

**JSPS Core-to-Core Program**  
**FY2010 Implementation Plan (Project No.:18006)**

Research Theme Stem Cells and Cancer Stem Cells  
 Duration of Project 2008.4.1 – 2011.3.31 ( 36 months)  
 Core Institution in Japan (Co-Chair) Keio University  
( Prof. Toshio Suda )

**Implementing Organizations**

○ **Japan**

Japan	Core Institution	Keio University	
	Co-Chair (name and title)	Toshio Suda, Professor	
	Cooperating Institutions		Number of Cooperating Institutions
			0

○ **Partner Countries**

	Core Institution	Lund University	
	Co-Chair (name and title)	Stefan Karlsson, Professor	
	Cooperating Institutions		Number of Cooperating Institutions
			0

	Core Institution	Karolinska Institutet	
	Co-Chair (name and title)	Sten Lindahl, Director	
	Cooperating Institutions		Number of Cooperating Institutions
			0

	Core Institution	University of Oxford	
	Co-Chair (name and title)	Sten Eirik Jacobsen, Professor	
	Cooperating Institutions		Number of Cooperating Institutions
			0

	Core Institution	MD Anderson Cancer Center	
	Co-Chair (name and title)	Naoto Ueno, Professor	
	Cooperating Institutions		Number of Cooperating Institutions
0			

	Core Institution	Stowers Institute for Medical Research	
	Co-Chair (name and title)	Linheng Li, Associate Investigator	
	Cooperating Institutions		Number of Cooperating Institutions
0			

## Objectives of Research Exchange (including the five years after the project finishes)

Stem cell, sustaining self-renewal activity, causes tissue formation. It is divided broadly into tissue stem cell which causes normal tissue and embryonic stem cell which is produced from embryos. There are a tremendous amount of researches on stem cells have been conducted in many countries aiming for regenerative medicine. We propose “choice and concentration” program instead of “omnidirectional” research system, with the main aim of fundamental research of tissue stem cell and its clinical application focusing on cancer and regenerative medicine. At “Integrated Action Initiative” program, we promoted our research focusing on hematopoietic and neural stem cell to accomplish the significant discovery regarding stem cell niche and molecular mechanism both at Lund University and Keio University ultimately. Also at “Strategic Research Network” program, we are going to continue “choice and concentration” researches with 5 core institutions in Sweden, UK and US. This is to say, the aim of our research is to demonstrate dynamics of normal stem cells and cancer stem cells focusing on “How tissue stem cells stay as stem cells.” These researches are expected to reach fruition as expansion of stem cells and drug discovery of cancer stem cells inhibitor 5 years later.

## Results to the present

### **Joint Research**

A Keio young researcher has been sent to Dr. Elizabeth Grimm and Dr. Naoto Ueno of M.D. Anderson Cancer Center for the translational research. He is going to continue his cancer research in 2010.

### **Seminar**

In August, there was “Summer School KEIO-LUND 2009” at Keio. 4 faculty members and graduate students from Lund University etc. participated to the 2-day intensive program. Graduate students of Keio and Lund gave an oral and poster presentations and the excellent presenter was awarded by vote at the end of the program. The students of Lund University also stayed at the laboratories of their interest after the program. Since the event was organized in collaboration with Global COE program and Kanrinmaru Project(Tenure track), it turned out to be a successful event with various kinds of program. Young minds have been motivated by a series of intensive discussions.

### **Research Exchanges**

Young researchers were sent to core institution and attended international conferences in the stem cell field (i.e. ISSCR: International Society of Stem Cell Research) at which young elite researchers gather. Besides making presentations, they successfully deepen exchanges with the researchers to establish the network for the future collaboration in the stem cell field.

### **Other**

In October, there was “Autumn Symposium 2009” was held at Keio. Four faculty members and 1 graduate student from Lund University participated to the intensive lecture course. A student stayed at the laboratory of his interest after the symposium. The result of the event was so fruitful due to the collaboration with Global COE program and Kanrinmaru project.

