

KOBE

Kobe Translational Research Cluster

Outline of the Project

Kobe has been selected as a participant area, together with Osaka (Saito), in the “Cooperative Link of Unique Science and Technology for Economic Revitalization” (CLUSTER), which will create a super-cluster of life science research in the Kansai region. Joint research activities in the Kobe area, focused at the core institution of the Institute of Biomedical Research and Innovation (IBRI), and including the participation of a wide range of research and industrial sites in the Kansai region, will be directed toward the comprehensive and systematic development of knowledge and technologies for advanced medicine, including regenerative medicine using neural and vascular stem cells. The goal is the creation of an advanced research cluster, for the effective utilization of basic research outcomes, acquisition of intellectual property rights, and commercialization of advanced medical technologies.

Members of the Headquarters

- Advisor..... IMURA Hiroo (Chairman, Kobe Medical Industry Development Project Study (Group))
- Director General..... TERADA Masaaki (President, Institute of Biomedical Research and Innovation)
- Project Director..... HIGUCHI Shuji
- Research Director..... NISHIKAWA Shin-ichi (Deputy Director, RIKEN Center for Developmental Biology)
- Science and Technology Coordinator..... KODAMA Hiroaki

Central Project Organization Foundation for Biomedical Research and Innovation (FBRI)

Core Institute(s) Institute of Biomedical Research and Innovation (IBRI)
 RIKEN Center for Developmental Biology (CDB)
 Kyoto Univ., Kobe Univ.

Participants

Industry...Stem cell Sciences K. K., Sumitomo Pharmaceuticals Co.,Ltd. and others
 Academia...Kyoto Univ., Osaka Univ., Kobe Univ.

Institute...Institute of Biomedical Research and Innovation (IBRI), Kobe City General Hospital,
 RIKEN Center for Developmental Biology (CDB), Tissue Engineering Research Center
 (TERC, National Institute of Advanced Science and Technology),
 National Cardiovascular Center and others

Main Researchers

SASAI Yoshiki (Group Director, RIKEN Center for Developmental Biology (CDB))
 IWATA Hiroo (Prof., Institute for Frontier Medical Sciences, Kyoto Univ.)
 ASAHARA Takayuki (Director, Regenerative Medicine Research Division, IBRI)
 KASUGA Masato (Prof., Kobe Univ. Graduate School of Medicine)

Outline of Research Projects

●Systematic Development of Stem Cell Technologies for Clinical Application

The prospect of regenerative medicine based on the transplantation of neurons derived from stem cells is attracting worldwide attention. In order to realize the promise of this technology, it is essential to establish a system of *in vitro* cell production, and to supply these cells for clinical use in accordance with medical ethical guidelines. Research in this field specifically addresses the systematic development of stem cell technologies targeting currently incurable neurological diseases, such as Parkinson's disease.

Stem cells: These cells are capable of differentiating into specific types of cells following appropriate biological stimuli. This research project will also utilize pluripotent embryonic stem cells (ES cells), derived from fertilized eggs.

[CDB, Kyoto Univ., TERC, IBRI, Kobe City General Hospital, National Cardiovascular Center, and others]

●Development of Innovative Practical Technologies Through the Fusion of Stem Cell Biology with Advanced Engineering

- ① The development two - and three-dimensional cell displays and next generation analytical systems
- ② The development of technologies for regenerative therapy using cardiac and vascular stem cells

This research targets the development of new technologies via the fusion of knowledge in engineering and developmental biology. Research focus ① aims to establish methods and tools for the screening and fine analysis of stem cell function and physiology based on cell biological knowledge and techniques. Research focus ② aims to develop technologies for the regeneration of blood vessels and cardiac tissue by clarifying the mechanisms of proliferation and differentiation in cells in these tissues.

[Kyoto Univ., Osaka Univ., TERC, IBRI, National Cardiovascular Center, and others]

●Development of New Medical Technologies Combining Post-genomic and Cell Signaling Research

The metabolic function of insulin is involved in a number of lifestyle-related diseases, including diabetes, hyperlipidemia, hypertension and atherosclerosis. This research targets the development of new therapeutic technologies for the prevention and treatment of such diseases through investigations using bioinformatics into the reduction of insulin action in liver and adipocyte hypertrophy.

[Kobe Univ., Kyoto Univ., CDB, and others]

★“Biocirculator” for Linking Research Outcomes to Practical Applications

Properly designed translational research and business models are essential for the practical application of the fruits of basic research. This project aims to construct a framework for rapid application by supporting the securing of patent rights and the formation of appropriate license and incubation arrangements for nascent technologies. This project also aims to establish an autonomous “circulation system” (circulator) between R&D and application through the management of intellectual property rights and efforts to develop human resources toward that end.

[FBRI, City of Kobe, and others]

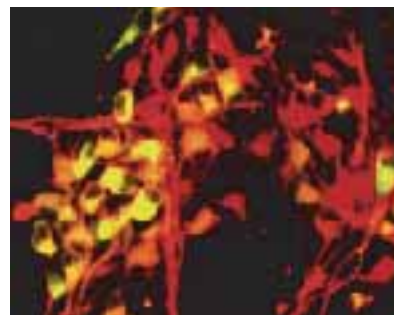


Fig.1 Neural cells derived from monkey ES cells under *in vitro* culture conditions (yellow: dopamine-secreting cells red: other neural cells)

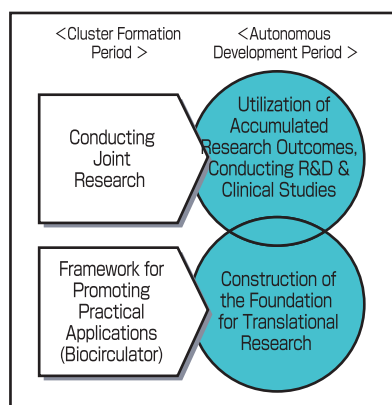


Fig.2 Project Overview
(This project aims to build a support system for research activities and the commercialization of technologies and to conduct collaborative research leading to the creation of an advanced medical research cluster.)

Expected Results

- Development of a series of innovative technologies to be practicably applied for the medicine, including regenerative medicine
- Establishment of systems encouraging researchers and enterprises from other fields to participate in the development of regenerative medical research and technologies
- Significant contribution to the development of innovative therapies for diabetes and disorders of the nervous and cardiovascular systems