

Kobe Medical Industry Development Project

~For raising the level of medical services of citizens and revitalizing Kobe's economy~

City of Kobe

February 2009



History

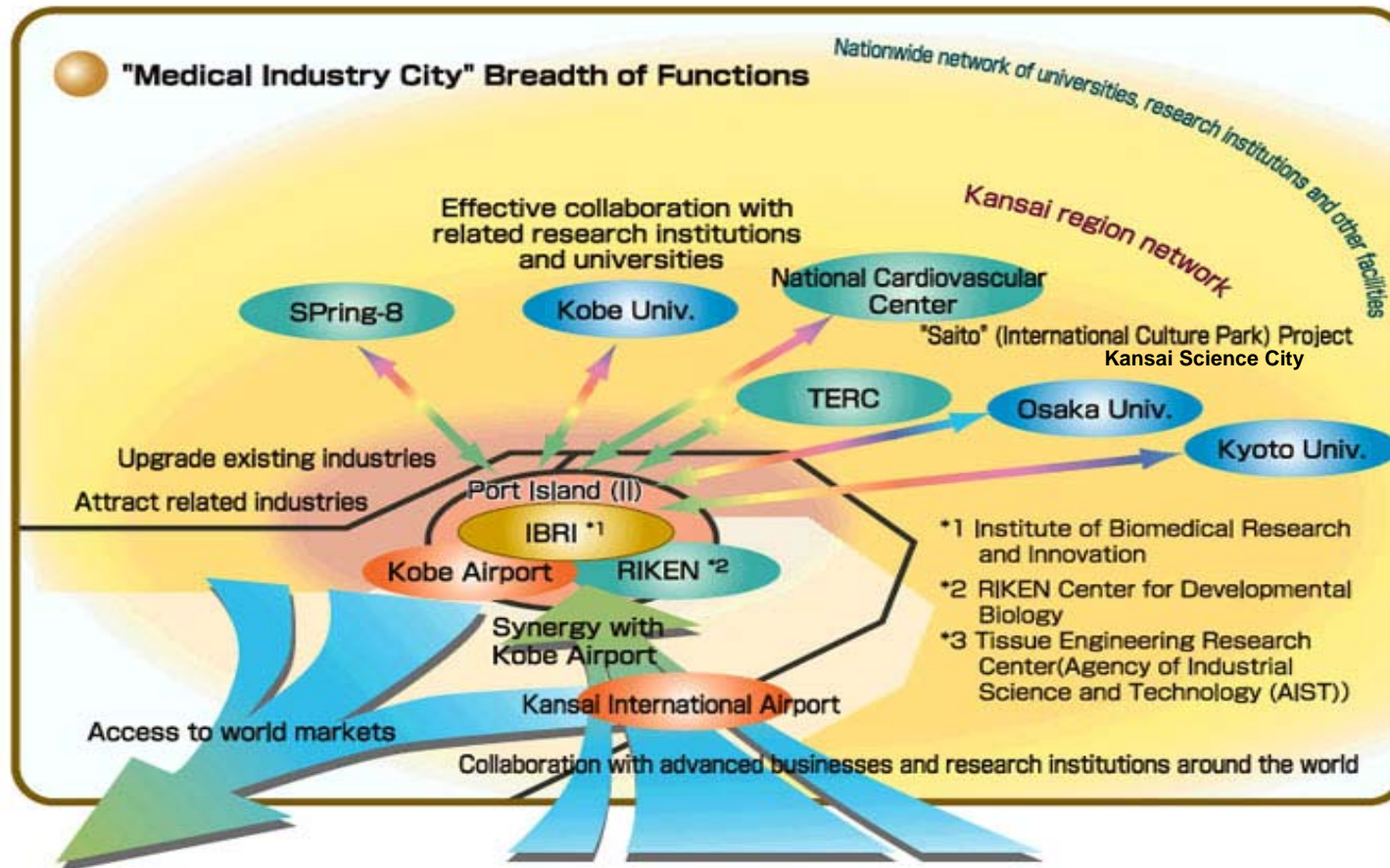
- Oct. 1998: Establishment of “Kobe Medical Industry Development Project Discussion Group”
Chairman – Dr. Hiro’o Imura (then President of Kobe City General Hospital)
- Dec. 1999: Budget approved for the establishment of IBRI and RIKEN CDB
(Millennium Project)
- Feb. 2000: Designated as the Special Earthquake Restoration Project
- Aug. 2001: Designated as the Urban Renaissance Project
- Apr. 2002: Designated as the Knowledge Cluster Initiative Project
- Apr. 2003: Deregulation Zone for Advanced Medical Industry created
- Mar. 2007: Council for Life Science Promotion suggested



Background

- ◆ Expansion of the medical-related industry (including welfare)
38 trillion yen (1996) ⇒ 91 trillion yen (2010) [Cabinet meeting decision in 1997]
- ◆ Innovation of advanced medicine technology ⇒ Genome analysis (Personalized medicine),
Induced differentiation of cells (Regenerative medicine)
- ◆ Concentration of life-science related industry in the Kansai area : Close collaboration with industry,
academic and government bodies

Advantages of Kobe ⇒ ① Transportation infrastructure ② Living environment ③ Collaboration with other Asian regions ④ Technological capability ⑤ Information infrastructure



Objective

- *Develop as a focal point for R&D of highly advanced medical technology*
- *Establish a streamlined process from basic research to clinical application and industrialization*

