Diets rich in fish oil could slow the spread and growth of breast cancer cells

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Omega-3 fatty acids, such as those typically contained in fish oil, may suppress the growth and spread of breast cancer cells in mice. This is according to a new study in the journal *Clinical & Experimental Metastasis*, which is published under the Springer imprint. According to lead author, Saraswoti Khadge of the University of Nebraska Medical Centre in the US, fatty acids stopped further delayed tumors from forming, and blocked the cancerous cells from spreading to other organs in mice. The researchers speculate that this might be because of the way in which omega-3 fatty acids support the body's immune and anti-inflammatory systems.

Two groups of adult female mice were fed a liquid diet for which the calorie count and percentage of fat that each contained were the same. The notable difference was that one diet contained plant oils rich in omega-6 polyunsaturated fats, and the other diet contained fish oil rich in omega-3 fatty acids. The mice were then injected with 4T1 breast cancer cells that cause aggressive tumors to develop in the breast. These cells are known to spread spontaneously to other parts of the body, such as bones, the lungs and liver, but less frequently to the heart, kidneys and ovaries. The mice were autopsied and studied 35 days after the breast cancer cells were injected.

Khadge and her colleagues found the chance that the breast cancer cells would take hold in the breast glands of the adult female mice was significantly lower in those on the omega 3-diet. Tumors took significantly longer to start developing in these mice, and this had an

influence on their size. After 35 days, the tumors detected in their breasts were 50 per cent smaller than those that developed in the omega 6-group. The likelihood of the cancerous cells growing and spreading to other organs in the omega-3 group was also lower and these mice survived longer than those on the omega-6 diet. Indeed some of the omega-3 fed mice appeared to never develop breast cancer.

More T-cells were found in the tissue of the mice in the omega-3 group than in the omega-6 group, and these correlated with dying tumor cells. This is important because T-cells are white blood cells that play a role in strengthening the immune system against tumors. The mice fed an omega-3 diet also had less inflammation. According to Khadge this could mean that a diet rich in omega-3 fatty acids helps to suppress the type of inflammation that can trigger the rapid development and spread of tumors as well as promote T-cell responses to tumors.

"Our study emphasizes the potential therapeutic role of dietary long-chain omega-3 fatty acids in the control of tumor growth and metastasis," explains Khadge, who emphasizes that this does not mean that an omega-3 diet could summarily prevent breast cancer tumors from forming altogether.

This study is based on dietary consumption during adult life. Its findings are in line with previous studies that showed how eating fish oil based diets during pregnancy and as a child markedly suppresses the development and spread of breast cancer.

More information: Saraswoti Khadge et al, Long-chain omega-3 polyunsaturated fatty acids decrease mammary tumor growth, multiorgan metastasis and enhance survival, *Clinical & Experimental Metastasis* (2018). DOI: 10.1007/s10585-018-9941-7

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