



Effect of DHA-rich fish oil on PPAR γ target genes related to lipid metabolism in type 2 diabetes: A randomized, double-blind, placebo-controlled clinical trial

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BACKGROUND: The beneficial effects of omega-3 polyunsaturated fatty acids on lipid levels are well documented. However, the related molecular mechanisms are widely unknown. Omega-3 polyunsaturated fatty acids are natural ligand for peroxisome proliferator-activated receptor γ (PPAR γ).

OBJECTIVE: The aim of this study was to evaluate the effect of docosahexaenoic acid (DHA)-rich fish oil supplementation on modulation of some PPAR γ -responsive genes related to lipid metabolism.

METHODS: Patients with type 2 diabetes were randomly assigned to consume either DHA-rich fish oil (containing 2400 mg/d fish oil; DHA: 1450 mg and eicosapentaenoic acid: 400 mg) or placebo for 8 weeks. Lipid profile and glycemic control parameters as well as the gene expression of PPAR γ , liver x receptor-a, ATP-binding cassette A1, and *CD36* in peripheral blood mononuclear cells were measured at baseline and after 8 weeks.

RESULTS: DHA-rich fish oil supplementation resulted in decreased triglycerides (TG) level compared with placebo group, independently of the baseline value of TG (all patients ($P = .003$), hypertriglyceridemic subjects ($P = .01$), and normotriglyceridemic subjects ($P = .02$)). Moreover, a higher reduction in TG level was observed in hypertriglyceridemic subjects, comparing to normotriglyceridemic subjects with DHA-rich fish oil supplementation ($P = .01$). Other lipid parameters as well as the expression of PPAR γ , liver x receptor-a, ATP-binding cassette A1, and *CD36* were not affected by

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