

An aerial photograph showing a vast urban landscape with a river and an airport. The city is densely packed with buildings, and the river winds through the center. The airport is visible in the lower right quadrant of the image.

Life Innovation in Keihin Coastal Areas

Comprehensive Special Zones for International Competitiveness Development

Kanagawa Prefecture, Yokohama City, and Kawasaki City



Utilizing the Strengths of Industrial and Technological Clusters and

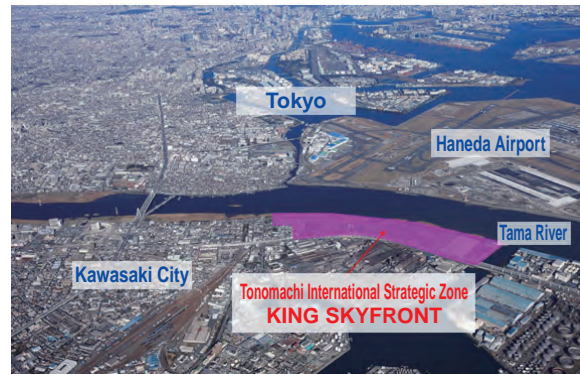
Development and manufacture of innovative pharmaceuticals and medical equipment by global companies that can respond to the new era of individualization and preventive medicine and creation of health-related industries.

Utilize comprehensive special zones*: Promote lifestyle innovations by taking advantage of preferential and support measures

* Comprehensive special zones: Zones the national government has designated as areas with a high probability of carrying out pioneering efforts to form the clusters of industries and functions that will serve as the engines of Japan's economic growth.

Robust urban and transportation infrastructure

- Close to Haneda Airport, with 90,000 international and 357,000 domestic arrivals and departures (anticipated by the end of FY2013)
- Cornerstone of metropolitan region's transportation network
- Keihin ports



The metropolitan region's human resource, data and technology clusters

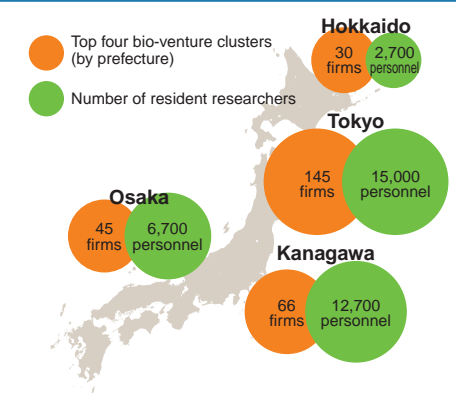
- Meets the needs of 37 million people in the metropolitan region for sophisticated medical care
- Home to Pacifico Yokohama, the number one venue in terms of total number of international convention participants for five consecutive years
- Corporate clusters: 4,189 in Tokyo and 641 in Kanagawa Prefecture
- Research clusters: 944 organizations in Tokyo and 543 in Kanagawa Prefecture



the Keihin Coastal Area to Promote Life Innovations

Industrial clusters based in the Keihin coastal area

- Clusters of small and mid-sized enterprises, and venture companies
- Groups of global companies, including Takeda Pharmaceutical Co., Ltd.; Ajinomoto Co., Inc.; Terumo Corporation; Fujifilm Corporation; Canon Inc.; Toray Industries, Inc.; and Chugai Pharmaceutical Co., Ltd.
- Site of the Central Institute for Experimental Animals, RIKEN (Yokohama Branch), Yokohama City University School of Medicine, Kitasato University, Keio University, Kanagawa Academy of Science and Technology, and Kanagawa Cancer Center, among others



Sources: 2012 Survey of Bio-venture Statistics and Trends, Japan Bioindustry Association (JBA); national census, Statistics Bureau, Ministry of Internal Affairs and Communications

World-famous researchers typical of this region



Hideki Taniguchi
Professor
Department of Regenerative Medicine, Graduate School of Medicine, Yokohama City University

The research team Professor Hideki Taniguchi leads succeeded in creating the world's first functional human organ with a vascular structure from iPS cells. The highlights of this research were featured in the international science journal *Nature* (July 2013 edition). This technology is expected to become a groundbreaking regenerative medical technique that will provide relief to numerous patients as an alternative to organ transplants, and will also radically speed up the development of new pharmaceuticals by utilizing the organs produced.

