

Abstract

J Nutr Biochem. 2008 Jul;19(7):417-37.

Modulation of enzymatic activities by n-3 polyunsaturated fatty acids to support cardiovascular health.

Siddiqui RA, Harvey KA, Zaloga GP.

Cellular Biochemistry Laboratory, Methodist Research Institute, Clarian Health, Indianapolis, IN 46202, USA; Department of Medicine, Indiana University School of Medicine, Indianapolis, IN 46202, USA.

BACKGROUND: Epidemiological evidence from Greenland Eskimos and Japanese fishing villages suggests that eating fish oil and marine animals can prevent coronary heart disease. Dietary studies from various laboratories have similarly indicated that regular fish oil intake affects several humoral and cellular factors involved in atherogenesis and may prevent atherosclerosis, arrhythmia, thrombosis, cardiac hypertrophy and sudden cardiac death. The beneficial effects of fish oil are attributed to their n-3 polyunsaturated fatty acid (PUFA; also known as omega-3 fatty acids) content, particularly eicosapentaenoic acid (EPA; 20:5, n-3) and docosahexaenoic acid (DHA; 22:6, n-3).

DISCUSSION: Dietary supplementation of DHA and EPA influences the fatty acid composition of plasma phospholipids that, in turn, may affect cardiac cell functions in vivo. Recent studies have demonstrated that long-chain omega-3 fatty acids may exert beneficial effects by affecting a wide variety of cellular signaling mechanisms. Pathways involved in calcium homeostasis in the heart may be of particular importance. L-type calcium channels, the Na(+)-Ca(2+) exchanger and mobilization of calcium from intracellular stores are the most obvious key signaling pathways affecting the cardiovascular system; however, recent studies now suggest that other signaling pathways involving activation of phospholipases, synthesis of eicosanoids, regulation of receptor-associated enzymes and protein kinases also play very important roles in mediating n-3 PUFA effects on cardiovascular health.

SUMMARY: This review is therefore focused on the molecular targets and signaling pathways that are regulated by n-3 PUFAs in relation to their cardioprotective effects.

PMID: 17904342