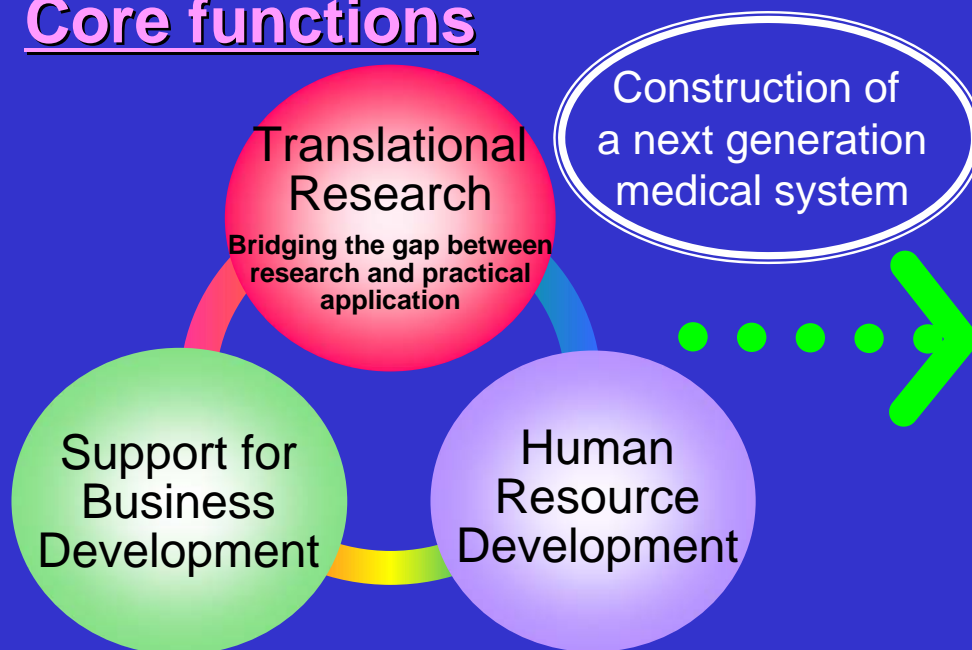
Target areas

Medical device

Clinical research and trials

Regenerative medicine

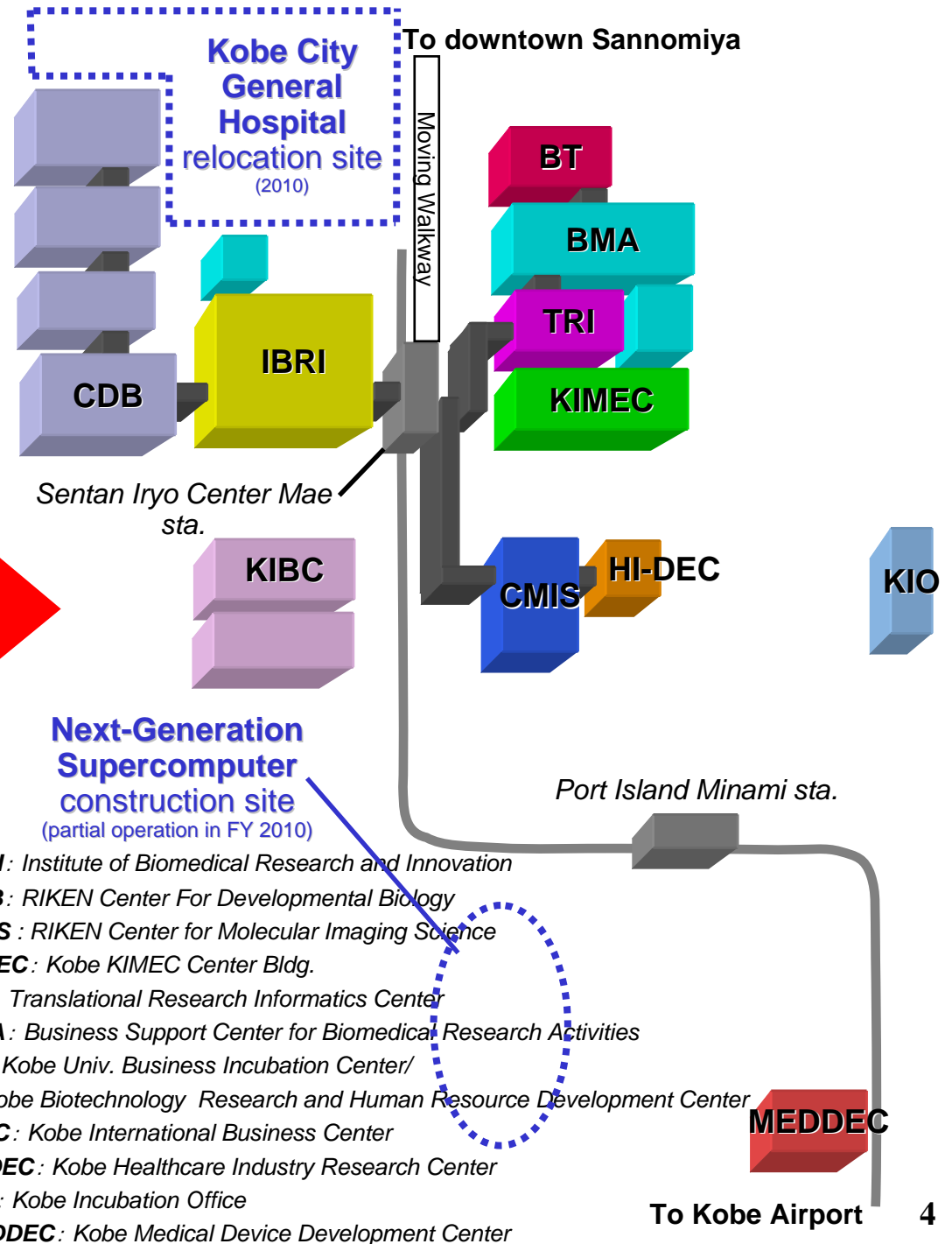
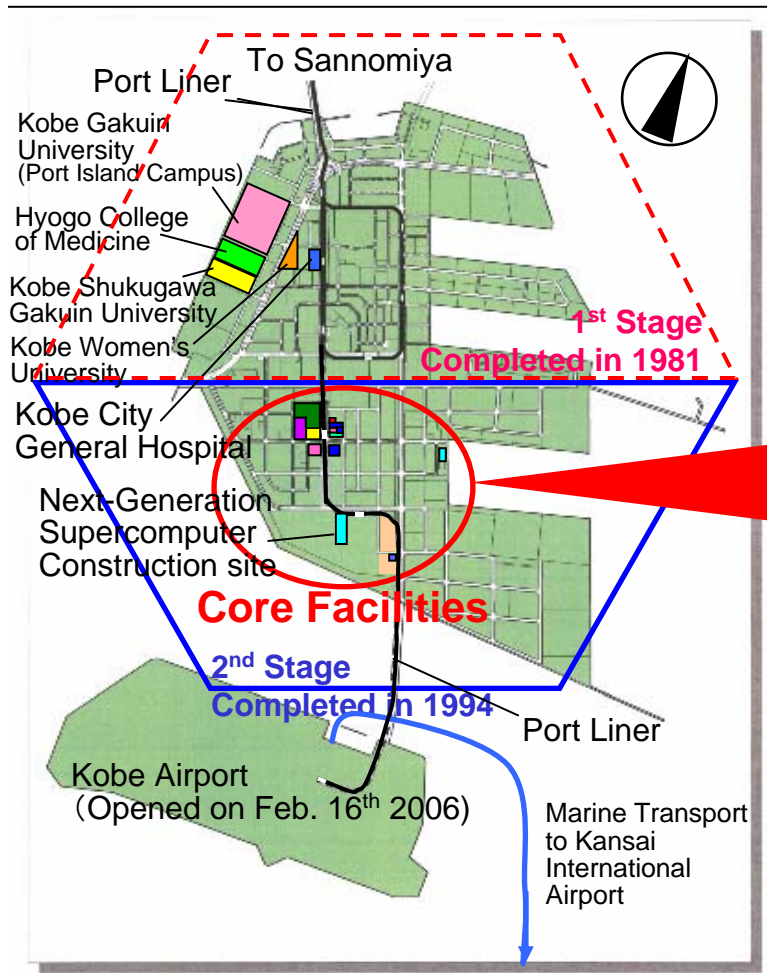
Core functions



Goals

- ✧ Create employment and revitalize local economy
- ✧ Provide advanced medical services and welfare for Kobe citizens
- ✧ Contribute to improvement of medical technologies in Asian countries

Core Facilities



Institute of Biomedical Research and Innovation

Administered by **Foundation for Biomedical Research and Innovation (FBRI)**

Activities currently pursued:

- ◆ Hematopoietic stem cell transplants
(Bone-marrow transplants, cord blood stem cell transplants)
- ◆ Peripheral blood vessels regeneration of the lower extremities
and cardiovascular regeneration
- ◆ Dental implants and regeneration of alveolar bone
- ◆ Diagnosis and medical treatment using PET and Linac
- ◆ Cerebrovascular therapy
- ◆ Chemotherapy for cancer
- ◆ Clinical trials of
pharmaceuticals and
medical devices



