

KOBIC

KOBE Biomedical Innovation Cluster

November 2017

KOBE Biomedical Innovation Cluster

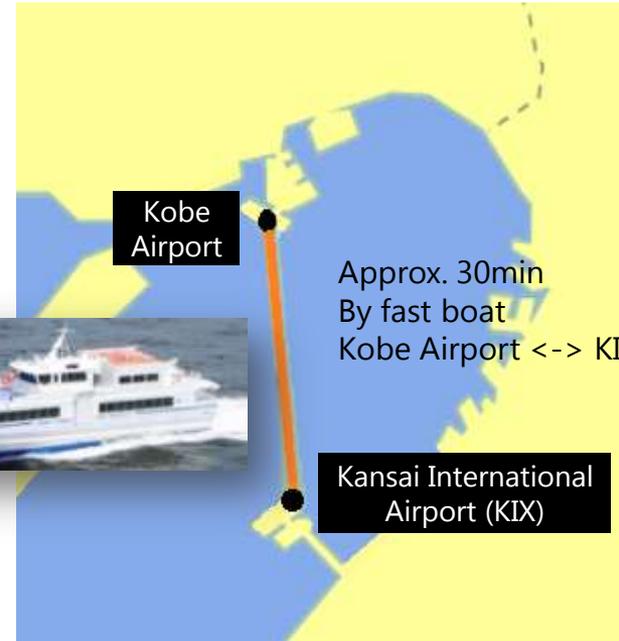
Kenichi TAMIYA

Director, Biomedical Policy
Biomedical Innovation and New Industry Headquarters
KOBE CITY GOVERNMENT

Location and Surrounding Environment



2h 50min
By bullet train
Shin Kobe <-> Tokyo



Approx. 30min
By fast boat
Kobe Airport <-> KIX



Approx. 1h 10min
By air
Kobe <-> Tokyo Haneda
(10 round-trip flights/day)

Background

Launched as one of the disaster reconstruction projects



Death toll in Kobe City: approx. 4,600

Economic loss: 6.9 trillion yen (equivalent to city's one-year GRP)



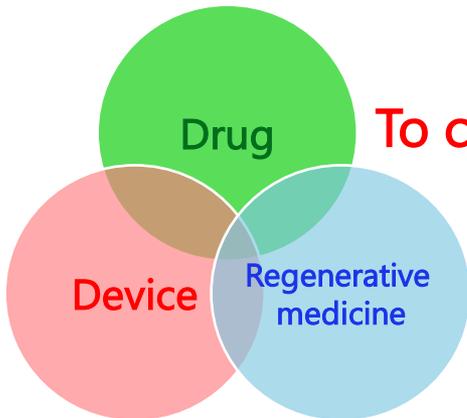
Dr. Hiroo Imura
President Emeritus
Foundation for Biomedical Research and Innovation

To create Japan's first biomedical cluster

Establishing an R&D hub for highly advanced medical technology on Kobe's Port Island

To construct a medical innovation system

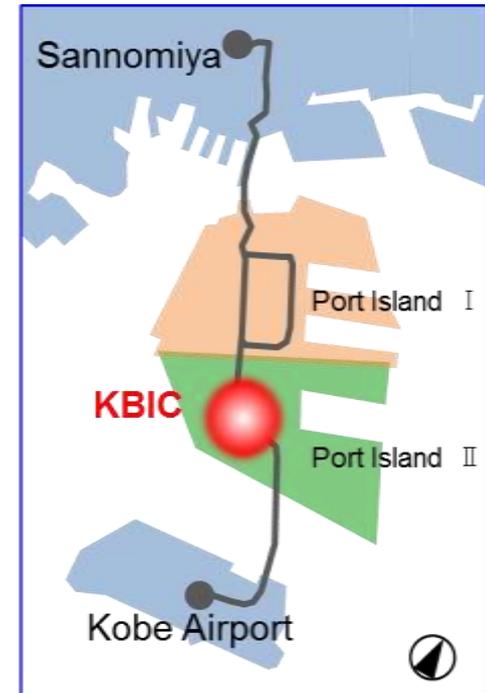
Promoting translational research which bridges basic research and clinical application / commercialization

