Maresin 1, an anti-inflammatory lipid mediator, induces physiological hypertrophy in neonatal rat cardiomyocytes

Arisa Kobayashi[1], Wahyuni Tri[1], Ryuta Igarashi[1], Masashi Tomimatsu[1], Kotaro Matsumoto[1], Makiko Maeda[2], Masanori Obana[1], Yasushi Fujio[1]

[1]Laboratory of Clinical Science and Biomedicine, Grad. Sch. Pharm., Osaka Univ., [2]Educational and Research Project for Pharm.D, Grad. Sch. Pharm., Osaka Univ.

【Background】

Maresin1 (MaR1), a lipid mediator biosynthesized from docosahexaenoic acid (DHA), has both anti-inflammatory and proresolving activities. Much attention has been paid to the functional regulation by MaR1 in inflammatory cells, but not in tissue component cells. Since inflammatory reactions are involved in cardiovascular diseases, we addressed the effects of MaR1 on cardiomyocytes.

【Methods & Results】

Neonatal rat cardiomyocytes (NRCMs) were cultured with MaR1 for 48 hours. Immunofluorescent microscopic analyses using anti-sarcomeric α-actinin revealed that MaR1 increased cell surface area in a dose-dependent manner. Real time RT-PCR analyses demonstrated that the expression of the pathological hypertrophy markers, such as BNP and skeletal-actin, was not upregulated in NRCMs cultured with MaR1, indicating that MaR1-induced hypertrophy is physiological. Finally we treated NRCMs with SR3335, an ROR alpha inhibitor, because MaR1 was previously reported to utilize ROR alpha as a receptor. Importantly, SR3335 prevented the increase in cell surface area induced by MaR1.

【Conclusion】

MaR1 induces physiological hypertrophy of neonatal rat CMs through stimulating ROR alpha. MaR1 could play an important role in the tissue repair after myocardial injury.