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Effects of omega-3 fatty acids and pioglitazone combination on insulin resistance through Fibroblast Growth Factor 21 in Type 2 Diabetes Mellitus

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Fibroblast growth factor 21 (FGF21) is an effective regulator of glucose and lipid metabolism. It is mainly regulated by peroxisome proliferators activated receptors and is widely associated with cases of insulin resistance as obesity and Type 2 Diabetes (T2D). Our study aimed to investigate the potential effects of omega-3 fatty acids, pioglitazone and their combination on serum and liver FGF21 concentrations and its hepatic gene expression in a rat model of T2D. We also studied the modulating effects of these treatments on blood glucose, lipid profile and insulin resistance. T2D was induced in male Sprague-Dawley rats by combination of high fat diet and low dose streptozotocin (35 mg/kg). Diabetic rats were treated with omega-3 fatty acids (10% W/W diet), pioglitazone (20 mg/kg) and their combination for a period of 4 weeks. Serum FGF21 concentration was significantly increased in diabetic rats. In contrast, hepatic FGF21 concentration and gene expression were significantly decreased. Omega-3 fatty acids, pioglitazone and their combination significantly decreased serum FGF21. Omega-3 fatty acids and combination therapy significantly decreased liver FGF21 concentration with non-significant changes in gene expression. On the other hand, pioglitazone significantly increased hepatic FGF21 concentration and gene expression. Omega-3 fatty acids, pioglitazone and their combination significantly improved lipid profile. Pioglitazone and combination significantly decreased blood glucose levels and improved insulin resistance. In conclusion, this study introduces the first evidence regarding the anti-diabetic effects of omega-3 fatty acids and pioglitazone combination, such effects are mediated through FGF21.

Biography

Salma M Eraky has completed her Master's degree from Mansoura University. She has published one paper in the "Egyptian Journal of Basic and Applied Sciences".

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