Research and Development of Medical Devices



PET* Camera



Linac



Radiotherapy Machine

*PET: Positron Emission Tomography

62 companies consisting of medical device producers and machinery/metal firms within the city participate in “the Medical Devices Development Study Group”

PET diagnosis



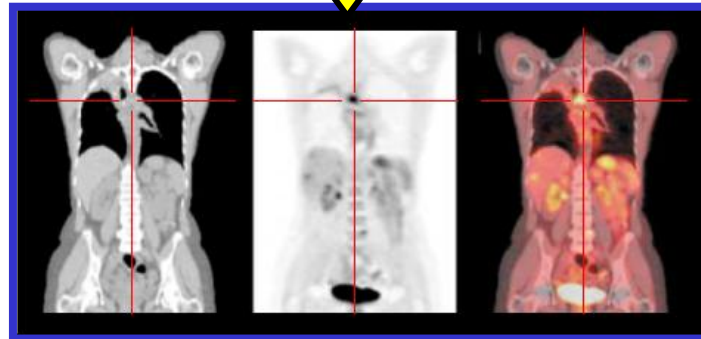
Administrate radioactive drug into the patients



PET image
(PET image by FDG of patient with esophageal cancer)



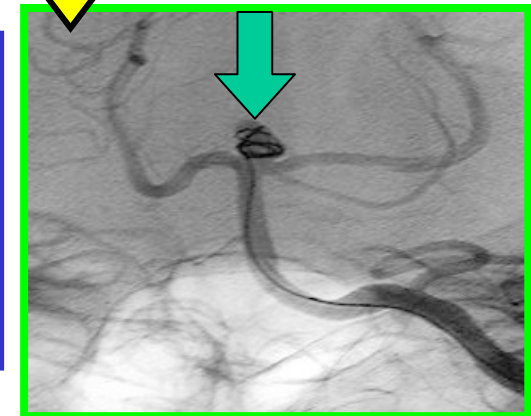
PET/CT



X-ray angiographic device



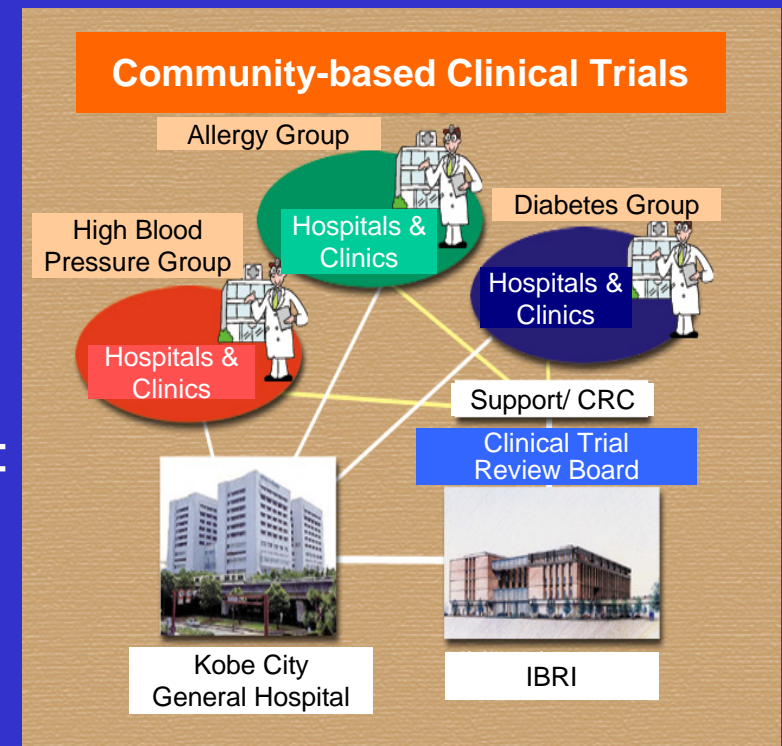
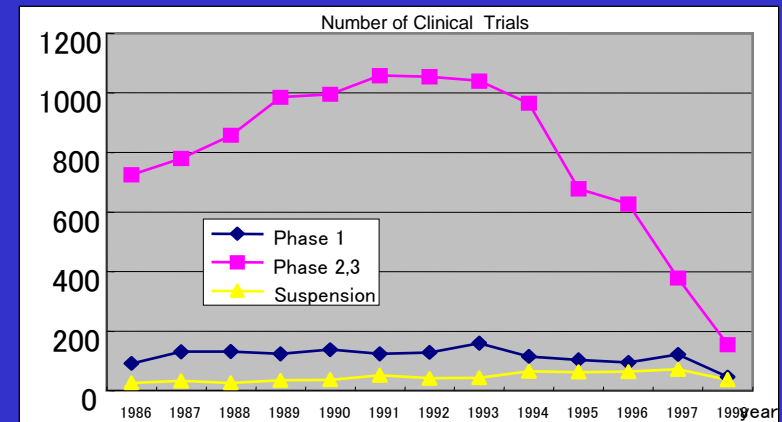
Put platinum coil into cerebral aneurysm using catheter



Images offered from
Dr. Sakai, Neurosurgery Dept.,
Kobe City General Hospital

Support for Clinical Trials

- ◆ **Clinical Trial Model Project:**
Establishment of the clinic (Oct. 2000)
- ◆ **Community-based Clinical Trials:**
 - Establishment of a network between IBRI and local medical institutions to treat lifestyle-related diseases
 - "Community-based Clinical Trial Discussion Group" (Dec. 2000-Jul. 2001)
 - Signing of Basic Agreement (Mar. 2002)
 - Co-hosting seminars for community-based clinical trial with Kobe Doctors Association (Nov. 2002-)
- ◆ **Training for Clinical Research Coordinator:**
Courses for the non-experienced and the experienced



