シンポジウム | 分子医学・再生医療・心臓血管発生

シンポジウム04（ I-S04）
分子医学・再生医療・心臓血管発生「先天性心疾患の理解・治療・予防につなげる臨床心臓発生学」

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座長:山岸 敬幸（慶應義塾大学医学部 小児科）※I-S04-1基調講演担当
Sun. Nov 22, 2020 8:00 AM - 10:00 AM Track7

[I-S04-1]【基調講演】 Impact, benefit and safety of mitochondrial transplantation for myocardial protection and its potential application for the pediatric cardiology

○James D. McCully (Boston Children's Hospital/Harvard Medical School)

To ameliorate the effects of myocardial ischemia/reperfusion injury (IRI) we have utilized a novel therapeutic approach, mitochondrial transplantation, in which myocardial mitochondria damaged by ischemia/reperfusion injury are replaced or augmented with viable, respiration competent mitochondria obtained from the patient’ s own body. The isolated mitochondria can be delivered by direct injection or by intra coronary delivery to the myocardium where they are rapidly internalized by cardiac cells by actin dependent endocytosis and then fuse with resident mitochondria and remain viable for at least 28 days. The transplanted mitochondria increase total tissue ATP content and ATP synthesis and upregulate cardioprotective cytokines and proteomic pathways for the mitochondrion and the generation of precursor metabolites for energy and cellular respiration. Mitochondrial transplantation is not associated with adverse short- or long-term complications related to mitochondrial delivery such as arrhythmia, intramyocardial hematoma, scarring, or immune or inflammatory responses. The efficacy of mitochondrial transplantation has been demonstrated in in vitro and in vivo animal studies to rescue myocardial cells and significantly enhance post-ischemic functional recovery. In a single-center study of patients requiring extracorporeal membrane oxygenation for post-cardiotomy cardiogenic shock following IRI, mitochondria transplantation has been shown to be associated with improved cardiac function and short-term outcomes for post-cardiotomy ECMO related to ischemia/reperfusion injury.