

ORIGINAL RESEARCH COMMUNICATION

Effects of fish-oil supplementation on myocardial fatty acids in humans^{1,2,3}

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Background: Increased fish or fish-oil consumption is associated with reduced risk of cardiac mortality, especially sudden death. This benefit putatively arises from the incorporation of the long-chain n-3 fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) into cardiomyocyte phospholipids.

Objective: The study examined the kinetics of incorporation of n-3 fatty acids into human myocardial membrane phospholipids during supplementation with fish oil and α -linolenic acid-rich flaxseed oil.

Design: Patients with low self-reported fish intake (<1 fish meal/wk and no oil supplements) accepted for elective cardiac surgery involving cardiopulmonary bypass were randomly allocated to 1 of 6 groups: no supplement; fish oil (6 g EPA+DHA/d) for either 7, 14, or 21 d before surgery; flaxseed oil; or olive oil (both 10 mL/d for 21 d before surgery). Right atrial appendage tissue removed during surgery and blood collected at enrollment and before surgery were analyzed for phospholipid fatty acids.

Results: Surgery rescheduling resulted in a range of treatment times from 7 to 118 d. In the fish-oil-treated subjects, accumulation of EPA and DHA in the right atrium was curvilinear with time and reached a maximum at \approx 30 d of treatment and displaced mainly arachidonic acid. Flaxseed oil supplementation yielded a small increase in atrial EPA but not DHA, whereas olive oil did not significantly change atrial n-3 fatty acids.

Conclusion: The results of the present study show that dietary n-3 fatty acids are rapidly incorporated into human myocardial phospholipids at the expense of arachidonic acid during high-dose fish-oil supplementation.

Key Words: Fish oils • fatty acids • n-3 fatty acids • dietary fats • myocardium • humans

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