## Summary of FY 2010 Exchange Plan

### Joint Research

Keio University is going to promote researches on stem cells and cancer stem cells such as cooperative researches with the following core institutions through “Strategic Research Network” program.

#### Lund University:

Dr.Toshio Suda will give a talk at “Hematopoiesis in Health and Disease” which is held at Lund University May 15 to 17, 2010. He will meet Dr.Karlsson’s group. In addition, it will continuously develop the cooperative research on the mechanism and the role of the activation of endogenous neural stem cells in the regeneration after cerebral infarction in collaboration with Dr.Olle Lindvall and Dr.Zaal Kokaia. A Keio PhD student who has studied at Lund University joins the project.

#### Karolinska Institutet:

The cooperative research will be on the behavior of neural stem cells and vascular cells from the aspects of metabolism and blood brain barrier during the recovery of brain injury. A debrief session will be held at Karolinska. It will continuously develop the cooperative research and intellectual exchange in the regeneration of spinal cord with Dr.Lars Olson and the epigenetic manipulation of the differentiation of neural stem cell with Dr.Ola Hemanson.

#### Oxford University:

Keio University will continue the cooperative research with Dr. Jacobson of Weatherall Institute for Molecular Medicine (a former professor at Lund University), which is superior in the field of hematopoiesis and haematologic disease. A Keio PhD who has studied in Oxford will continue the research on TPO/mpl signal, which is the common theme for Oxford and Keio. Dr.Arai is going to visit to have a discussion about the gene analysis of single cells.

#### MD Anderson Cancer Center:

Keio University will continue the project with Dr. Elizabeth Grimm on melanoma stem cells and the cooperative research on breast cancer stem cells with Dr.Naoto Ueno. Mouse brain tumor which was established in Dr.Saya’s Lab was provided to Dr. Alfred Yung in Department of Neuro-Oncology. They will facilitate the global communication among young investigators through the exchange of information on preclinical for anti-cancer drugs. Two young researchers will be sent to MDACC for some months. The cost will be partly supported by the matching fund of MDACC.

#### Stowers Institute for Medical Research:

Keio University will conduct a cooperative basic research on development biology and stem cells niche. Keio University will promote the research on hematopoietic niche by exchanging opinions with Dr. Liheng Li, and the research on germline stem cell niche with Dr. Ting Xie. When both researchers visit China, Keio will use the opportunity to invite them to hold a seminar at Keio.

### Seminar

“Symposium on Stem Cell 2010” (2 days in March, 2011)

Keio University will hold a symposium on hematopoietic stem cells and have a discussion about the cooperative research with 3 professors and 3 young researchers from Lund University. There will be an evaluation session of the presentation of the research results by 13 young Keio researchers (Tenure Track) by 3 professors of Lund University.

- 1) A discussion about the cooperative research on hematopoietic stem cells
- 2) An evaluation of the output of Keio young researchers based on the global standard. They will expect some advice for the proceedings hereafter.

**Researcher Exchanges**

Besides academic exchange between the core institutions, it is also significant to attend international conferences regarding stem cells and cancer stem cells and to communicate with researchers of advanced research institutes in the world. Through such actions, we will be able to obtain diverse opinions from diverse fields and to expand the relationship efficiently and effectively. Major plans are as following.

- GAP(Global Academic Programs) Conference : Texas, US  
Meet Dr. Naoto Ueno of M.D. Anderson Cancer Center
- ISSCR (International Society for Stem Cell Research) : San Francisco, US  
Meet Dr. Olle Lindvall of Lund University to discuss stem cells niche.
- ISEH (International society for Experimental Hematology) : Melbourne, Australia  
Meet Dr. Stefan Karlsson of Lund University to discuss the research on Hematopoietic stem cell signal.
- Neuroscience 2010 : San Diego, US
- Biophysical Society 55th Annual Meeting : Baltimore,US
- The 18th International Conference of Brain Tumor Research and Therapy : Travemunde, Germany