Translational Research for Regenerative Medicine

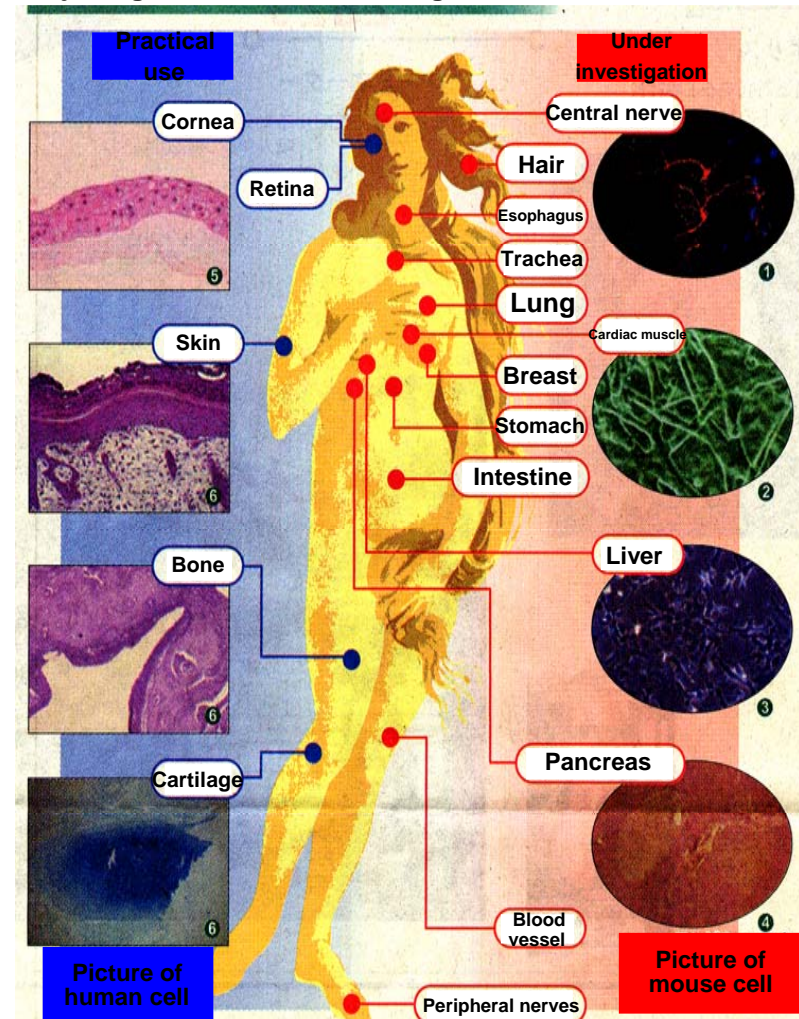
~Realizing cell and tissue Therapies~

- ◆ Joint promotion of regenerative medicine with regional organizations
- ◆ Development of comprehensive technological infrastructure for regenerative medicine
- ◆ Research and development (R&D) of cell and tissue processing technology
- ◆ Clinical Research & Trials for Regenerative Medicine

Major Projects:

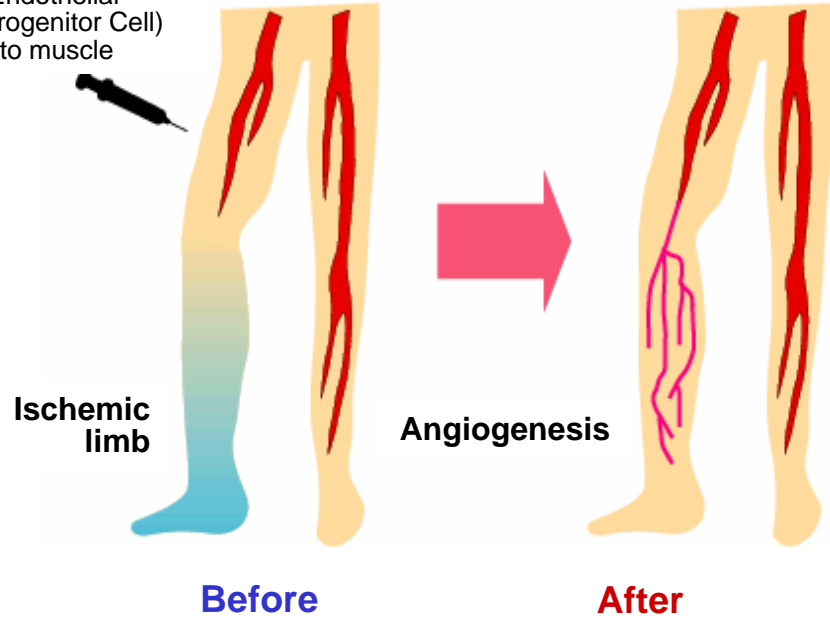
- Leukemia treatment using cultivated umbilical cord blood
- Regeneration of skin, cartilage and bone
- Regeneration of nerve cells, pancreas cells, blood vessels etc.

Major organ and tissue under regenerative research

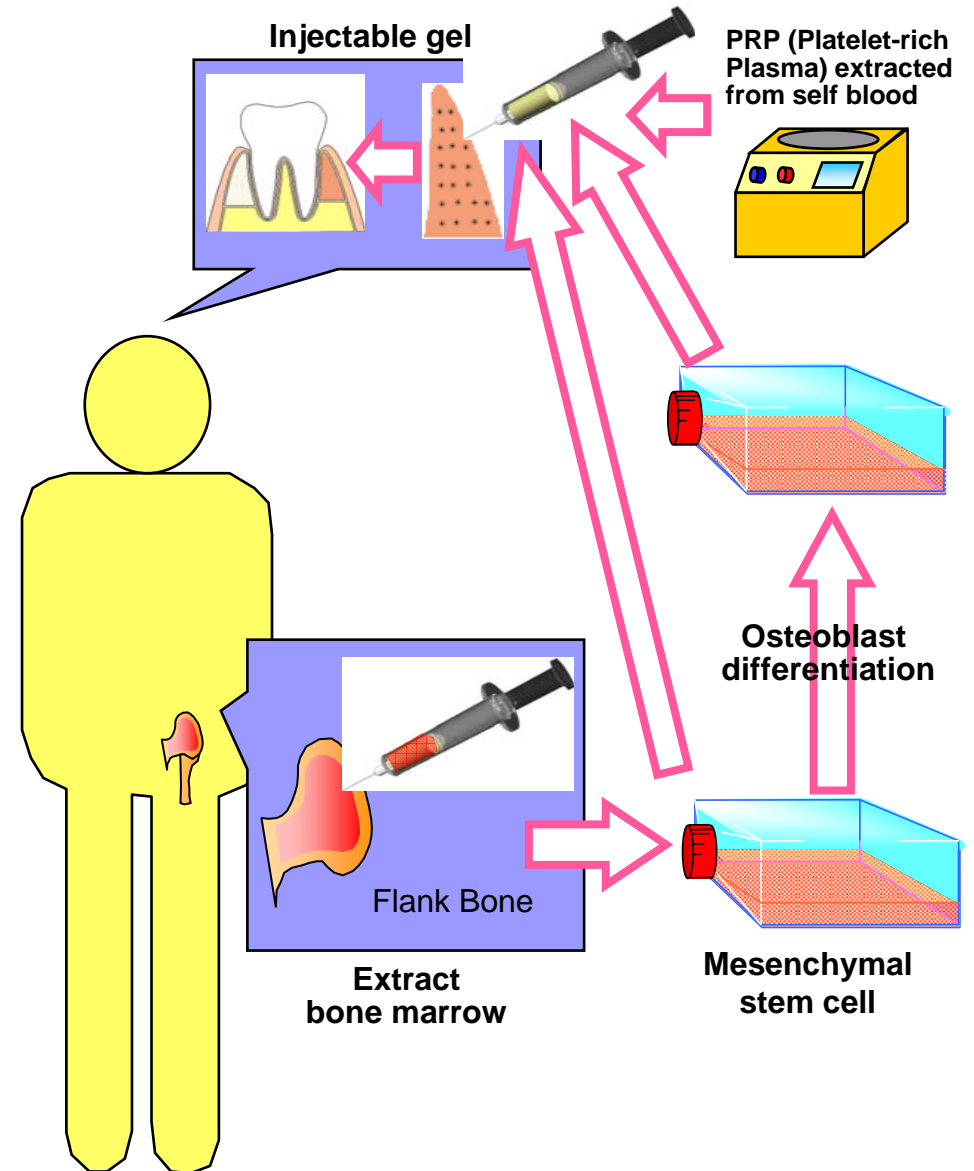


Treatment of ischemic limb

Transplant EPC
(Endothelial
Progenitor Cell)
into muscle



Regeneration of alveolar bone and periodontium



RIKEN Center for Developmental Biology(CDB)