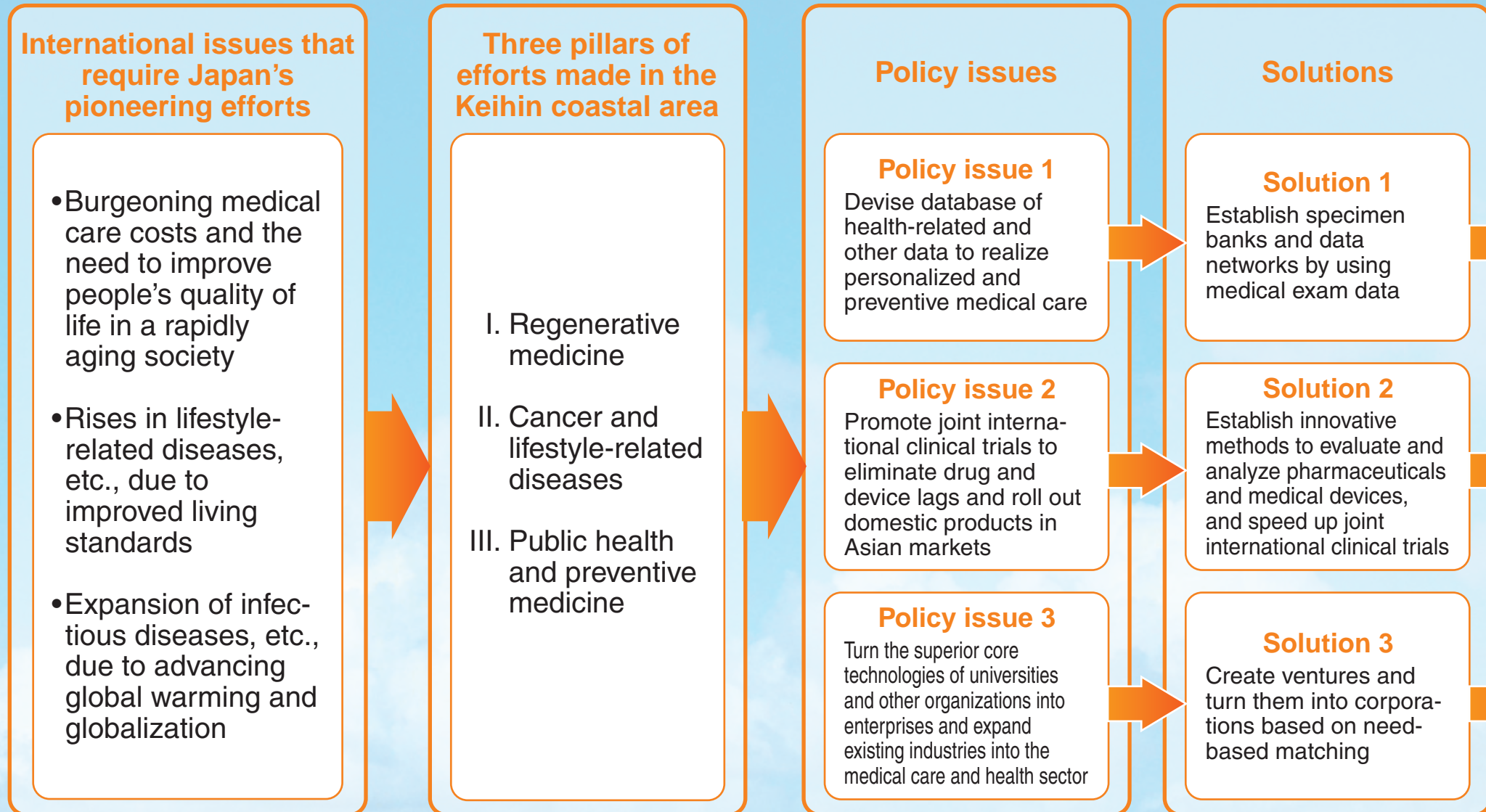
A recipient of both the Humboldt Research Award and the Leo Esaki Prize in 2012, Professor Kazunori Kataoka is developing functional nanomaterials that induce cell differentiation in specific parts of the body and nanodevices that accurately deliver genes and drugs to target cells. Expectations are that these types of macromolecular nanodevices will lead to groundbreaking forms of treatment for pancreatic cancer and other intractable forms of cancer. Clinical trials are in progress. Professor Kataoka will be a lead researcher at the Innovation Center of Nanomedicine, scheduled to open in 2014.



Kazunori Kataoka
Professor
Graduate Schools of Engineering and Medicine, the University of Tokyo

Goals to be realized

Development and manufacture of innovative pharmaceuticals of individualization and preventive medicine and creation of



Special Zones for International Competitiveness Development

and medical equipment by global companies that can respond to the new era health-related industries.

