1549879

Insulin-resistant diabetic rats benefit from omega-3 fatty acids supplementation due to up-regulation of connexin-43.

Radosinska, J[1]; Bacova, B[2]; Dosenko, V[3]; Lin, H[4]; Imanaga, I[5]; Tribulova, N[2]
[1]Comenius University Faculty of Medicine, Bratislava, Slovakia; [2]Institute for Heart Research, Bratislava, Slovakia; [3]Bogomoletz Institute of Physiology, Kyiv, Ukraine; [4]Fukuoka University Medical school, Fukuoka, Japan; [5]Fukuoka University School of Medicine, Fukuoka, Japan

Goal of this study was to investigate whether myocardial transcript and protein expression of connexin-43 (Cx43), which ensures direct cell-to-cell communication, are altered in insulin-resistant diabetic rats and whether they may benefit from omega-3 fatty acids supplementation. Experiments were conducted on spontaneously diabetic rats and age-matched healthy rats. They were divided into un-treated and treated for 2-month with omega-3 FA (200mg/kg/day). Biometrical and biochemical parameters were registered. Left ventricular heart tissues were used for determination of Cx43 mRNA and protein expression as well as for protein kinase C (PKC) expression and myocardial ultrastructure examination. Blood glucose, cholesterol and triglycerides were increased in diabetic rats and significantly reduced due to treatment with omega-3 FA while body and heart weights were not affected. Myocardial Cx43 mRNA level was higher in diabetic than non-diabetic rats and omega-3 FA caused its marked increase in both groups. Ratio of phosphorylated to non-phosphorylated form of Cx43 protein was lower in diabetic versus healthy rats and enhanced upon omega-3 FA that was associated with increased expression of PKC epsilon. Moreover, subcellular integrity of cardiomyocytes and their junctions was improved due to omega-3 FA treatment. It is concluded that rats with type-2 diabetes benefit from omega-3 FA supplementation because of suppression a risk markers for CVD and particularly due to up-regulation of myocardial connexin-43 and preservation of ultrastructure. Consequently, it may improve heart function and decrease susceptibility to malignant arrhythmias.