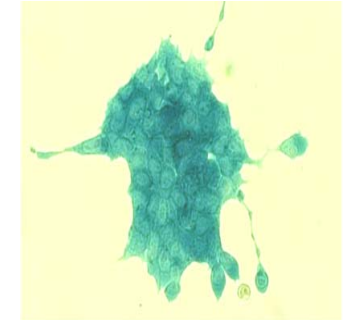
A world-class center in the field of embryology and stem cell research

Research groups

- Director: Dr. Masatoshi TAKEICHI,
Professor Emeritus, Kyoto University
- 7 core programs and 19 creative research promotion programs
- Number of Researchers: approx. 330

Research Mission

- Techniques for use of stem cells including human ES cells
- Birth mechanisms of cloned mice
- Vertebrate axis formation in zebrafish and mice
- Developmental mechanics of nematodes and drosophila



ES Cell (mouse)



Planarian



zebra fish

Other Core Facilities I

Translational Research Informatics Center (TRI)

- Providing information and supporting for translational research
- Management of clinical trial and supporting data management
- Establishment of management system of disease data and outcome research data
- Providing cancer-related information via internet



Business Support Center for Biomedical Research Activities (BMA)

Provides special research environment (cell processing center, animal laboratory, RI facility) for biomedical VBs and companies related to regenerative medicine

Other Core Facilities II

Kobe Biotechnology Research and Human Resource Development Center (BT Center) / Kobe University Business Incubation Center

Pursues research and human resource development in advanced science and technology



Kobe Medical Device Development Center (MEDDEC)

- R&D and training of catheter and endoscope
- Operating room
- MRI laboratory
- Device development corner for small-medium companies
- Rental laboratory
- Breeding and observation space

Other Core Facilities *III*

Center for Molecular Imaging Science

RIKEN, venture company

- Speeding up the process of identifying candidate materials for the design of new drugs and medications



Kobe Healthcare Industry Development Center

Development of

- Bio-experiment devices
- Diagnostic and preventive devices
- Healthcare devices

Incentives for Business Activities

Kobe Biomedical Venture Fund

- Total 8.3 billion yen, invested in total 84 companies
- GP: Daiwa SMBC Capital Co., Ltd.
- Venture capital fund specialized in biomedical business

Kobe Life Science IP Fund

- 0.5 billion yen, invested in 5 companies
- GP: Nomura Research & Advisories Co., Ltd.
- Supports establishment of venture businesses utilizing their intellectual properties

Incentives by the Kobe Enterprise Zone Ordinance

- Tax reductions and subsidies for land purchase/lease
- Establishment of the Pilot Enterprise Zone in Port Island 2nd Stage
(Land rent waiver for 10 years)

Establishment of the “Pro-Cluster Kobe”

- Provides comprehensive and professional support for commercialization and human resource development

Business Expansion into Port Island

Location	Number of companies
Business Facilities Area	6
Manufacturing Plant Area	14
Sport and Recreation Field	3
Pilot Enterprise Zone	5
Kobe International Business Center	23
KIMEC Center Building	25
Kobe Incubation Office	9
Institute of Biomedical Research and Innovation	10
Translational Research Informatics Center	2
Business Support Center for Biomedical Research Activities	9
Kobe University Business Incubation Center	2
Kobe Medical Device Development Center	11
Center for Molecular Imaging Science	1
Kobe Healthcare Industry Development Center	7
Port Island 1st Stage	11
TOTAL	138

Foreign-affiliated companies : 18 (7 countries)

Renewed Kobe City General Hospital



◆ Planned capacity: 700 beds
(max. 1,000 beds in time of emergency)

◆ Budget: ¥48 billion

◆ Scheduled to open in FY2010

Policies

✓ A hospital that patients and their families can visit and stay with comfort

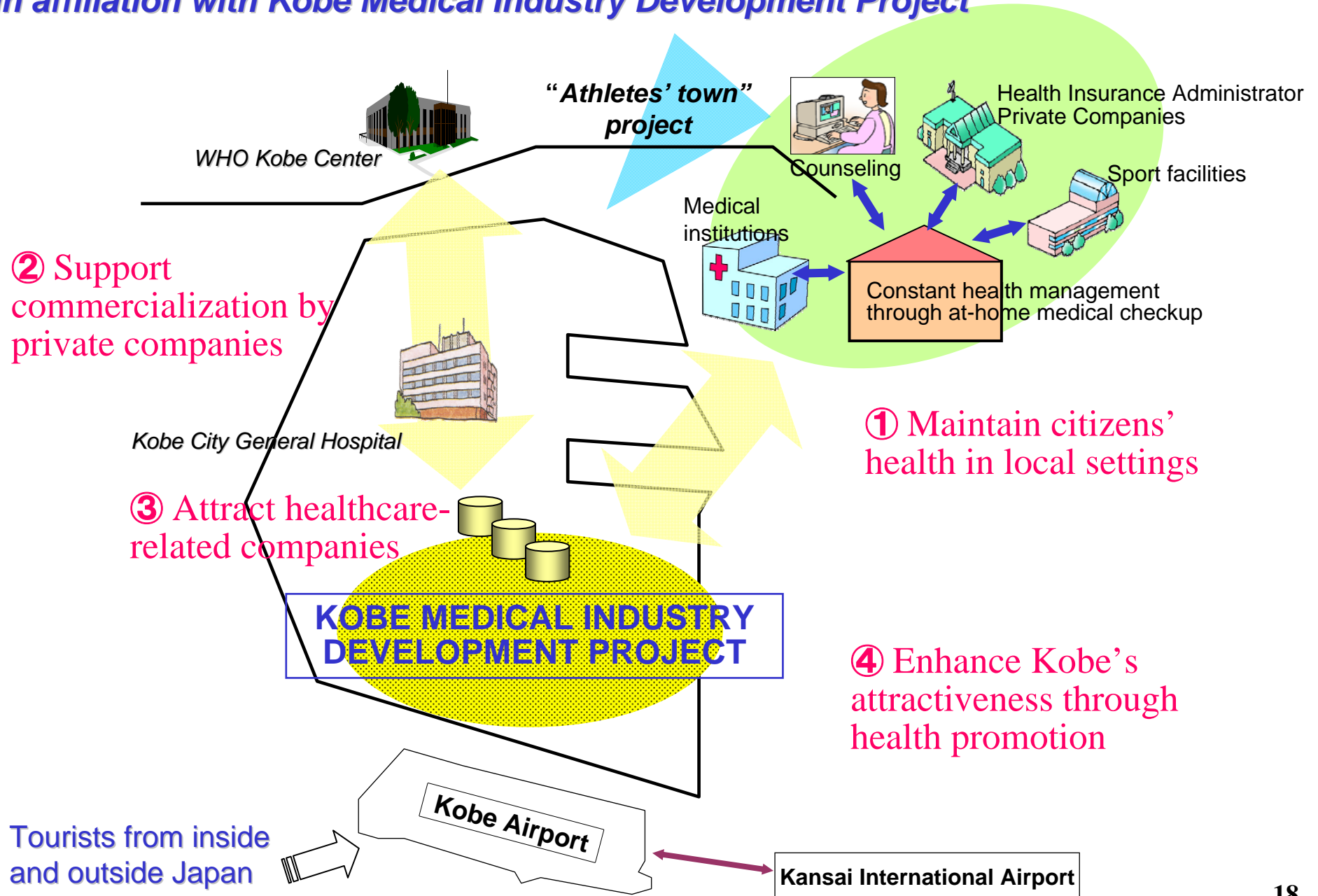
✓ A hospital that can function properly in times of emergency

✓ A hospital that can operate in environmentally-sound manner

✓ A hospital that can adapt to changes in medical environment

Creating a Health-Conscious City

In affiliation with Kobe Medical Industry Development Project



'Health-Conscious City' Initiative Specific Projects

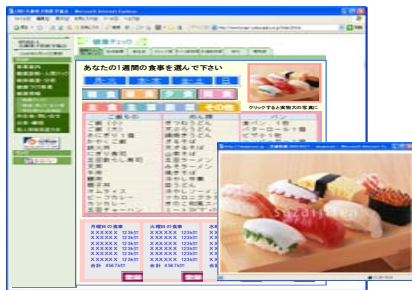
○Health Information Website

As part of the 'Health Creation Support System,' the website 'Lively Kobe Health Club' (<http://www.hatsuratsu-kobe.jp>), provides information on diabetes prevention.