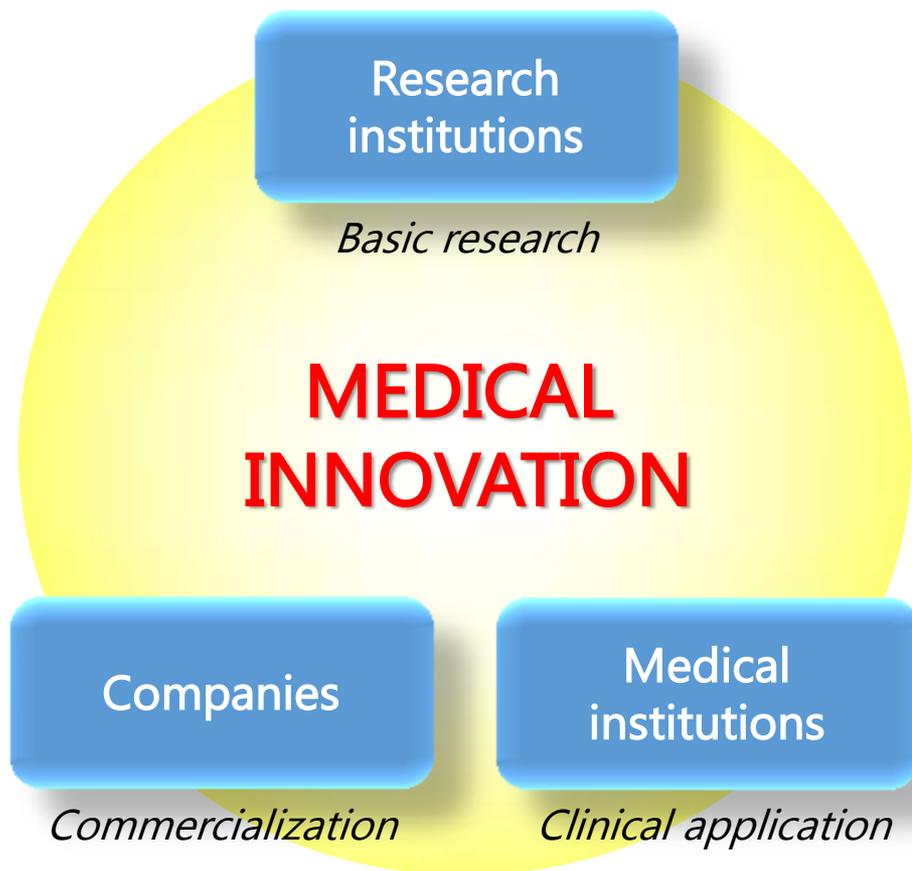


Research focus



- Creation of employment and revitalization of Kobe's economy
- Provision of advanced medical treatment to the city residents
- Contribution to the improvement of medical standards in Asian countries





Kobe City Government and the Foundation for Biomedical Research and Innovation work together to lay the foundation for and promote cluster development

Foundation for Biomedical Research and Innovation (FBRI)

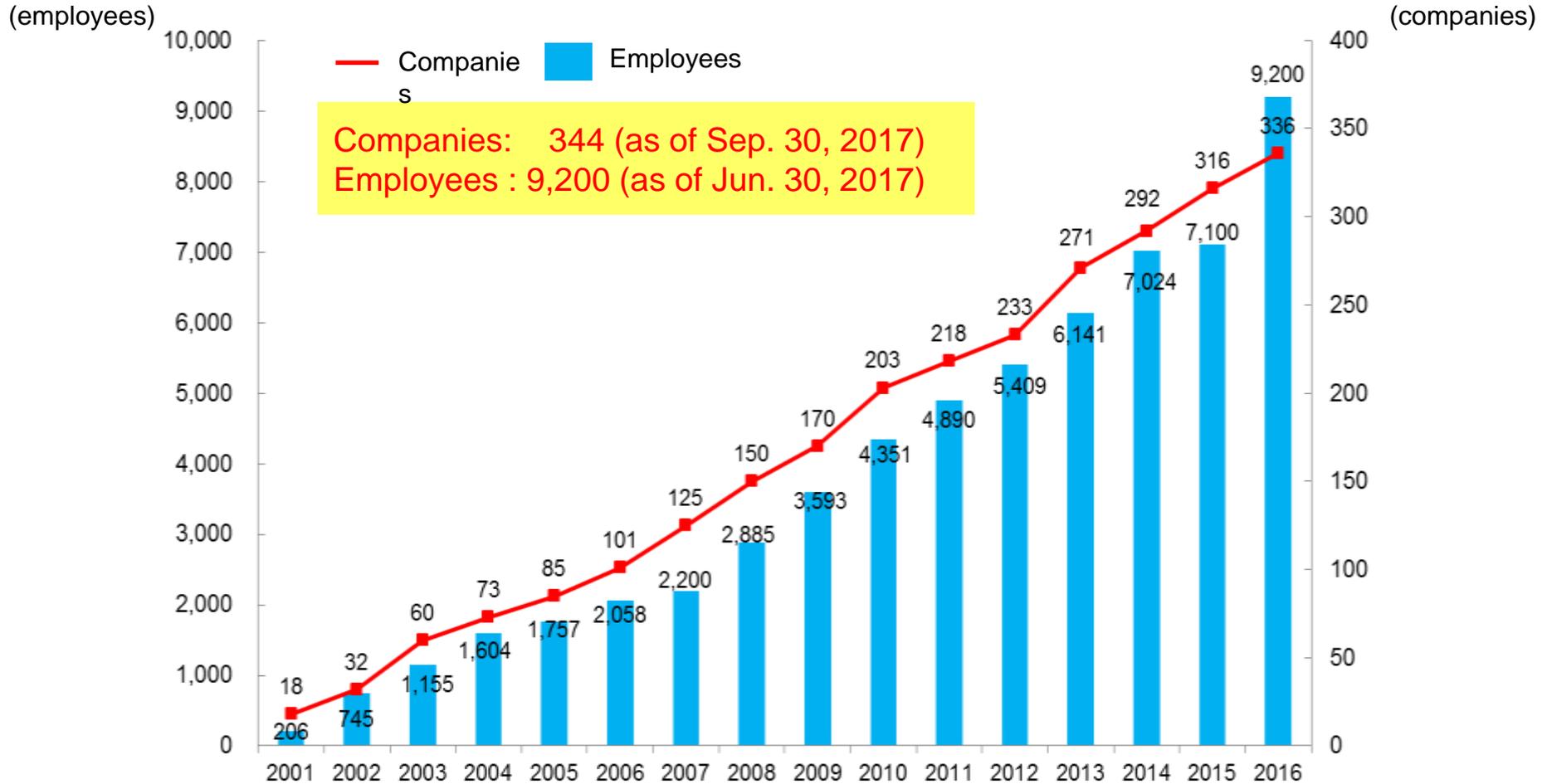


- The Institute of Biomedical Research and Innovation (IBRI)
- Translational Research Informatics Center (TRI)
- R&D Center for Cell Therapy (RDC)
- Pro-Cluster Kobe (PCK)

President Tasuku Honjo M.D., Ph.D.



