Omega-3 Fatty Acids Important for Breast Health

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By CP Staff

The omega-3 fatty acids found in fish oil, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), inhibit the growth of breast cancer in animals, according to a new study. Researchers fed mice diets rich in either omega-3 (fish oil) or omega-6 (corn oil) fatty acids, then implanted breast cancer cells in the animals. Three weeks after implantation of breast cancer cells, the tumor volume and weight were significantly lower in mice fed the omega-3 diets compared to those fed the omega-6 diets. Within the tumors, dietary fish oil also caused a 40 percent increase in the activity of neutral sphingomyelinase (N-SMYase), an enzyme that promotes apoptosis (cell death) in cancer cells. The tumor tissues from fish oil-fed animals also expressed elevated levels of a gene called p21, whereas tumor tissues from corn oil-fed animals exhibited undetectable levels of p21 expression. p21 is important in the repair of cellular DNA and can stop the spread of cancer cells. In an in vitro experiment, the same researchers discovered that EPA and DHA inhibited the growth of cultured breast cancer cells in a dose-dependent manner by 20-25 percent. N-SMYase activity was also increased by 30-40 percent. Furthermore, in DHA- or EPA-treated cells, the study authors observed an increase in ceramide, a chemical that assists in metabolic pathways involved in cancer-cell death. DHA and EPA caused another advantageous event—the formation of blebs, protrusions on cancer cells that are associated with the cells’ death. The expression of p21 was also enhanced by the omega-3s in this cell culture experiment just as it was in the in vivo experiment. Many of the beneficial events thought to lead to cancer cell death were inhibited when the researchers treated the cells with the N-SMYase inhibitor GW4869. Treating the cells with the inhibitor also stopped the cancer cell death caused by the fish oil by approximately 40 percent. This indicated to the researchers that the mechanism by which fish oil inhibits breast cancer in animals and in cell culture is through the omega-3s ability to mediate activation of the apoptosis-controlling enzyme N-SMYase.