options in lieu of cash.

#### Venture Companies Assisted by Keio University

##### Shiratori Nano Technology Company (<http://www.snt.jp/>)

The company conducts funded research and joint development of nanotechnology for production and assessment of thin films. It also sells the nanotechnology and thin film manufacturing equipment.

Supported through technology licensing.

##### GBS Research Co., Ltd.

The company aims to practically implement nerve regeneration technology and brain tumor examination technology developed in the School of Medicine.

Keio University received subscription rights for the license to relevant intellectual property.

##### V-cube Inc. (<http://www.vcube.com/>)

Established by graduate students. Provides internet technology solutions and conducts related research and development.

Keio University received stock for technology licensing.

##### Human Metabolome Technologies Inc.

The company aims to conduct research and development based on the metabolome (metabolites within cells) measurement and analysis technology developed at the Institute for Advanced Biosciences on Tsuruoka Town Campus. The company plans to conduct a wide variety of business including drug discovery, examinations and order-made medicine through the practical application of analysis of human cells.

Keio University invested in the company through the Entrepreneur Assistance Fund.

##### Oxygenix Inc.

The company aims to achieve the application of artificial red blood cells and design new drug products using molecular association technology.

Keio University obtained stock for partial assignment of patent.