Ventures designed to achieve goals

- Develop tailor-made medical care using AminolIndex® cancer screening
- Develop new functional foods in anticipation of the fusion of Eastern and Western medicine, and establish ways to assess functionality and safety in connection with that
- Develop the National Institute of Health Sciences, and promote regulatory science
- Create infrastructure for medical care industries that use human induced pluripotent stem (IPS) cells and somatic stem cells
- Move forward on consultative functions related to regulatory reviews in approvals of pharmaceuticals
- Promote medical and engineering links in the Keihin coastal area (creating medical devices, etc., through cooperation among Kanagawa Prefecture, Yokohama City, Kawasaki City, and Ota Ward)
- Coordinate efforts to match corporate needs to the “seeds” universities and research organizations possess

Ripple effects

Reduced medical care expenses

Improved quality of life

Expanded employment

Economic growth

Fuel the sustained expansion of Japan's national economy while also helping to solve international issues

17 Bases of the Comprehensive Special Zones for International Competitiveness Development



★Zones created in December 2011

	Zone name	Location	Companies/institutions located there
A	Tonomachi Zone (KING SKYFRONT)	Kawasaki	Ajinomoto Co., Inc.; Kawasaki Municipal Hospital; Kawasaki City Institute for Public Health; National Institute of Health Sciences; Central Institute for Experimental Animals; Japan Radioisotope Association; Innovation Center Of NanoMedicine; Life Science & Environment Research Center (LiSE); others
B	Suehiro Zone (Yokohama Science Frontier)	Yokohama	Kihara Memorial Yokohama Foundation for the Advancement of Life Sciences, Suehiro Factory Park, Yokohama City University Tsurumi Campus, Yokohama Leading Venture Plaza, Yokohama Biopharmaceutical Research & Development Center, Yokohama Biotechnology Industry Center, RIKEN Yokohama Branch, others
C	Fukuura Zone	Yokohama	Yokohama City University School of Medicine, University Hospital, and Advanced Medical Research Center
D	Minato Mirai Zone	Yokohama	Pacifico Yokohama (venue for Bio Japan and other exhibitions, business conferences, and academic meetings related to medical care and medicine), Key Support for Life Innovation, others

◆Additional zones from October 2013

	Zone name	Location	Companies/institutions located there
1	Shin-Kawasaki Zone	Kawasaki	Keio University Shin-Kawasaki (K2 Town) Campus; IBM Japan, Ltd.; Pioneer Corporation; Academic Consortium for Nano and Micro Fabrication of Four Universities; others
2	Techno Hub Innovation Kawasaki (THINK)	Kawasaki	Ushio Inc., others
3	Shin-Koyasu Zone	Yokohama	Shibusawa Warehouse Co., Ltd.; Technology Village Partnership Industry Center; Thermo Fisher Scientific K.K.; Bruker Corporation; Yasuda Warehouse Co., Ltd.; others
4-5	Kannai District	Yokohama	Kanagawa Health Service Association, FANCL Corporation
6	Yokohama City University Medical Center	Yokohama	Yokohama City University Medical Center
7	Kanazawa Industrial Park Zone	Yokohama	Kishi Kasei Co., Ltd.; Kirin Holdings Co., Ltd.; Koyo Corporation; Fisheries Research Agency; Japan Tobacco Inc.; Palace Chemical Co., Ltd.; Roman Industries Co., Ltd.; others
8	Keio University Shonan Fujisawa Campus	Fujisawa	Keio University Faculty of Policy Management, Faculty of Environment and Information Studies, Faculty of Nursing and Medical Care, Graduate School of Media and Governance, and Graduate School of Health Management, Keio Research Institute SFC
9	Kanagawa Cancer Center	Yokohama	Kanagawa Prefectural Hospital Organization Kanagawa Cancer Center
10	Tokyo Institute of Technology Suzukakedai Campus	Yokohama	Organization for Life Design and Engineering, Tokyo Tech Yokohama New Technology Creation Center, Industry-Academia Research Building, others
11	Shin-Yokohama District	Yokohama	ReproCELL, Inc.
12	Kanagawa Science Park	Kawasaki	Kanagawa Academy of Science and Technology; KSP, Inc; Institute of Microchemical Technology Co., Ltd.; Global Collaboration Center for Life Innovation; others
13	Keio University Yagami Campus	Yokohama	Keio University Faculty of Science and Technology

