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MITO-Porter, mitochondrial drug delivery system toward innovative therapy

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A variety of human diseases, including neurodegenerative disorders, diabetes, cancer and inherited mitochondrial disease, are associated with mitochondrial dysfunction. Therefore, this organelle is a promising therapeutic drug target, and mitochondrial therapy would be expected to be useful and productive for the treatment of various diseases. To achieve such an innovative therapy, it will be necessary to deliver therapeutic agents into mitochondria in living cells. However, only a limited number of approaches are available for accomplishing this. We recently proposed a new concept of mitochondrial delivery, a MITO-Porter, a liposome-based carrier that introduces macromolecular cargos into mitochondria via membrane fusion. Using the green fluorescence protein as a model macromolecule and confocal laser scanning microscopy as the detection methodology, we were able to confirm that the MITO-Porter is, in fact, capable of delivering a macromolecule to mitochondria. In this presentation, we will talk about our current efforts regarding validation of mitochondrial therapeutic strategy using the MITO-Porter system.

Biography

Yuma Yamada is an Assistant Professor in the Faculty of Pharmaceutical Sciences, Hokkaido University and the Pharmacist in the Department of Pharmacy, Hokkaido University Hospital. He received BS, MS and PhD from Hokkaido University in 2003, 05 and 08, respectively. After an Instructor at Faculty of Pharmaceutical Sciences, Hokkaido University in 2007, he became an Assistant Professor in the Faculty of Pharmaceutical Sciences, Hokkaido University in 2009. He is an outstanding Reviewer of *Journal of Controlled Release* in 2013 & 2014. His main research interest is development of mitochondrial drug delivery system and nanoparticle packaging for various cargos (protein, nucleic acids, etc.).

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