

Omega-3 Product Science – Fish Oil & Flax Seed Oil Abstracts

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Functional foods for cardiovascular disease in women.

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Cardiovascular disease (CVD) is the leading cause of death in women. Functional food consumption can play an important role in the prevention and treatment of CVD. The purpose of this review is to establish recommendations for the intake of functional food ingredients in a healthy diet, such as soy proteins and isoflavone, omega-3 fatty acids (FAs) from fish oils (FOs) including eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and plant sterols-(PS) enriched foods - for prevention and treatment of CVD in postmenopausal women. First, controversial results exist on CVD risk factors after intake of soy protein and isoflavone that indicates that further clinical studies need to be done to better understand their role in maintaining and improving cholesterol levels. However, since soy contains polyunsaturated fats, replacing some higher fat meat protein sources with soy products may contribute to cardiovascular health. Secondly, Fish Oils, including EPA and DHA, have shown promising effects for lowering triglyceride levels. In addition, emerging research appears to show that omega-3 FAs may have additional health effects with improved arterial health and a reduction in oxidative stress in postmenopausal women. Thirdly, foods and beverages supplemented with PS may reduce cholesterol; therefore, are a worthy addition to interventions aimed at lowering heart disease risk in women. Overall, incorporating functional foods into a healthy diet may be beneficial in helping to reduce lipids levels and thus the risk of CVD.

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Prescription omega-3 fatty acids and their lipid effects: physiologic mechanisms of action and clinical implications.

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Hypertriglyceridemia is a risk factor for atherosclerotic coronary heart disease. Very high triglyceride (TG) levels ($>$ or $=$ 500 mg/dl [5.65 mmol/l]) increase the risk of pancreatitis. One therapeutic option to lower TG levels is omega-3 fatty acids, which are derived from the oil of fish and other seafood. The American Heart Association has acknowledged that fish oils may decrease dysrhythmias, decrease sudden death, decrease the rate of atherosclerosis and slightly lower blood pressure, and has recommended fish consumption or fish oil supplementation as a therapeutic strategy to reduce cardiovascular disease. A prescription omega-3-acid ethyl esters (P-OM3) preparation has been available in many European nations for at least a decade, and was approved by the US FDA in 2004 to reduce very high TG levels ($>$ or $=$ 500 mg/dl [5.65 mmol/l]). Mechanistically, most evidence suggests that omega-3 fatty acids reduce the synthesis and secretion of very-low-density lipoprotein (VLDL) particles, and increase TG removal from VLDL and chylomicron particles through the up-regulation of enzymes, such as lipoprotein lipase. Omega-3 fatty acids differ mechanistically from other lipid-altering drugs, which helps to explain why therapies such as P-OM3 have complementary mechanisms of action and, thus, complementary lipid benefits when administered with statins. Additional human studies are needed to define more clearly the cellular and molecular basis for the TG-lowering effects of omega-3 fatty acids and their favorable cardiovascular effects, particularly in patients with hypertriglyceridemia.

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[Am J Cardiol.](#) 2006 Aug 21;98(4A):3i-18i. Epub 2006 May 30.

Dietary omega-3 fatty acid intake and cardiovascular risk.

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Dietary omega-3 fatty acids decrease the risk of cardiovascular disease (CVD). Both epidemiologic and interventional studies have demonstrated beneficial effects of omega-3 fatty acids on many CVD end points, including all CVD (defined as all coronary artery disease [CAD], fatal and nonfatal myocardial infarction [MI], and stroke combined), all CAD, fatal and nonfatal MI, stroke, sudden cardiac death, and all-cause mortality. Much of the evidence comes from studies with fish oil and fish; to a lesser extent, data relate to plant-derived omega-3 fatty acids. Cardioprotective benefits have been observed with daily consumption of as little as 25 to 57 g (approximately 1 to 2 oz) of fish high in omega-3 fatty acids, an intake

equivalent to ≥ 1 fish meal weekly or even monthly, with greater intakes decreasing risk further in a dose-dependent manner, up to about 5 servings per week. Fish, including farm-raised fish and their wild counterparts, are the major dietary sources of the longer-chain omega-3 fatty acids. Sources of plant-derived omega-3 fatty acids include flaxseed, flaxseed oil, walnuts, canola oil, and soybean oil. Because of the remarkable cardioprotective effects of omega-3 fatty acids, consumption of food sources that provide omega-3 fatty acids--especially the longer-chain fatty acids (≥ 20 carbons) from marine sources--should be increased in the diet to decrease CVD risk significantly.

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Dietary omega-3 Fatty acids and psychiatry: mood, behaviour, stress, depression, dementia and aging.

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In view of the high omega-3 poly unsaturated fatty acid content of the brain, it is evident that these fats are involved in brain biochemistry, physiology and functioning; and thus in some neuropsychiatric diseases and in the cognitive decline of ageing. Though omega-3 fatty acids (from fatty fish in the human diet) appear effective in the prevention of stress, their role as regulator of mood and of libido is a matter for discussion pending experimental proof in animal and human models. Dietary omega-3 fatty acids play a role in the prevention of some disorders including depression, as well as in dementia, particularly Alzheimer's disease. Their direct role in major depression, bipolar disorder (manic-depressive disease) and schizophrenia is not yet established. Their deficiency can prevent the renewal of membranes, and thus accelerate cerebral ageing; none the less, the respective roles of the vascular component on one hand (where the omega-3's are active) and the cerebral parenchyma itself on the other, have not yet been clearly resolved. The role of omega-3 in certain diseases such as dyslexia and autism is suggested. In fact, omega-3 fatty acids participated in the first coherent experimental demonstration of the effect of dietary substances (nutrients) on the structure and function of the brain. Experiments were first of all carried out on x-vivo cultured brain cells (1), then on in vivo brain cells(2), finally on physiochemical, biochemical, physiological, neurosensory, and behavioural parameters (3). These findings indicated that the nature of poly unsaturated fatty acids(in particular omega-3) present in formula milks for infants (both premature and term) determines the visual, cerebral, and intellectual abilities, as described in a recent review (4). Indeed, the insufficient dietary supply of omega-3 fatty acids in today's French and

occidental diet raises the problem of how to correct dietary habits so that the consumer will select foods that are genuinely rich in omega-3/ the omega-3 family; mainly rapeseed, (canola) and walnut oils on one hand and fatty fish on the other.

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Multi-targeted therapy of cancer by omega-3 fatty acids.

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Omega-3 (n-3) and omega-6 (n-6) polyunsaturated fatty acids (PUFAs) are essential fatty acids necessary for human health. Currently, the Western diet contains a disproportionally high amount of n-6 PUFAs and low amount of n-3 PUFAs, and the resulting high n-6/n-3 ratio is thought to contribute to cardiovascular disease, inflammation, and cancer. Studies in human populations have linked high consumption of fish or fish oil to reduced risk of colon, prostate, and breast cancer, although other studies failed to find a significant association. Nonetheless, the available epidemiological evidence, combined with the demonstrated effects of n-3 PUFAs on cancer in animal and cell culture models, has motivated the development of clinical interventions using n-3 PUFAs in the prevention and treatment of cancer, as well as for nutritional support of cancer patients to reduce weight loss and modulate the immune system. In this review, we discuss the rationale for using long-chain n-3 PUFAs in cancer prevention and treatment and the challenges that such approaches pose in the design of clinical trials.

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