Abstract

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Myocardial membrane fatty acids and the antiarrhythmic actions of dietary fish oil in animal models.

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BACKGROUND: Epidemiologic studies, animal studies, and more recently, clinical intervention trials all suggest a role for regular intake of dietary fish oil in reducing cardiovascular morbidity and mortality. Prevention of cardiac arrhythmias and sudden death is demonstrable at fish or fish oil intakes that have little or no effect on blood pressure or plasma lipids.

RESULTS AND OBSERVATIONS: In animals, dietary intake of fish oil [containing both eicosapentaenoic acid (EPA, 20:5n-3) and docosahexaenoic acid (DHA, 22:6n-3)] selectively increases myocardial membrane phospholipid content of DHA, whereas low dose consumption of purified fatty acids shows antiarrhythmic effects of DHA but not EPA. Ventricular fibrillation induced under many conditions, including ischemia, reperfusion, and electrical stimulation, and even arrhythmias induced in vitro with no circulating fatty acids are prevented by prior dietary consumption of fish oil.

CONCLUSION: The preferential accumulation of DHA in myocardial cell membranes, its association with arrhythmia prevention, and the selective ability of pure DHA to prevent ventricular fibrillation all point to DHA as the active component of fish oil. The antiarrhythmic effect of dietary fish oil appears to depend on the accumulation of DHA in myocardial cell membranes.

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