

Creating advanced medical industries based on regenerative medicine and other innovative medical technologies

Core Organization Foundation for Biomedical Research and Innovation

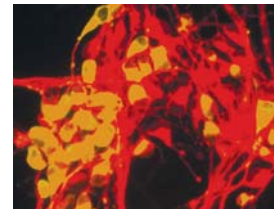
Participating Research Organizations (Bold: Core Research Organization)

Industry...Shin Nippon Biomedical Laboratories, Ltd., Dainippon Sumitomo Pharm Co., Ltd., Teijin Pharma Limited, and others
 Academia...**Kyoto Univ., Osaka Univ., Kobe Univ.**, Kyoto Prefectural University of Medicine, University of Hyogo, Fujita Health University
 Government...**Institute of Biomedical Research and Innovation, Riken Center for Developmental Biology(CDB)**, National Cardiovascular Center, and others

Project Overview

Stem cell research has advanced markedly in the universities and research institutions located in and around the Kansai region. On the basis of this research, we [our medical project in Kobe] aim to develop treatments for intractable illnesses, including cerebral and nervous system disorders (such as Parkinson's disease) and heart infarctions. To realize medical treatments for these diseases, we must develop cell/tissue culture and cell sorter technologies, which are also expected to foster novel industries. Another target is to develop effective treatments for diabetes. Here, the results from the recently completed sequencing of the human genome are being used.

- Embryonic stem (ES) cells have the unique ability to differentiate into various types of cells, including neurons (nerve cells). Using ES cells, we are developing treatments for intractable neural diseases such as Parkinson's disease.
- Using state-of-the-art engineering and technology, we have developed a cell chip and new microscope technologies. Utilizing these technologies, we are improving the quality control of cultured cells and tissue in order to contribute to regenerative medicine and the development of new pharmaceuticals.
- Using human blood vessel (hematopoietic) stem cells that exist even in mature adulthood and myocardial (heart muscle) stem cells, we are developing treatments for cardiovascular diseases, including cardiac infarctions and vascular occlusions.
- Exploiting the most-advanced genetic analysis technologies, we are searching for genes related to "lifestyle-related diseases;" e.g. diabetes, high blood pressure, and high cholesterol-related disease (hyperlipidemia). In return, treatments for these will be also developed.



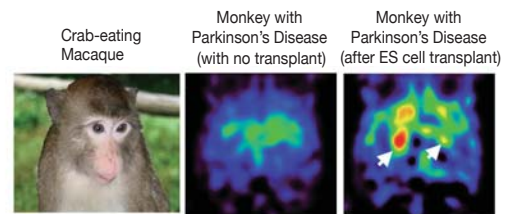
Nerve cells that have been differentiated from monkey ES cells within a test tube
 Yellow: dopamine cells
 Red: other nerve cells

FBRI (Foundation for Biomedical Research and Innovation) provided various systematically and comprehensive workshops and seminars for venture companies and researchers on regulatory affairs, intellectual property, licensing and others; which are important for industrializing state-of-the-art medical technologies.

Main Results

1. Treatment of an animal model of Parkinson's disease using human stem cells

Using embryonic stem (ES) cells (cells that have attracted attention as "master" cells); we have successfully achieved efficient in-vitro dopamine neuron production. We almost establish a dopamine nervous system progenitor cells differentiation method from a human embryonic stem cell, and preparations for clinical studies are set.



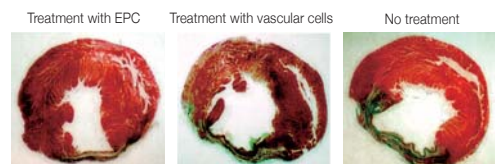
The transplantation of ES cell-derived dopamine neurons resulted in the increased activity of dopamine neurons (red portion) within the brain of the crab-eating macaque (*Macaca fascicularis*)

2. Identification of multiple treatment target molecules for lifestyle-related diseases including diabetes

We succeeded in identifying multiple diabetes target genes such as MCP1, Stra13, KLF15, and HG-EGF; several of which are being jointly researched with companies and are expected to become important target molecules. The study of the development process from embryonic stem cells to adipocytes reveals the physiological significance and potential for clinical use of adipose stem cells.

3. Business of regenerative medicine using endothelial progenitor cells

We isolated EPC(Endothelial Progenitor Cell) that become blood vessels from blood and succeeded in growing them. We conducted a clinical study that treated areas like the lower limbs, where blood was not flowing, with EPC. Based on this technology, StemMed Co., Ltd. was established, and we are striving for the further development of regenerative medicine.



Improvement No improvement
 The business of regenerative medicine using endothelial progenitor cells