Transition of Number of Companies and Employees



Companies: 344 (as of Sep. 30, 2017)
 Employees : 9,200 (as of Jun. 30, 2017)

Estimate of economic impact
 • economic impact (bn yen)
 • tax revenue (bn yen)

40.9
1.3

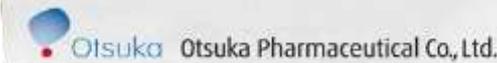
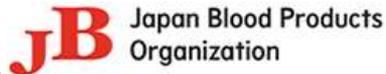
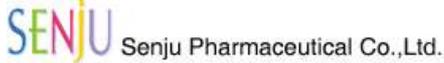
104.1
3.5

125.1
4.5

153.2
5.3

Companies in KBIC

Pharma



NEVER SAY NEVER



KAN RESEARCH INSTITUTE, INC.



344 Companies
(as of Sep. 2017)

Regenerative Medicine



Medical Device

Take the next leap forward in the Kobe Biomedical Innovation Cluster

Commercialize
your
technologies
and ideas in
medical field

Kobe Support Platform for Promoting Medical Device Commercialization and Marketing

Match needs from clinical site and seeds
companies own, coordinate meeting with
advisers



Further
opening up
of new
market

Joint participation in trade fairs in Japan and overseas

Bio Japan, BIO tech (Tokyo)
BIO International Convention (U.S.)
MEDICA (Germany), Medical Japan (Osaka),
etc.



Expand
business
network

KBIC networking event/workshop

Great opportunities for business matching
among healthcare-related companies and
researchers

- Study Group for Regenerative Medicine
- Port Island Forum for Drug Development

Accelerate
R&D

Designated as National Strategic Special Zone May 2014

Relaxation of regulations,
Preferential tax/financial treatment

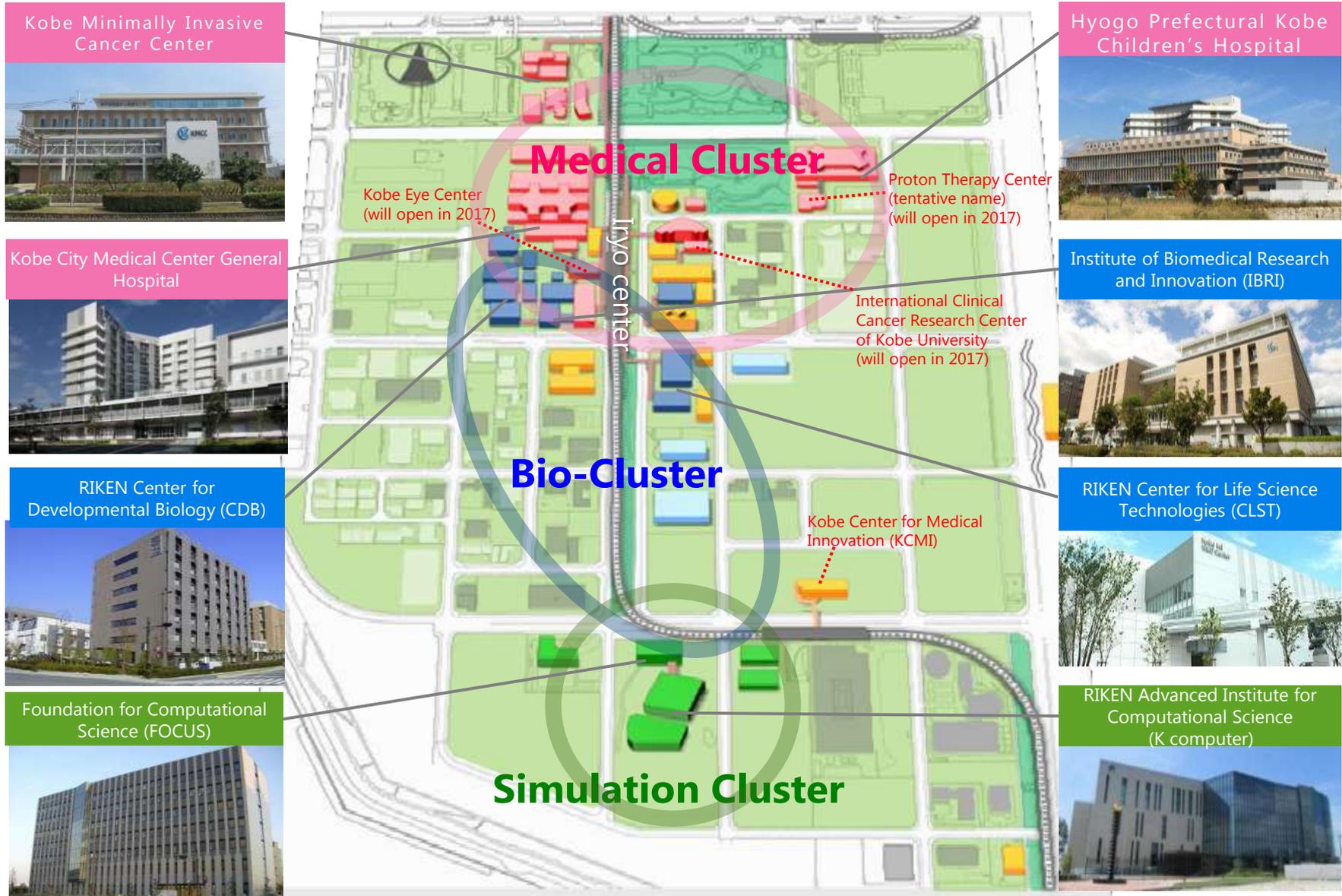
Respond to various needs

Rental labs/offices, facilities for temporary
use (RI experiments, animal testing) are
available. This makes it possible to conduct
research or business by holding down
initial investment.

