

Abstract

Am J Clin Nutr. 2010 May;91(5):1185-94.

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

Yee LD, Lester JL, Cole RM, Richardson JR, Hsu JC, Li Y, Lehman A, Belury MA, Clinton SK.

Department of Surgery, The Ohio State University, Columbus, OH, USA.

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 ≥ 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 $92.9 \pm 9.2\%$ 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