

1st International Immunonutrition Workshop, Valencia, 3–5 October 2007, Valencia, Spain

The effect of moderate dose of EPA+DHA on lipid profile and inflammatory markers in middle-aged men

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The aim of the present study was to investigate the effects of a moderate dose of long-chain (LC) *n*-3 PUFA (2.3 g EPA+DHA/d; 6:1) in the form of fish oil capsules on cardiovascular risk factors, particularly the plasma lipid profile and plasma inflammatory markers (C-reactive protein, IL-6, soluble adhesion molecules). In a double-blind placebo-controlled study twenty healthy middle-aged men were randomised to fish oil providing 2.3 g/d EPA+DHA or medium-chain TAG-rich oil (placebo) for 8 weeks. Blood was collected after an overnight fast.

Plasma total cholesterol (TC) concentration was significantly increased in the fish oil group but HDL-cholesterol and LDL-cholesterol concentrations were not significantly affected following supplementation with fish oil, although they were influenced by the placebo oil (see Table). Fish oil supplementation did not exhibit a favourable TAG-lowering effect previously shown⁽¹⁾. Likewise, positive effects of LC *n*-3 PUFA on inflammatory markers were not observed, except that there was a significant difference between fish oil and placebo in terms of percentage change from baseline for soluble intercellular adhesion molecule 1 (sICAM-1; $P=0.05$). It was demonstrated that in the fish oil group plasma sICAM-1 concentration decreased by 9.5% compared with a 9.9% increase in the placebo group. Correlation analyses, however, did not show any relationships between the changes in the fatty acid profiles, particularly of LC *n*-3 PUFA, and the reduction in sICAM-1.

Outcome	Fish oil (<i>n</i> 9)					Placebo (<i>n</i> 11)				
	Baseline		8 weeks		<i>P</i>	Baseline		8 weeks		<i>P</i>
	Mean	SE	Mean	SE		Mean	SE	Mean	SE	
TC (mmol/l)	5.2	0.4	5.6	0.4	<0.05	4.8	0.3	5.6	0.3	<0.001
LDL-cholesterol (mmol/l)	3.1	0.3	3.3	0.3	NS	3.0	0.3	3.5	0.3	<0.001
HDL-cholesterol (mmol/l)	1.4	0.1	1.5	0.2	NS	1.1	0.1	1.3	0.1	<0.001
TAG (mmmol/l)	1.3	0.2	1.7	0.3	NS	1.1	0.1	1.4	0.2	NS
TC:HDL	4.1	0.5	4.2	0.5	NS	4.5	0.3	4.5	0.3	NS
LDL:HDL	2.5	0.4	2.6	0.4	NS	2.8	0.3	2.8	0.2	NS

The results of the current study are consistent with a limited effect of modest doses of LC *n*-3 PUFA on the outcomes studied here. Reasons for the lack of TAG lowering by fish oil may be too low an intake of LC *n*-3 PUFA, insufficient DHA or the inclusion of subjects who were normotriacylglycerolaemic. The finding of the current study in relation to sICAM-1 is in general accordance with some previous studies^(2–5) and it can be concluded that some aspects of the inflammatory response are sensitive to modest-dose LC *n*-3 PUFA and that EPA+DHA may exert similar modest anti-inflammatory effects in middle-aged men and in the elderly. In summary, findings from the present study indicate that a dose of 2.3 g/d EPA+DHA is not sufficient to demonstrate maximal effects on CVD risk factors, including inflammatory markers, in fairly-healthy middle-aged men.

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