AEPC-YIA session

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Chair:Nico Blom（Leiden University Medical Center, the Netherlands）, Chair:Hiroyuki Yamagishi（Keio University School of Medicine, Japan）

2023年7月6日(木) 10:40 ～ 11:30 第2会場 (G4)

[I-AEPCYIA-01]Human cardiosphere-derived cells with activated mitochondria for better myocardial regenerative therapy

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Background and Aim: Cell transplantation is a promising therapeutic strategy for myocardial regeneration therapy. To improve therapeutic effects, we are developing a culture medium additive to enhance the mitochondrial function of cardiomyocytes for transplantation. We have succeeded in delivering mitochondrial activation molecules to mouse-derived cardiac progenitor cells using mitochondrial target drug delivery system (MITO-Porter system). In this study, we investigated whether the mitochondrial function of human-derived myocardial precursor cells could be enhanced with a view to clinical application of MITO-Porter.Methods: Human cardiosphere-derived cells (CDCs) were isolated from excised myocardium during surgery for congenital heart disease, and coenzyme Q10 (CoQ) was selected as the mitochondrial activating molecule. Human CDCs treated with the MITO-porter (CoQ) are referred to herein as human MITO cells. We optimized the protocol for preparing human MITO cells based on the oxygen consumption rate (OCR), which is an index of mitochondrial function. We then verified the therapeutic effect of cell transplantation therapy using human MITO cells on a rat myocardial ischemia-reperfusion injury.Results: Human MITO cells transplantation showed improvement in cardiac function and suppression of myocardial fibrosis compared with non-treated CDCs transplantation. These effects were observed not only by myocardial administration but also by intravenous administration of human MITO cells.Conclusions: Transplantation of human MITO cells into ischemic myocardium showed a stronger therapeutic effect compared with non-treated CDCs transplantation. This study is the first attempt to verify that mitochondrial delivery of functional compound would contribute to improving the outcome of human CDCs transplantation therapy.