

FY2013

JSPS Core-to-Core Program
-Strategic Research Networks-
Research Report

Project No.	21003
Research Theme	Construction of cardiac tissue using integrated gene, cell, and tissue engineering technology and its application for the treatment of cardiac failure
Duration of Project	4/1/2011 – 3/31/2014 (36months)
Core Institution in Japan	Osaka University Graduate School of Medicine

Implementing Organizations

Country	Japan
Core Institution	Osaka University Graduate School of Medicine
Co-Chair (name and title)	Professor Yoshiki Sawa
Number of Cooperating Institutions	1
Cooperating Institutions	The Center for Advanced Medical Engineering and Informatics, Osaka University

Country	Finland
Core Institution	University of Helsinki
Co-Chair (name and title)	Professor Ari Harjula
Number of Cooperating Institutions	3
Cooperating Institutions	University of Kuopio, AIV Institute University of Tampere Finnish Red Cross Blood Service
Matching Fund	Basic scientific grant (Finland Academy) Clinical grant (Government Subsidy for Medical Research) Bilateral Program (TEKES)

Country	Germany
Core Institution	Hannover Medical School
Co-Chair (name and title)	Professor Axel Haverich
Number of Cooperating Institutions	4
Cooperating Institutions	University of Rostock University of Düsseldorf Heidelberg University German Tissue Transplantation Bank
Matching Fund	Excellence Initiative Germany (DFG) DFG-JSPS Bilateral Program (DFG)

Result of Program Implementation

To develop an international research consortium for cardiac tissue engineering and to apply the tissue engineered cardiac tissue to clinical use in patients with severe heart disease, we have done experimental works to develop three dimensional cardiac tissue, using gene, cell, and tissue engineering technologies, which have been developed in Finland, Germany, and Japan, respectively. To integrate our technologies, we have held "Summer Seminar" in Helsinki, Finland on 19th to 20th August, 2013. About twenty researchers from Finland, Germany, and Japan got together and made presentations and discussions on our research consortium and international research works. Furthermore, we have held "International symposium for young researchers" in Osaka on 11th December 2013. About 40 young researchers got together in the seminar room of the graduate school of medicine, Osaka University and made hot discussions on the recent research results. In order to develop this consortium, we up dated our home page. The events news are also uploaded in the site. International collaboration of young scientists and surgeons of each country is promoted by establishment of exchange program. As many as 9 young researchers have been exchanged in the last year.

Achievements in FY2013 (Self Review)

Joint Research

Using temperature-responsive cell sheet, BCT and iPS cells, we are trying to construct a tissue engineered three-dimensional cardiac tissue, which can be transplanted into the human heart. 1) Experiments using cell sheet is done in Osaka, Helsinki. 2) Experiments using iPS cells and BCT are underwent in Hannover.

Seminar

We have held "Summer Seminar" in August 2013, in Helsinki, Finland.

Researcher Exchanges

Following to the last year, three Japanese researchers stayed in Hannover (November 2013 to February 2014). They performed experimental works with the coordinators in the partner institutes. Furthermore, short-period young researcher exchange has been performed in this year. Total five researchers from Osaka have come to Hannover to exchange information.

Future Plan (Measures toward Achieving Research Objectives)

As the end of "Type A: Strategic Research Network", this program should be further expanded with another financial supports. To promote young researcher exchange and to give them the chances to present their research works are the main issue. To achieve this goal, three coordinators of each countries, Prof. Harjula, Prof. Haverich, and Prof. Sawa will meet regularly, during the annual meeting of American Association of Thoracic Surgery and European Association of Cardiothoracic surgery, where they discuss on the further development of our research works on cardiac tissue engineering. Furthermore, we will make International symposium in 2014. As for the research theme, we plan to expand our collaboration works to iPS cell research. To develop our international consortium not only in experimental works but also in clinical works, we are planning to perform "International multi-center clinical trials of Cardiovascular Regenerative Medicine". To perform it, we added the Finnish Red Cross Blood Service and German Tissue Transplantation Bank into our consortium. The clinical trial of tissue engineered heart valve implantation in pulmonary position is planed in Osaka University Hospital, and the first case will be performed the first half of the year 2014.