Access to
up-to-date
information



Overview Map of the Cluster



Bio-tech R&D Area



Institute of Biomedical Research and Innovation (IBRI)



International Medical Device Alliance (IMDA)



Translational Research Informatics Center (TRI)



RIKEN Center for Developmental Biology (CDB)



RIKEN Integrated Innovation Building (IIB)



RIKEN Center for Life Science Technologies (CLST)

Core institution promoting translational research and preemptive medicine

■ Research Department

Regenerative Medicine Research (Dr. Taguchi)

Image-based Medicine (Dr. Senda)

Molecular Life Science (Dr. Nabeshima),

R&D of Preemptive and Preventive Medicine (Dr. Nabeshima)

Immunoregulation for the Treatment of Inflammation-related Disorders (Dr. Ohta)



Yoichi Nabeshima, M.D., Ph.D.
IBRI Director

■ Research and clinical trials currently conducted

- ① **Regenerative Medicine:** Neuro-regeneration for stroke, vascular regeneration for limb ischemia and refractory fractures, and cornea regeneration, etc.
- ② **Therapeutic immune regulation** of inflammation-related disorders including cancers
- ③ **Pathologic clarification of aging-related diseases** such as arteriosclerosis, osteoporosis, emphysema, Alzheimer's type dementia
- ④ **A cohort study called the Kobe Study** for early diagnosis and intervention before the onset of diseases



Medical Area

Provision of optimum medical care through collaboration within the cluster

Institute of Biomedical Research and Innovation (IBRI)



Kobe City Medical Center General Hospital



Hospital integration in Nov. 2017

Kobe Eye Center (will open in Dec. 2017)



Nishi Memorial Port Island Rehabilitation Hospital



Total number of beds: Approx. 1,500

Total number of patients in 2015

Inpatient approx. 350,000

Outpatient approx. 550,000

International Clinical Cancer Research Center of Kobe University



Kobe Minimally Invasive Cancer Center



Child Chemo House



Hyogo Prefectural Kobe Children's Hospital



Proton Therapy Center (tentative name) (will open in Dec. 2017)



Medical Cluster Promotion Committee was established to discuss the cooperation and responsibilities.

K computer

- General-purpose supercomputer for research and industrial use (installed in RIKEN AICS)

As of June 2017

HPCG 1st place (application processing performance for industrial use)

Graph500 1st place (big data processing performance)

Top500 8th place (peak performance solving systems of linear equations)



Development of post K supercomputer (the FLAGSHIP 2020 Project)

- Aiming to develop another general-purpose supercomputer with the world highest standards by 2020
- In March 2014: Decided to install the post K supercomputer in the RIKEN AICS

[Expected research projects]

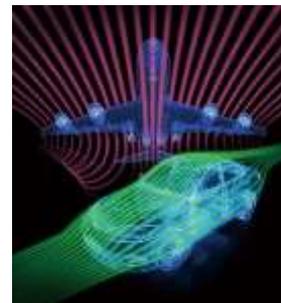
Development of groundwork
for innovative drug discovery



