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Eicosapentaenoic acid has improved the impaired insulin-signaling pathway of the cardiac muscle of infants

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Previous many studies suggest that early nutrition during critical developmental periods affects long-term health. Infants of diabetic mothers (IDM) have also abnormal circulatory organs. When we investigated the insulin signaling in the newborn rat heart, they found that the insulin signaling showed insulin resistance at the Akt/mTOR pathway. However, we have already reported that the abnormality of insulin signaling of the infant hearts of diabetic mothers was improved by feeding the pregnant mothers a diet rich in fish oil. In this study, we would like to clarify that eicosapentaenoic acid (EPA) of ingredient of the fish-oil improves insulin signaling by diabetic mother's infant's hearts and the primary cardiomyocyte cells. Pregnant diabetic rats induced by streptozotocin and were then fed the EPA or DDW via gastric tube. To examine changes in insulin signaling in the cardiac muscle in IDM, we isolated the heart and cultured the primary cardiomyocyte cells. Western blotting was carried out for determine the Akt-related insulin signaling. The phosphorylation level of Akt and the expression level of mTOR and the GLUT4 translocation to the plasma membrane with insulin were decreased in IDM of the control group. However, the phosphorylation level of Akt, FOXO, Stat3 and the expression level of mTOR were increased compared with control group by EPA ingestion of mother. During pregnancy, the placenta transfers the EPA from the mother to the fetus. The EPA in the fish oil may improve the impaired signaling pathway of the cardiac muscle of infants caused by a diabetic mother's hyperglycemia.

Biography

Akio Nakamura, PhD is an Associate Professor in the Department of Molecular Pharmacology and Oncology at School of Medicine, Gunma University. He has published more than 50 papers in reputed journals.

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