

# Breast Cancer: Protection With Omega-3 Fats, Vitamin E, Beta-Carotene, and Dietary Fiber

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by James Meschino, DC, MS

Two recent studies published in the *International Journal of Nutrition and Cancer (IJCN)* provide further evidence that higher intake of omega-3-fats, vitamin E, beta-carotene and dietary fiber can help reduce the risk of breast cancer.

Previous evidence suggests that as much as 50 percent of breast cancer cases are attributable to faulty dietary behaviors. Which nutrients are protective and which dietary agents are causing the problem is not yet conclusive. However, a wealth of research implicates certain nutrients in the prevention or development of this disease. In the recent study involving 282 Mexican women (141 cases and 141 control subjects), the researchers demonstrated that a high intake of polyunsaturated fat, vitamin E, dietary fiber and beta-carotene exerted a protective effect against breast cancer.<sup>1</sup>

Regarding polyunsaturated fats, the researchers indicated that the body of evidence suggests that omega-6-fats, such as arachidonic acid and linoleic acid, increase breast cancer risk, whereas omega-3-fats decrease breast cancer risk. These remarks are further supported by an animal-based research investigation published in the same issue of the *IJCN*. Research demonstrated the protective effect of fish oil, particularly the docosahexaenoic acid (DHA) fraction, in the prevention of breast cancer in rats exposed to a lethal breast-cancer-inducing carcinogen, N-methyl-N-nitrosourea (MNU).

Human epidemiological studies report that coastal- and rural-dwelling Japanese and Greenland Eskimos, who traditionally consume a large amount of omega-3-fats, have low breast cancer rates, compared to Americans. Other animal studies confirm that corn oil, rich in the omega-6 fat linoleic acid, increases breast cancer incidence, compared to a low-fat diet. Fish oil, on the other hand, has been shown to exert an inhibitory effect on experimental mammary carcinogenesis, compared with similar intake levels of corn oil. A number of studies, including this most recent one by Takashi, et al., show that the omega-3-fat found in fish oil (DHA) provides greater protection against breast cancer than does the other omega-3-fat found in fish oil, eicosapentaenoic acid (EPA). Both fats have been shown to inhibit breast cancer via several mechanisms, including increased expression of the tumor suppressor gene, p53, as well as direct and indirect inhibition of cancer cell growth, and production of prostaglandin series-3 hormones, which affect the fluidity of the cell membrane and slow cell division.

It is known that vitamin E may inhibit breast cancer by preventing oxidative damage to DNA by quenching free radicals, blocking the cytotoxic response associated with omega-6-fats, and slowing cellular proliferation via its effects on increasing transforming growth factor B, a cellular signaling agent that slows down the rate of cell division. The Mexican study showed a significant protective effect for higher intake levels of vitamin E in

postmenopausal women, which remained after adjustment for confounding variables, such as total caloric intake; reproductive factors; history of breast feeding; body mass index; family history of breast cancer; and vitamin A intake. A protective effect for vitamin E intake was also reported recently in the Nurses Health Study and an Italian retrospective study.

Experimental evidence shows that dietary fiber intake reduces blood levels of estrogens associated with a reduced risk of breast cancer. Dietary fiber has been shown to bind directly to nonconjugated estrogens in the small intestine, dragging them through the intestinal tract and out of the body via the fecal route. This prevents their reabsorption into the bloodstream from the intestinal tract. Fiber has also been shown to increase the secretion of sex hormone binding globulin (SHBG), which binds to estrogen in the bloodstream, reducing its uptake by breast cells. This, in turn, decreases overstimulation of breast cells by estrogens. The recent Mexican study supports the view that a higher intake of dietary fiber reduces the risk of breast cancer.

The Mexican study also showed that a higher intake of betacarotene was associated with a reduced risk of breast cancer. Carotenes protect lipid molecules and DNA against free radicals (oxidative stress); show anti-tumor activity; inhibit the proliferation of breast cancer cells in experimental studies; and suppress the production of insulin-like growth factor I, implicated as a biomarker in the future development of breast cancer.

It appears prudent to encourage female patients to consume more fish (and possibly fish and flaxseed oils high in omega-3-fats); eat less total fat; increase vitamin E and beta-carotene nutritional status via food selection (and possibly supplementation); and consume more fiber-rich foods daily.

### *References*

1. Bonilla-Fernandez P, et al. Nutritional factors and breast cancer in Mexico. *IJCN* 2003;45(2):148-155.
2. Takashi Y, et al. Dietary docosahex- aenoic acid suppresses N-methyl-N-nitrosourea-induced mammary carcinogenesis in rats more effectively than eicosapentaenoic acid. *IJCN* 2003;45(2): 211-217.

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