Personalized/ preemptive medicine



Neo-futuristic manufacturing



Sophistication of
meteorological and global
environment prediction

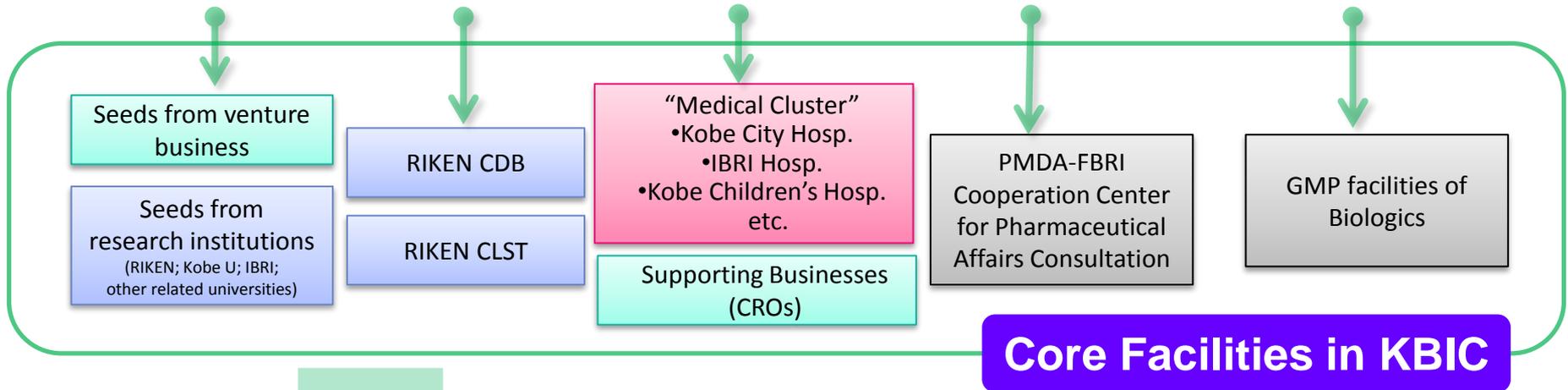


Major Projects



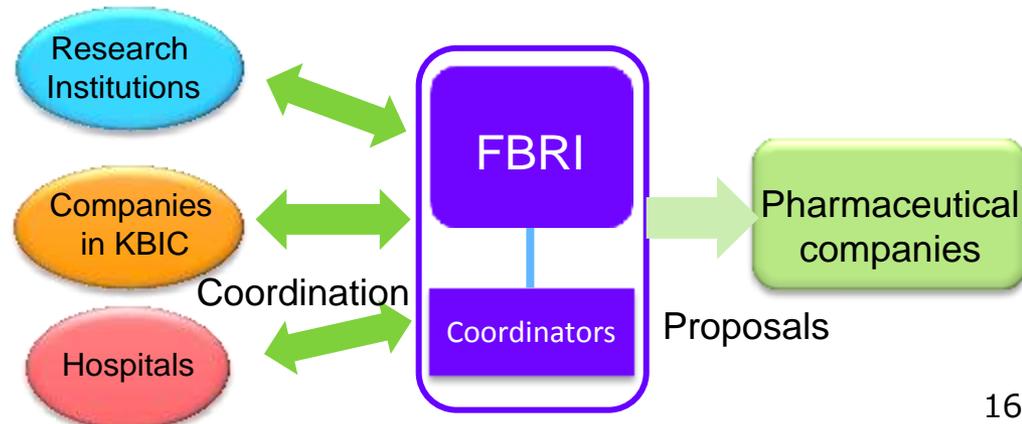
Promotion of "Open Innovation"

Process for drug discovery and development

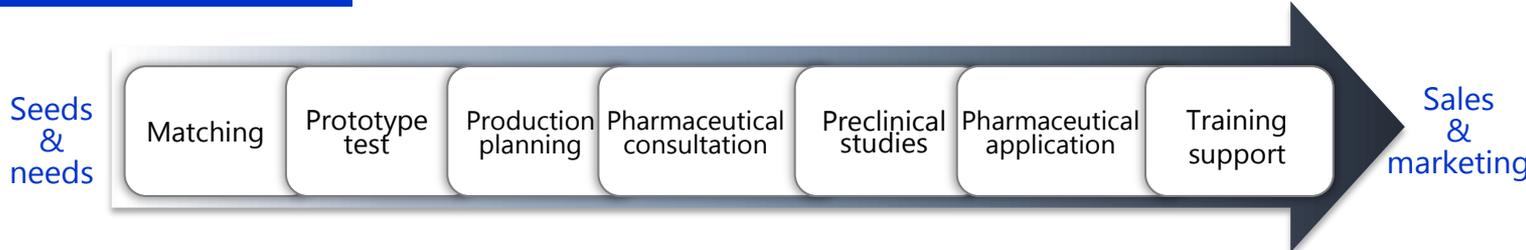


"Open Innovation Program"

Supporting drug discovery and development by coordinating researchers, businesses, facilities, and clinical sites



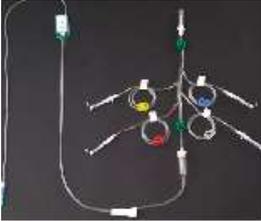
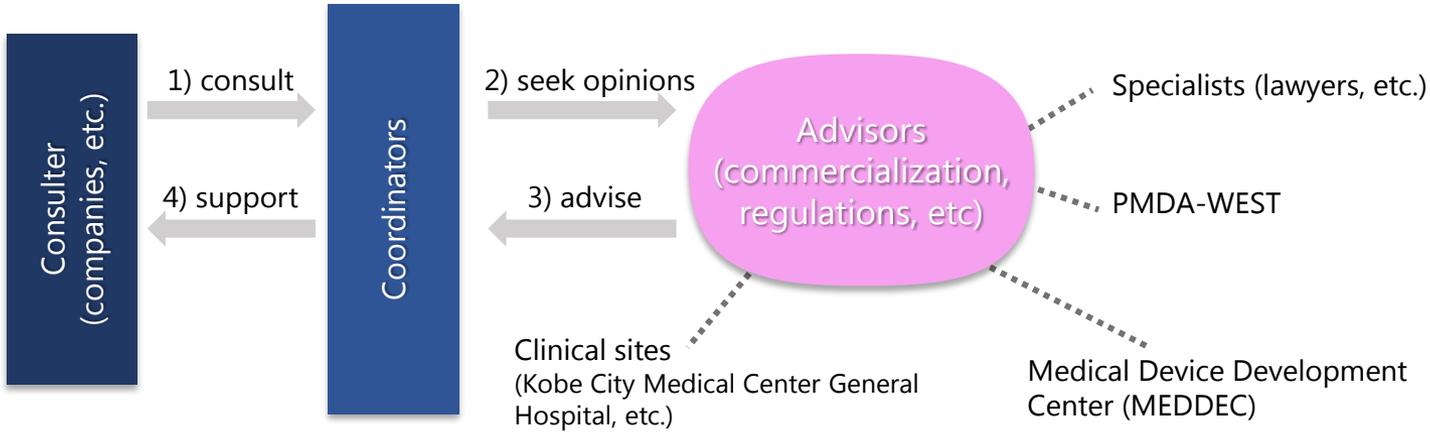
R&D process



Examples



Support process

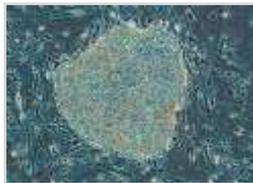


Commercialized: 12 out of 93 cases
(Jul. 2013 – Mar. 2017)

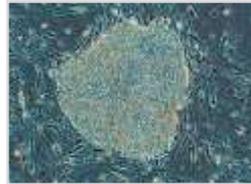
Regenerative Medicine Using iPS Cells

Toward clinical research on allogeneic transplantation of retinal pigment epithelial cells

Center for iPS Cell Research and Application (CiRA), Kyoto Univ.



