

# Abstract

Pharmacol Res. 2007 Mar;55(3):217-23.

## Omega-3 fatty acids and cardiovascular disease: a case for omega-3 index as a new risk factor.

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**BACKGROUND:** The omega-3 fatty acids (FAs) found in fish and fish oils (eicosapentaenoic and docosahexaenoic acids, EPA and DHA) have been reported to have a variety of beneficial effects in cardiovascular diseases. Ecological and prospective cohort studies as well as randomized, controlled trials have supported the view that the effects of these FAs are clinically relevant.

**DISCUSSION:** They operate via several mechanisms, all beginning with the incorporation of EPA and DHA into cell membranes. From here, these omega-3 FA alter membrane physical characteristics and the activity of membrane-bound proteins, and once released by intracellular phospholipases, can interact with ion channels, be converted into a wide variety of bioactive eicosanoids, and serve as ligands for several nuclear transcription factors thereby altering gene expression. In as much as blood levels are a strong reflection of dietary intake, it is proposed that an omega-3 FA biomarker, the omega-3 index (erythrocyte EPA+DHA) be considered at least a marker, if not a risk factor, for coronary heart disease, especially sudden cardiac death.

**CONCLUSIONS:** The omega-3 index fulfils many of the requirements for a risk factor including consistent epidemiological evidence, a plausible mechanism of action, a reproducible assay, independence from classical risk factors, modifiability, and most importantly, the demonstration that raising tissue levels will reduce risk for cardiac events. For these and a number of other reasons, the omega-3 index compares very favourably with other risk factors for sudden cardiac death.

PMID: 17324586

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