Fujiwara-No-Michinaga, considered to be the first person to suffer from diabetes in our country, will guide you!

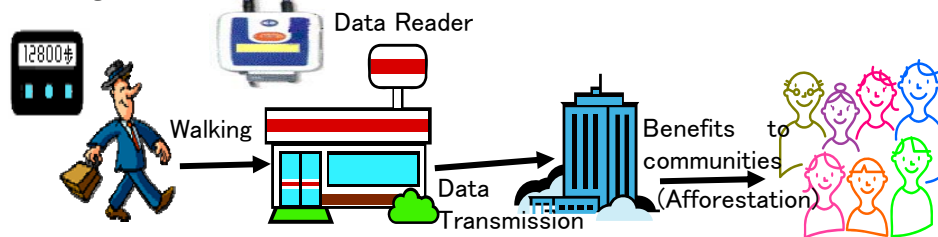
○Nutrition Guidance Program



By making use of ICT and in cooperation with Kobe Women's University, the program develops a 'Nutrition Guidance System', which can collect the citizens' food information and analyze and evaluate nutritional balance and calories taken. The system is planned to be put in use in adult daycare service facilities. (Supported by the Ministry of Health, Labor, and Welfare)

○'Walking Mileage Experimental Project'

In cooperation with the Health Ministry's research group, the project aims to figure out what incentives are effective in ensuring the continuance of habitual exercising (Started in 2007)



Transmitters are installed in convenience stores, Co-op supermarkets and other places (total 50 places) to send pedometer data

○'Kobe Health Walk'



Held every year since FY2005 in each wards to encourage waking for health promotion.

○Walking Support Program

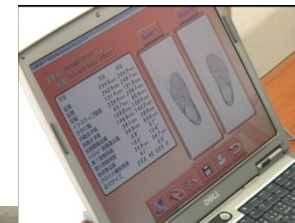
What effects does wearing fit shoes and walking properly have on health?

The Program aims to make scientific validation of 'Promoting Health by Walking'.

(Participated by one hundred self-reliant senior citizens in Suma-Tomogaoka Community, 2006)

(Participated by three hundred daycare recipients, 2007)

(Project of Ministry of Health, Labor, and Welfare)



Health Exercise

Next-Generation Supercomputer

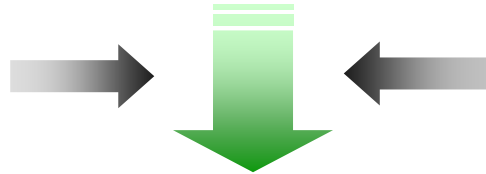


- ◆ Developed by the Ministry of Education and RIKEN (Budget ¥110 billion)
- ◆ Computing capacity: Over 10 petaflops (10^{16} /sec. – 36 times faster than the world's fastest computer now existing)
- ◆ Scheduled to start partial operation in FY2010

General Outline of Kobe Life Science Innovative Program

Discussion Report in March 1999

*Outcome of Kobe
Medical Industry
Development Project*

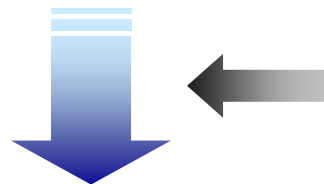


*Environmental change of Kobe
Medical Industry*

Kobe Life Science Innovative Program

- 1. Grand Designs of the cluster in 10 and 20 years**
- 2. New propulsion plan of research and technology development**
- 3. Scheme for supporting continuance promotion of cluster formation**

*Consideration for operation
Proposal of promotion plan*



*Rolling System (Proposal and
evaluation of a new project
scheme)*

Goals

**Creating next
generation
medical system**

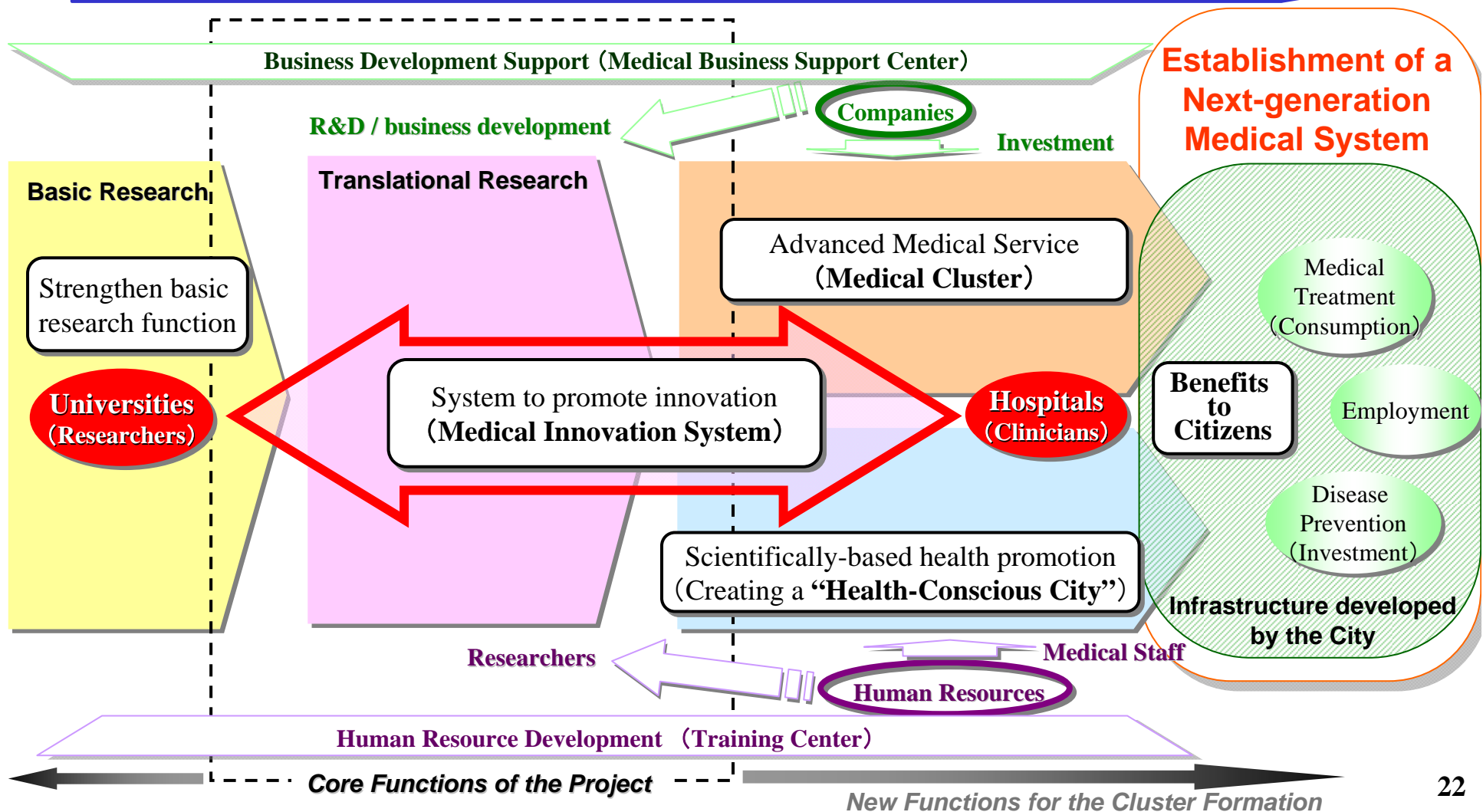
**Securing employments
and revitalizing Kobe
economy**

