

Effects of Fish and Walnuts on LDL-C and Triglycerides: Influence of BMI and Baseline Lipids

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Consumption of n3 fatty acids has been shown to produce cardiovascular benefits, but in some published studies, fish oil supplementation resulted in a paradoxical increase in LDL-cholesterol (LDL-C). We used mixed linear models to investigate how BMI and baseline serum lipids influence the effects of 2 sources of n3 fatty acids, fish and walnuts, on serum LDL-C and triglyceride (TAG) levels in a randomized crossover metabolic trial. 25 subjects received 3 eucaloric diets for 4 wk each in random order. The diets conformed to the Dietary Guidelines for Americans and differed primarily in source and type of polyunsaturated fat: Walnut (42.5 g, 6 d/wk), Fish (113 g salmon, 2 d/wk), and Control (no fish or nuts). Compared with Control, we observed an LDL-C-increasing effect of Fish that was magnified in subjects with higher baseline LDL-C (mean change \pm SE: 3.2 ± 1.9 mg/dL for a baseline LDL-C of 110 mg/dL vs 8.1 ± 2.0 for a baseline LDL-C of 170; P value for diet-baseline interaction 0.04). In contrast, we observed an LDL-C-lowering effect of Walnut that was uninfluenced by subjects' baseline LDL-C level. After controlling for baseline TAG, we observed a TAG-lowering effect of Fish that attenuated with increasing BMI, reversed, and became a TAG-increasing effect among the 3 subjects with the highest BMI ($>30\text{kg/m}^2$) (-23.2 ± 5.5 mg/dL at BMI of 22, -0.6 ± 6.4 at BMI of 27.5, 25.4 ± 17.1 at BMI of 33; P value for diet-BMI interaction 0.02). We observed no effect on TAG for Walnut. In summary, high baseline LDL-C magnified an LDL-C-increasing effect of Fish, but did not influence an LDL-C-lowering effect of Walnut; and high BMI attenuated a TAG-lowering effect of Fish.

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