Abstract


Omega-3 fatty acid supplements in women at high risk of breast cancer have dose-dependent effects on breast adipose tissue fatty acid composition.

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BACKGROUND: Preclinical evidence of the preventive benefits of omega-3 (n-3) polyunsaturated fatty acids (PUFAs) in breast cancer continues to fuel interest in the potential role of dietary fat content in reducing breast cancer risk. The dose of fish-oil/omega-3 PUFAs needed to achieve maximal target tissue effects for breast cancer prevention remains undefined.

OBJECTIVE: To determine the dose effects of omega-3 fatty acids on breast adipose tissue fatty acid profiles, we conducted a study of 4 doses of omega-3 PUFAs in women at high risk of breast cancer.

DESIGN: In this 6-mo randomized open-label study, 48 women with increased breast cancer risk received 1, 3, 6, or 9 capsules/d of an omega-3 PUFA supplement that provided 0.84, 2.52, 5.04, and 7.56 g docosahexaenoic acid (DHA) + eicosapentaenoic acid (EPA) daily, respectively. Subjects made monthly visits, at which time pill counts were made and fasting blood samples were collected to determine fatty acid profiles; anthropometric measurements were made, breast adipose tissue samples were collected, and laboratory tests of toxicity (alanine aminotransferase, LDL cholesterol, and platelet function) were made at baseline and at 3 and 6 mo.

RESULTS: All doses led to increased serum and breast adipose tissue EPA and DHA concentrations, but the response to 0.84 g DHA+EPA/d was less than the maximum possible response with > or = 2.52 g/d. Body mass index attenuated the dose response for serum tissue DHA and EPA (P = 0.015 and 0.027, respectively) and breast adipose tissue DHA (P = 0.0022) in all of the treatment groups. The incremental increase in DHA and EPA correlated inversely with baseline fat and serum values. Compliance over 6 mo was 92.9 +/- 9.2% and was unaffected by treatment arm. No severe or serious toxicities were reported.

CONCLUSIONS: Daily doses up to 7.56 g DHA+EPA were well tolerated with excellent compliance in this cohort at high risk of breast cancer. Body mass index and baseline fatty acid concentrations modulated the dose-response effects of omega-3 PUFA supplements on serum EPA and DHA and breast adipose tissue DHA.

PMID: 20335550