

Mechanisms of omega-3 fatty acid-induced growth inhibition analyzed

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Researchers analyzed the mechanisms of omega-3 fatty acid-induced growth inhibition in MDA-MB-231 human breast cancer cells.

According to a study from Canada, "The omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), inhibit the growth of human breast cancer cells in animal models and cell lines, but the mechanism by which this occurs is not well understood. In order to explore possible mechanisms for the modulation of breast cancer cell growth by omega-3 fatty acids, we examined the effects of EPA and DHA on the human breast cancer cell line MDA-MB-231."

"Omega-3 fatty acids (a combination of EPA and DHA) inhibited the growth of MDA-MB-231 cells by 30-40% ($p < .05$) in both the presence and absence of linoleic acid, an essential omega-6 fatty acid. When provided individually, DHA was more potent than EPA in inhibiting the growth of MDA-MB-231 cells ($p < .05$)," explained P.D. Schley and colleagues, University of Alberta.

"EPA and DHA treatment decreased tumor cell proliferation ($p < .05$), as estimated by decreased [methyl- 3 H]-thymidine uptake and expression of proliferation-associated proteins (proliferating cell nuclear antigen, PCNA, and proliferation-related kinase, PRK)."

"In addition," continued the investigators, "EPA and DHA induced apoptosis, as indicated by a loss of mitochondrial membrane potential, increased caspase activity and increased DNA fragmentation ($p < .05$). Cells incubated with omega-3 fatty acids demonstrated decreased Akt phosphorylation, as well as NF kappa B DNA binding activity ($p < .05$)."

The researchers concluded, "The results of this study indicate that omega-3 fatty acids decrease cell proliferation and induce apoptotic cell death in human breast cancer cells, possibly by decreasing signal transduction through the Akt/NF kappa B cell survival pathway."

Schley and colleagues published their study in *Breast Cancer Research and Treatment* (Mechanisms of omega-3 fatty acid-induced growth inhibition in MDA-MB-231 human breast cancer cells. *Breast Cancer Res Treat*, 2005;92(2):187-195).

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