

Results report

- 1 . Title of Research and Development : Bioinformatics platform for predicting autologous cell therapy efficacy in patients with heart failure
- 2 . Principal Investigator : Yoshiki Sawa (Professor, Department of Cardiovascular Surgery, Osaka University Graduate School of Medicine)
- 3 . Counterpart Principal investigator : Esko Kankuri (Docent, Pharmacology, Institute of Biomedicine, University of Helsinki (Finland))

4 . Results of Research and Development:

Our achievement of this year is to establish disease-specific induced pluripotent stem (iPS) cell from the patient of congenital cardiovascular disease. We decided to research Dilated Cardiomyopathy (DCM) and differentiation into cardiomyocyte was induced by adding cytokines such as Activin A and Bone morphogenetic protein 4. (Reference: Nature Biotechnology, 25 (9) (Sep 2007), pp. 1015–1024 and Journal of Molecular and Cellular Cardiology 50 (2011) 327–332). After differentiation, the purity of cardiomyocyte was 10 – 20 %. We are considering that some improvements will be needed in the differentiation process. On the other hand, we already developed the new method to purify iPS-derived cardiomyocyte from the cardiomyocyte-induced iPS cell population in the first year of this project. Because one of the extra cellular matrix has affinity to cardiomyocyte, cardiomyocyte can be easily separated from other cells without invasions in a short time. This technique is already applied domestic patent as we reported before (2014-188180). This year, we added some new data that shows our technique is superior in the point of high yield and low cytotoxicity than the conventional cell purification methods. Then we applied this method to international application (PCT/JP2015/076072). The researchers in Helsinki contributed actively to carrying out this research such as giving information about protocol to the researchers in Osaka. Antti Siltanen, a researcher of University of Helsinki is now writing a paper about this research. Furthermore, Keitaro Domae, a young researcher of Osaka University went to Helsinki from 23rd February to 18th March. He learned recent development of treatment for heart failure in Helsinki. Especially he discussed surgical stratagem in treating for heart failure with Ari Harjula, Professor of Cardiothoracic Surgery, Helsinki University Central Hospital and his colleague. He also shares the recent development of basic research of cardiac regenerative therapy in both University of Helsinki and Osaka University. . On 10th March, scientific meeting hold at University of Helsinki. The participants from Finland were Professor Harjula, Dr. Kankuri, Dr. Kankainen, and Dr. Siltanen. The participants from Japan were Dr. Miyagawa, Dr. Fukushima and Dr. Domae. We discussed actively about current status of cardiac regenerative therapy in Osaka University and University of Helsinki, and the application of bioinformatics into clinical setting of cardiac regenerative therapy. We also confirm the facilitation of exchange and cooperation between Helsinki and Osaka University. Our young researchers joined this meeting and discuss and interact with researchers of Helsinki University. We also confirmed the research plan and cooperation in the next year.