4 Capabilities to Encourage Life Innovation

Joint-use facilities

Facilities for incubation and conducting joint biopharmaceuticals research

- **Tonomachi Zone**
 - Life Science & Environment Research Center (LiSE)
 - Innovation Center Of NanoMedicine (in preparatory stage)
- **Shin-Kawasaki Zone**
 - Academic Consortium for Nano and Micro Fabrication of Four Universities located in Global Nano Micro Technology Business Incubation Center (NANOBIIC)
- **Suehiro Zone**
 - Yokohama New Technology Creation Center
 - Suehiro Factory Park
 - Yokohama Biotechnology Industry Center
 - Yokohama Biopharmaceutical Research & Development Center
- **Fukuura Zone**
 - Yokohama City University Advanced Medical Research Center
- **Kanazawa Industrial Park Zone**
 - Yokohama Kanazawa High-Tech Center Techno-Core
 - Yokohama Kanazawa Industrial Development Center
- **Tokyo Institute of Technology Suzukakedai Campus**
 - J3 Rental Laboratory
- **Keio University Shonan Fujisawa Campus**
 - Keio Research Institute SFC



LiSE



Yokohama Biotechnology Industry Center

Research organizations available for partnerships

- **Tonomachi Zone**
 - Central Institute for Experimental Animals
 - Kanagawa Academy of Science and Technology
 - National Institute of Health Sciences (in preparatory phase)
 - Japan Radioisotope Association (in preparatory phase)
- **Suehiro Zone**
 - RIKEN (Yokohama Branch)
 - Yokohama City University Partner Graduate School
- **Fukuura Zone**
 - Yokohama City University School of Medicine, University Hospital, and Advanced Medical Research Center
- **Yokohama City University Medical Center**
- **Tokyo Institute of Technology Suzukakedai Campus**
- **Kanagawa Science Park**
 - Kanagawa Academy of Science and Technology
 - Global Collaboration Center for Life Innovation
- **Kanagawa Cancer Center**

- **Keio University Shonan Fujisawa Campus**
 - Faculty of Policy Management
 - Faculty of Environment and Information Studies
 - Faculty of Nursing and Medical Care
 - Graduate School of Media and Governance
 - Graduate School of Health Management
 - Keio Research Institute SFC
- **Keio University Yagami Campus**
 - Faculty of Science and Technology



Yokohama City University Hospital



Yokohama City University Advanced Medical Research Center



Central Institute for Experimental Animals



RIKEN Yokohama Branch

Other support capabilities

(Business support and PR capabilities)

Matching businesses, researchers, physicians and others, and inter-venture coordination

- **Suehiro Zone**
 - Kihara Memorial Yokohama Foundation for the Advancement of Life Sciences
- **Tonomachi Zone**
 - Kawasaki Institute of Industrial Promotion

Publicizing business content and successes in Japan and elsewhere through exhibitions held in the area