**Raising medical
service and welfare
level.**

**Contribution to
global community**

Kobe Cluster Formation Strategy

- Strengthen translational research (TR) support function
- Ensure sustainable cluster development
- Create a “Medical Innovation System” to promote innovation
- Bring benefits to citizens and create new industries



Strategy for the Formation of Medical Cluster

Domestic Patients

Overseas Patients

Medical Institutions (Domestic and Overseas)

Relocation and Sophistication of Medical Institutions

Attract University Hospitals and National Hospitals

Osaka University
Kyoto University

Kobe University
Hyogo College of Medicine

Other Universities

Coordinator

Highly Advanced Hospitals

<Advanced Medicine>

Cardiac Affection

Cerebral Stroke

Cancer

IBRI

Transplantation, Regenerative Medicine

Child Health and Development

Infection

Kobe City General Hospital
Advanced Medical Center

Organizer

Set Advanced Medical Center in Kobe City General Hospital as a Satellite.

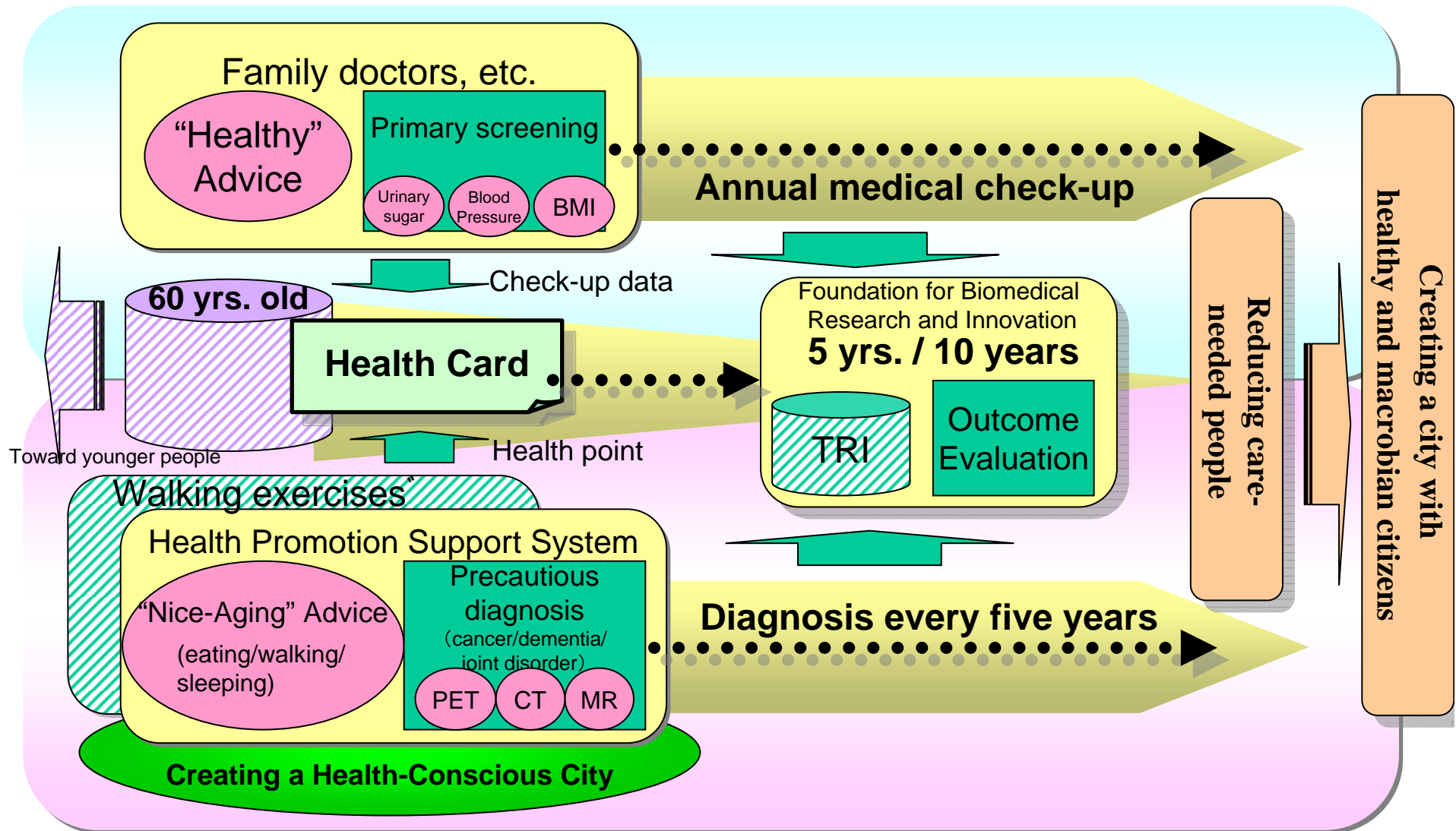
Local Clinics and hospitals
Clinicians

<Regional Medicine>

Kobe Citizens

- Training of medical doctors specialized in advanced treatment such as transplantations or minimal invasive treatment, and radiation imaging diagnosis devices, or treatment devices.
- Proposal of a scheme for securing the number of doctors and training doctors specialized in the regionally needful and new medical field.