Autologous
iPS cells



Allogeneic
iPS cells

- Subjects: patients with wet type age-related macular degeneration (AMD)
- The world's first retinal sheet transplantation using iPS cells in Sep. 2014
- The protocol of clinical research on allogeneic transplantation was approved by the Minister of Health, Labour and Welfare in Feb. 2017
- First allogeneic transplant surgery was performed in Mar. 2017

RIKEN Center for Developmental Biology (CDB)



Retinal pigment
epithelium (RPE)



RPE sheet



RPE
suspension

Kobe City Medical Center General Hospital
Osaka Univ. Hospital



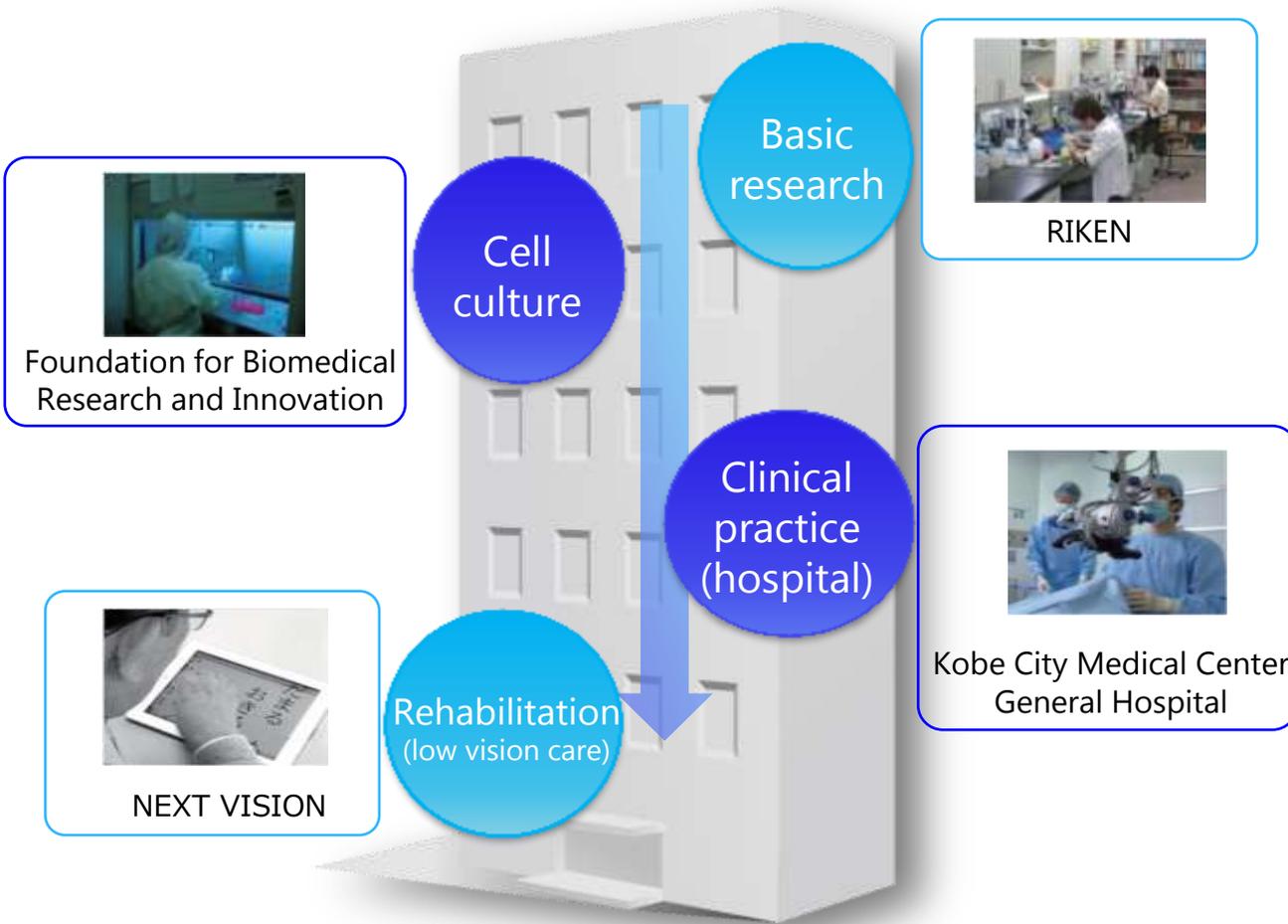
Transplant surgery of RPE in
patients with wet-type AMD



Press conference at Kobe City Medical
Center General Hospital on June 6, 2016

Establishment of Kobe Eye Center

- Integrated ophthalmic institution from basic research to clinical practice including rehabilitation
- Accelerate clinical application of regenerative medicine technology



Completion of construction is scheduled in October 2017
Opening of the center is scheduled in December 2017

Site area: 2,000m²
Total floor space: approx. 8,800m²
Bldg. structure: 7 stories above the ground

*Designated as a national strategic special zone project in September 2014

New Incubation Facility - Kobe Center for Medical Innovation (KCMI)

An incubation facility consisting of wet laboratories for pharmaceutical companies, CPC space suitable for regenerative medicine, and space for R&D of post K supercomputer.