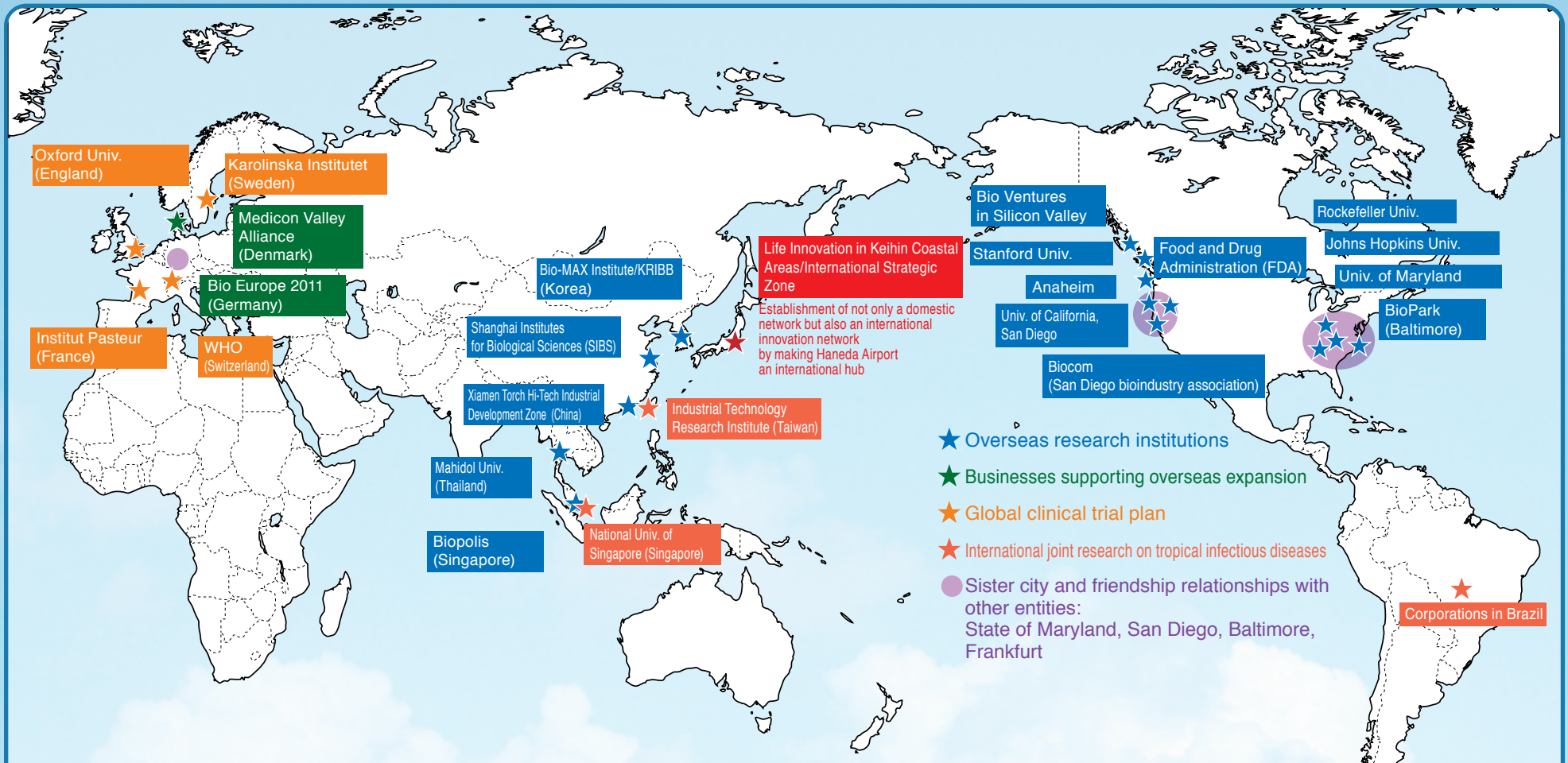
- **Minato Mirai Zone**
 - Pacifico Yokohama



Pacifico Yokohama

5

Establishment of an International Innovation Network through Collaboration with Overseas Research Institutes



Collaboration activities

- Joint research and development for medical care, drugs and medicines
- Consideration of regulations and quality inspection methods for new drug approval
- Consideration of global clinical trial

Global clinical trial

Through taking advantage of the good location, enforce Japan's excellent technologies for regional clinical trial networks and the initiatives of global clinical trials through international collaboration

Partner clinical trial hospitals in U.S. and Europe

Partner clinical trial hospitals in Asia

International Strategic Zone

TIACT

Creation and development of clinical protocols

Regional clinical trial network (Partner hospitals)

Overview of Preferential and Support Measures

Preferential regulatory measures

Preferential regulatory measures specific to the region

- ☆ Preferential measures related to physical exams and health advice
- ☆ Preferential measures related to displays of foreign cargo
- Preferential regulatory measures related to procedures for approval of pharmaceuticals and medical devices
- Preferential regulatory measures related to clinical research employing cells
- Preferential regulatory measures related to the implementation of clinical trials

☆: Measures that are clearly possible to implement

Note: These were under discussion with the national government, with the goal of implementation from 2013; additional new requests possible

Preferential measures against legally stipulated regulations

- Easing of regulations on usage in industrial parks (preferential measure related to the Building Standards Act)
- Easing of limitations on usage in special purpose zones (preferential measure related to the Building Standards Act)
- Preferential measures regarding procedures for approvals related to restrictions on the disposition of property (preferential measure related to the Grant Normalization Act)
- Preferential measures related to greenbelt regulations on plant locations (preferential measure related to the Factory Location Act and Act on the Promotion of Establishment of Enterprises)

Tax support

Selected Application of the Following Measures

Investment Tax Credits or Specially-Recognized Depreciation

- Specially recognized depreciation ratio: 50% of acquisition price (25% for buildings.)
- Tax deduction ratio: 15% of acquisition price (8% for buildings.) , Maximum deduction surplus carryover: 1 year

Deductions from Taxable Income

- Special treatment: 20% of the earnings from the relevant projects to be deducted from taxable income.

