

INTRO: We've been recommending flax seed oil for everyone in the US for years and have estimated that it could prevent cancers in a large percentage of people. A study has come out validating that indeed omega 3 fatty acids protect against breast cancer. The way it works is interesting...

Certain genes boost fish oils' protection against breast cancer

USC study hints at new targets for killing cancer cells

LOS ANGELES (Sept. 21, 2004) - Researchers who found that **fish oils appear to reduce breast cancer risk** have now discovered that **the oils may especially benefit women with particular genetic makeups.**

The protective effects of fish oils, called marine n-3 or omega-3 fatty acids, are linked to the cancer-fighting properties of the oil's byproducts, propose investigators from the Keck School of Medicine of the University of Southern California and the National University of Singapore. The **study in Carcinogenesis** was published early online through the journal's Web site.

Moreover, researchers believe that **women whose bodies do a poor job of getting rid of the fish oils' byproducts are the ones who benefit most from consuming the oils.** That may help scientists better understand exactly how fish oils deter cancer.

"In this study, we found that women with certain common DNA patterns experienced more breast cancer protection from marine n-3 fatty acids than women with other common patterns," explained Manuela Gago-Dominguez, M.D., Ph.D., assistant professor of preventive medicine at the Keck School of Medicine of USC and the study's lead author.

Findings came from the Singapore Chinese Health Study, a **prospective investigation of diet and cancer risk in more than 63,000 Chinese men and women in Singapore.**

"Through this study, we have identified a novel gene-environmental interaction between certain genotypes and omega-3 fatty acids on breast cancer development," says Mimi C. Yu, Ph.D., professor of preventive medicine at the Keck School and principal investigator of the Singapore Chinese Health Study.

The researchers had already found that **among postmenopausal women in this group, those who ate the most n-3 fatty acids (from fish such as salmon and mackerel) were 34 percent less likely to be diagnosed with breast cancer than women who ate the least n-3 fatty acids from fish. They suspected that lipid peroxidation products-that is, substances produced when the fatty acids break down-were behind the protection.**

Gago-Dominguez explains that certain enzymes in the body known as **glutathione S-transferases (GSTs, for short) help the body flush out and get rid of these lipid peroxidation products.** Each person has certain genes that carry the recipe for making GST. But interestingly, these genes can be found in slightly different varieties-called polymorphisms-in the population. The differences between the genes can mean the difference between GST that clears substances efficiently out of the body and GST that works a little slower.

The researchers looked at the genetic makeup of study participants and grouped them according to which polymorphisms they had. They **found that postmenopausal women who had low-activity versions of genes associated with GSTs (known as GSTM1, GSTT1 and GSTP1) had a lower risk of breast cancer. Women with a combination of the lowest-activity forms of GSTM1 and GSTP1 had 64 percent lower risk of the cancer, and women with a combination of the lowest-activity forms of GSTT1 and GSTP1 had a 74 percent lower risk of the cancer.**

Among women with high-activity versions of GST-related genes, though, they saw no evidence that fish oils reduced breast cancer risk. That held true for both pre- and postmenopausal women.

Interestingly, **laboratory studies have shown that cancer growth is suppressed by n-3 fatty acid byproducts, and the suppression is enhanced by drugs that increase lipid peroxidation. When antioxidants are introduced to battle the effects of peroxidation, though, the cancer continues to grow.**

"Our findings may have practical implications in treatment and prevention strategies for breast cancer," says Gago-Dominguez. **"Marine n-3 fatty acids have been shown to enhance the cancer-killing effect of certain chemotherapy drugs and radiotherapy in experimental studies. Since these anti-cancer agents may act, at least in part, through similar oxidative mechanisms as n-3 fatty acids-which is why patients under chemotherapy are advised not to take antioxidant vitamin supplements-understanding the anti-cancer effect of marine n-3 fatty acids may be important to finding the mechanisms for killing cancer cells."**