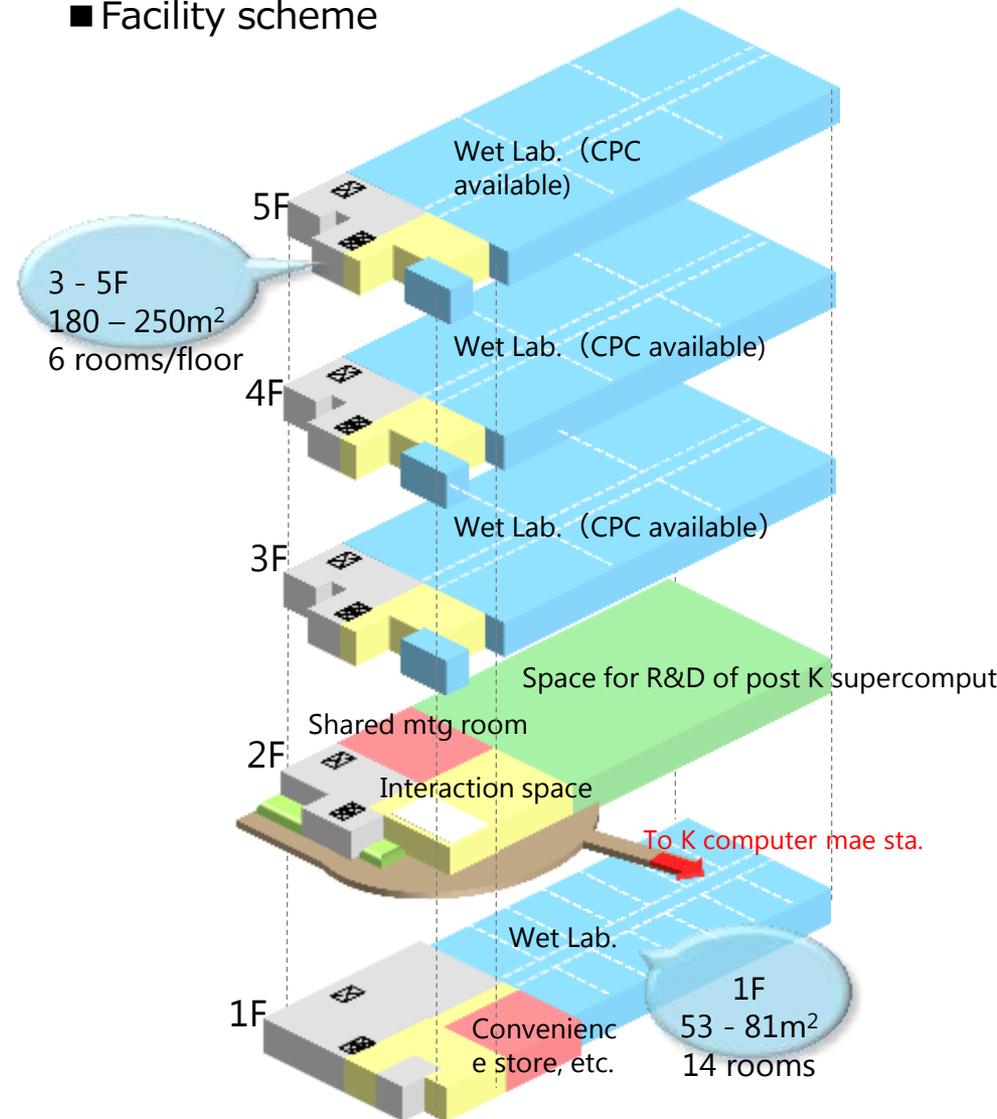
■ Rendering of the Center



■ 2F Image of common-use space



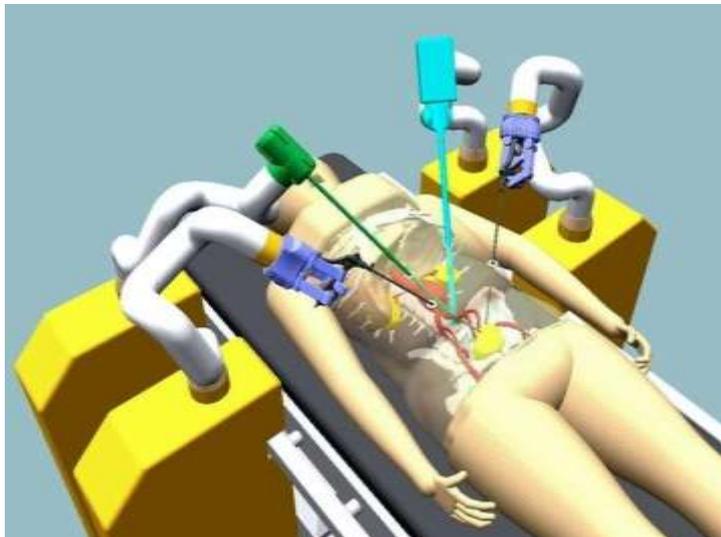
■ Facility scheme



Medicaroid Corporation

Joint establishment by Kawasaki Heavy Industries and Sysmex

- President: Yasuhiko Hashimoto (Kawasaki)
- Vice President: Kaori Asano (Sysmex)
- 26 board members and employees
- Business: design, development, manufacture, sales, marketing, of medical robots, and its after-sales service
- Office location: IMDA