Specific examples

Diagnostic support business and development of tailor-made medical care
● Ajinomoto Co., Inc.

Financial Support

- Payment of subsidies to cover interest payments on loans from financial institutions for the funds an enterprise requires to operate an approved venture (Subsidized interest rate: Within 0.7 percent, paid over a five-year period)
A financial institution that is scheduled to receive subsidies for interest payments must be approved by the national government and a member of the local council

Financial institutions that are local council members: the Development Bank of Japan, the Bank of Yokohama, the Kawasaki Shinkin Bank

Fiscal Support

- High-priority use of relevant ministerial budgets
- Flexible distribution of coordination cost for development of Comprehensive Special Zone

Specific examples
(from FY2011 and FY2012)

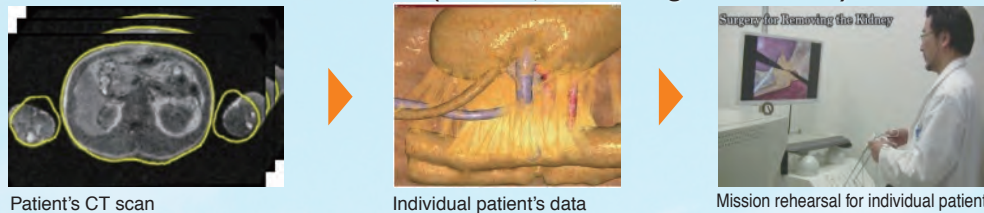
Ventures to establish a center to promote regulatory science

Relocation of National Institute of Health Sciences ● Ministry of Health, Labor and Welfare: ¥2.3 billion

Venture to develop problem-solving medical devices

1 Development of pre-laparoscopic surgery mission rehearsal device to enable individually tailored patient care

● Kihara Foundation: ¥54 million (FY2011, continuing into FY2012)



Patient's CT scan

Individual patient's data

Mission rehearsal for individual patient

2 Developed a home-use ultrasound device

● Kihara Foundation: ¥65 million (FY2011, continuing into FY2012)

Smaller size enabled by design and automatic guiding technology, one circuit board, and hardness measurement capability standard features



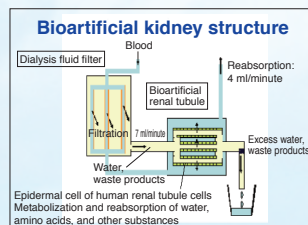
The case is half the usual size, and integrated with a PC.



3 Trial development of a bioartificial renal tubule device, using human renal tubule cells

● Kihara Foundation (FY2012)

Created a bioartificial renal tubule device by grafting human renal tubule cells inside a hollow fiber. This artificial device was developed with the goal of improving the ratio of lives saved when a patient suffers from severe acute renal failure that accompanies multiple organ failure.



Bioartificial renal tubule device prototype: Interior equipped with around 10,000 bundles of hollow fibers



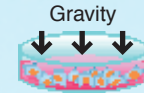
4 Developed a human cartilage device for use in regenerative medicine by employing the three-dimensional cell culture system

● Kihara Foundation (FY2012)

Existing technology

Stationary culture

[Two-dimensional cell culture]



[Three-dimensional cell culture by scaffolding]



New technology

Three-dimensional, revolving cell culture in vessel



Vessel (incubator)

Cell clusters maintain buoyant, upright state in vessel

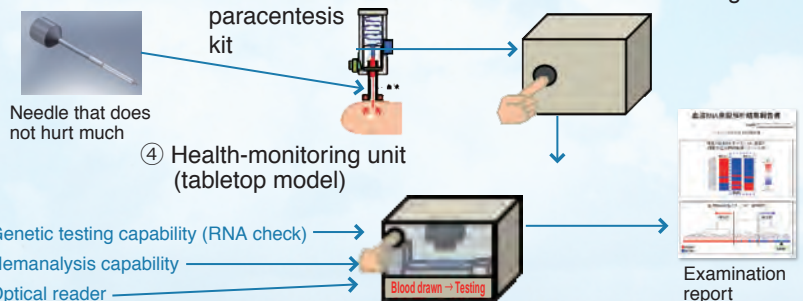
Three-dimensional cell culture device

Allows the formation of large structures (augmented high quality). This cell culture technique is particularly effective for cartilage cell cultures.

5 Developed a health-monitoring device equipped with a minimally invasive needle

● Kihara Foundation (FY2012)

- ① Micro-needle
- ② Minimally invasive paracentesis kit
- ③ Automated blood-drawing device



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