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Nutritional intervention with omega-3 fatty acids enhances tumor response to anti-neoplastic agents.

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Abstract

Nutritional intervention with specific fatty acids depresses tumor growth and enhances tumor responsiveness to chemotherapy. Supplementation of tumors with long chained omega-3 polyunsaturated fatty acids results in enrichment of tumor phospholipid fractions with omega-3 fatty acids resulting in an altered membrane composition and function. Tumors enriched with long chained omega-3 polyunsaturated fatty acids possess membranes with increased fluidity, an elevated unsaturation index, enhanced transport capabilities that results in accumulation of selective anti-cancer agents, increased activity of selected drug activating enzymes, and alteration of signaling pathways important for cancer progression. These nutritionally induced changes in tumor fatty acid composition result in increased sensitivity to chemotherapy, especially in tumor lines that are resistant to chemotherapy and cause specific enhancement of cytotoxicity to tumor cells and protection of normal cells. Pre-disposing tumors to increased chemo-sensitivity through nutritional intervention with specific fatty acids has the potential to improve patient response to chemotherapy with fewer untoward side effects if these pre-clinical findings carry over into a clinical setting.

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