Medical × Android



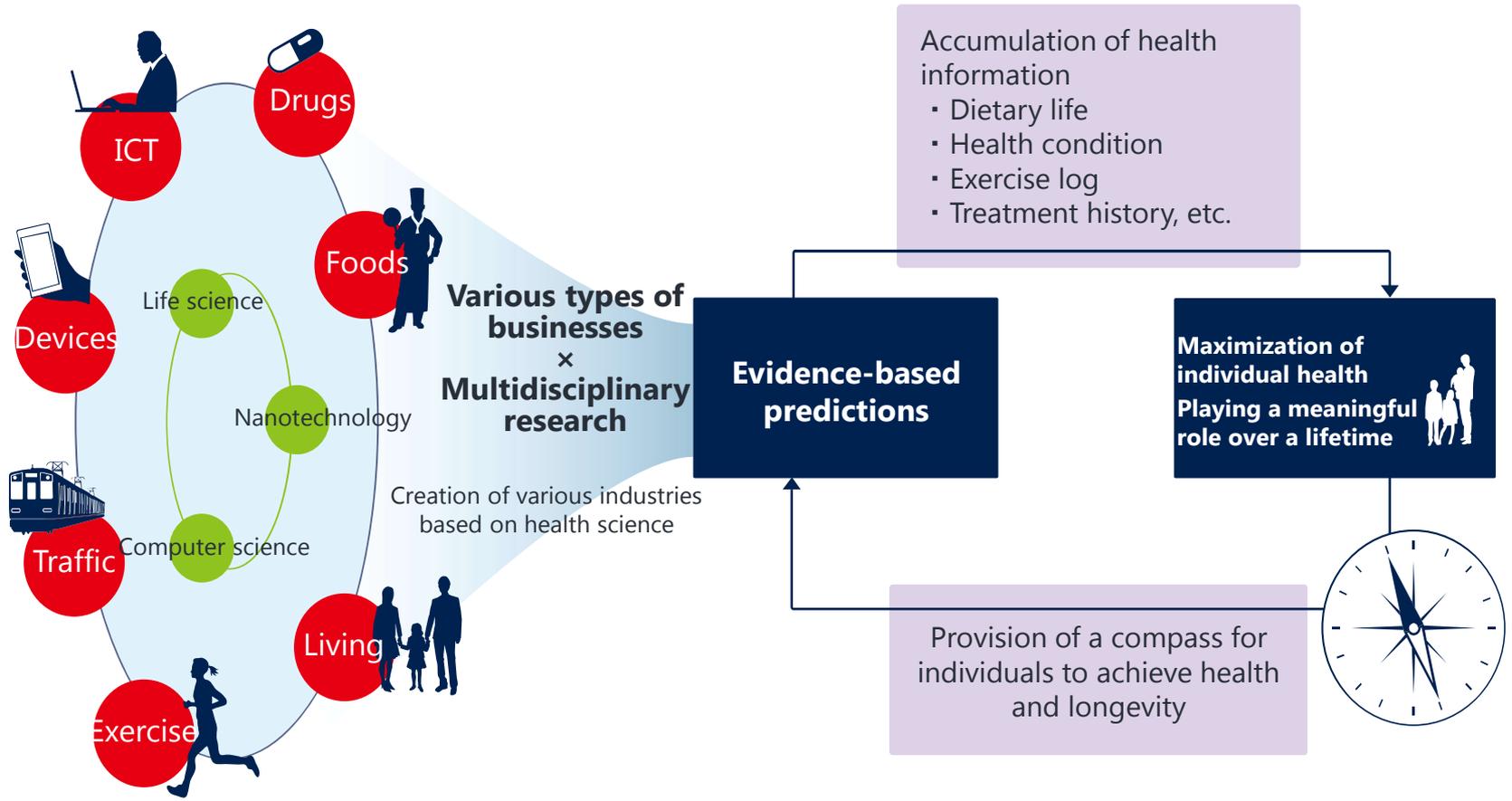
Manufacturer of testing and diagnostic devices



Manufacturer of industrial robots

- 2016 Launch of applied robots
- 2019 Aiming to launch operation-assisting robots
- 2030 Aiming to achieve sales amount of 100bn yen

MEXT's Project: program for promoting world-class research complex
 Kobe's proposal was chosen to be the first program nationwide



- Org. structure
- Core institution : RIKEN
- Local governments : Kobe City, Hyogo Pref.
- Universities/Research institutions : Kyoto Univ., Kobe Univ., Univ. of Hyogo, etc.
- Companies : Hankyu Hanshin Holdings, Inc., etc. (Total of 88 organizations/institutions)

Establishment of KOBE Monowasure (Memory) Network



Registered medical institutions: 20
(as of Aug. 2017)



Patients participating in clinical trials

Organizer: Foundation for Biomedical Research and Innovation

Establishing the Network consisting of 20 medical institutions and patients who want to participate in the clinical trials, toward the development of drugs for diagnosis and treatment on dementia

Launch of joint research among WHO Kobe Center, Kobe Univ., FBRI and Kobe Gakuin Univ.

Aiming to establish "Kobe Model," an integrated system for early detection, diagnosis and intervention on dementia, in the city of Kobe with the population of 1.5 million people.

Providing evidence worldwide to tackle dementia issues.

(3-year project starting in Sep. 2016)



Aiming to be Asia's No.1 Cluster