Supporting Scientifically-Based Health Promotion



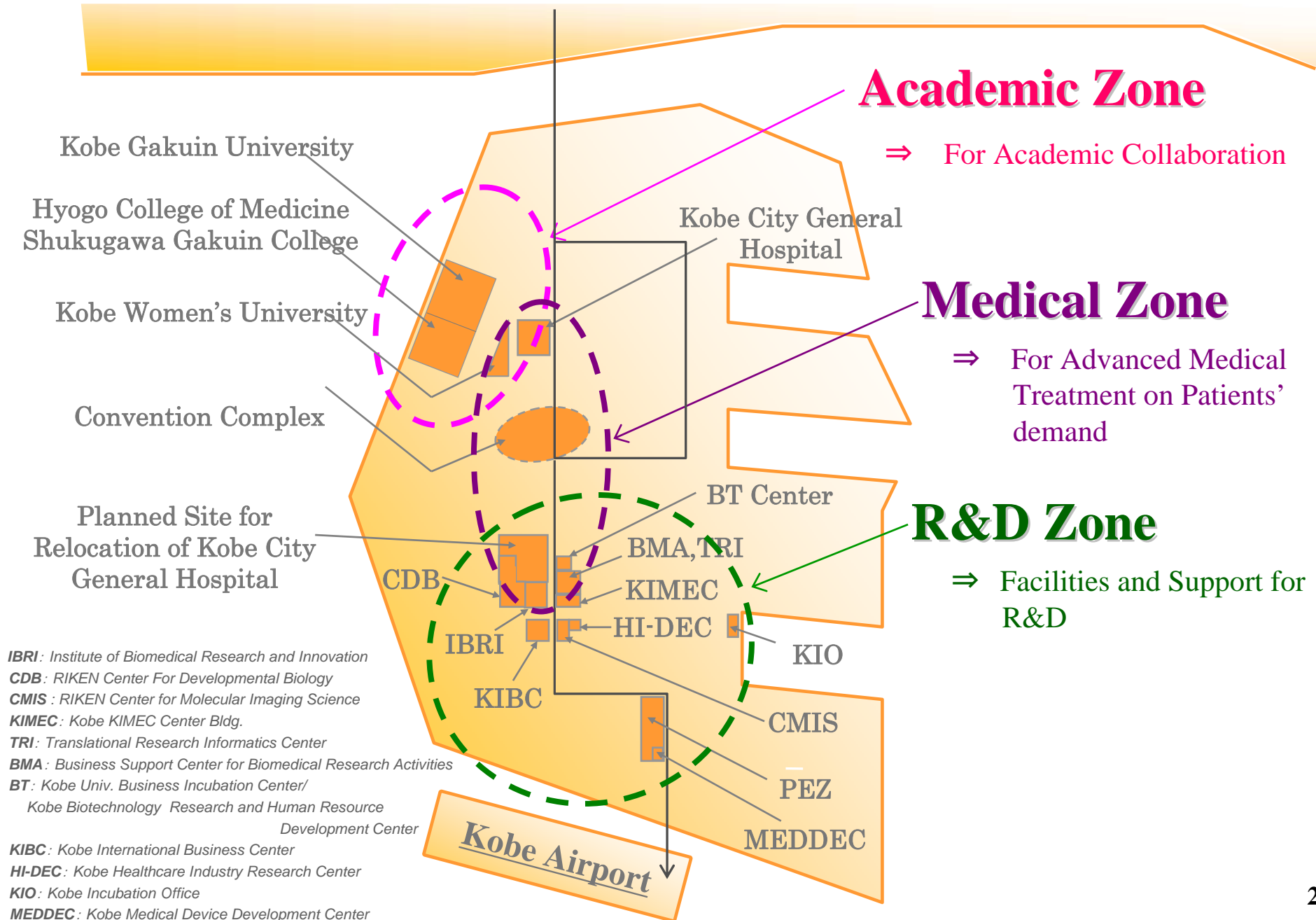
Economic Effects Estimation

(by Nomura Research Institute, Ltd.)

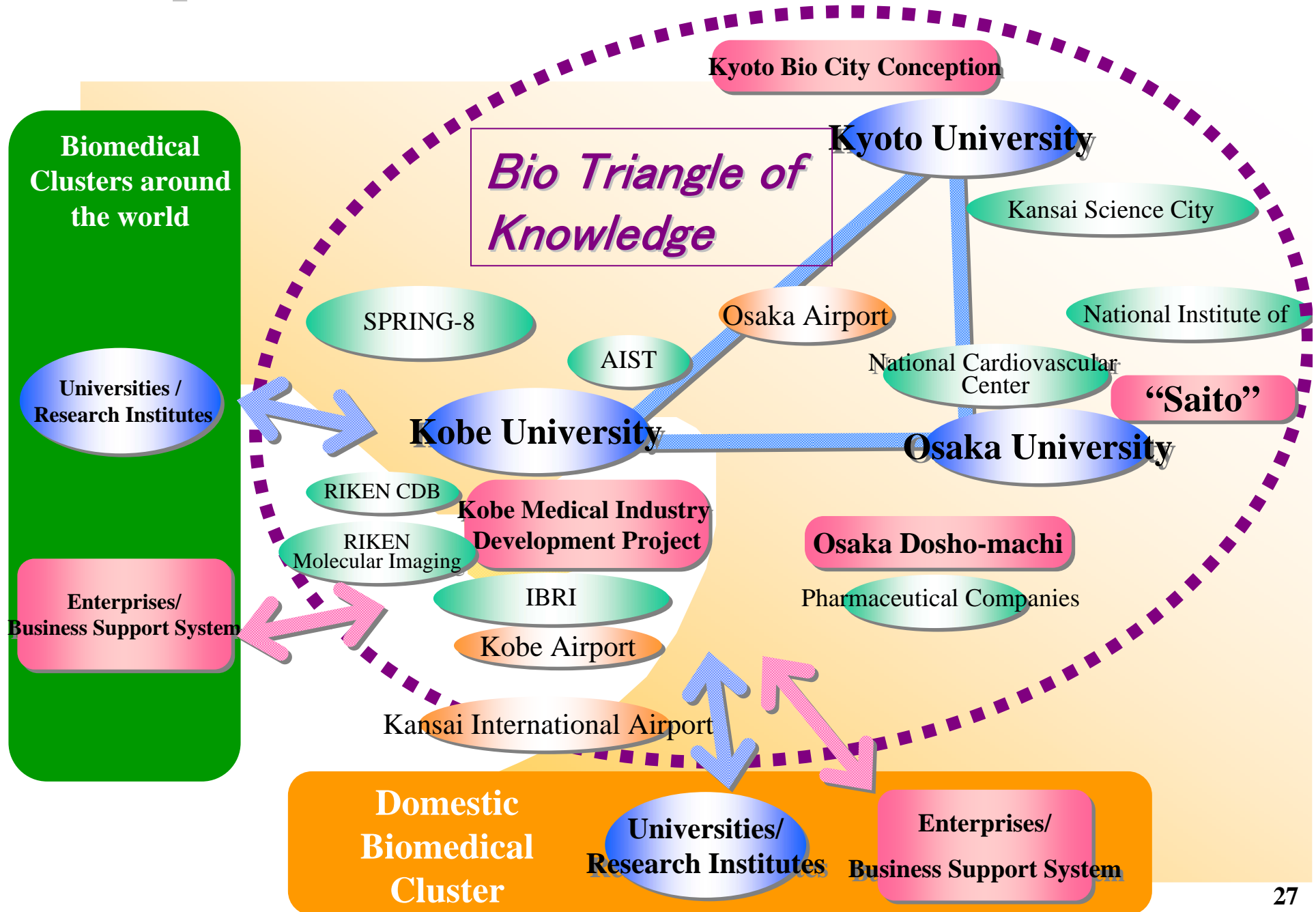
Fiscal Year	2005	2010	2015
Number of Companies	172 (75)	203 (203)	311 (311)
Generated Employment	2,690 (593)	5,599 (1,999)	9,745 (4,237)
Generated Wealth (million yen)	40,939 (5,595)	82,236 (24,195)	162,477 (73,097)
Effect on Tax Revenue (million yen)	1,282 (176)	2,690 (744)	5,062 (2,066)

*Figures in parenthesis are those of medical-related companies in Port Island 2nd Stage

Guideline for the Ground Design (Port Island Area)



Super Cluster Formation in Kansai Area



Developing an International Life Science Cluster

(Kobe Life Science Gateway)

