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Docosahexaenoic acid as an anti-proliferative and anti-invasive agent in breast cancer cells

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Docosahexaenoic acid (DHA), the main member of the Omega-3 essential fatty acid family, is highly present in microalgae such as *Phaeodactylum tricornutum*. The general goal of our studies is to demonstrate the benefic of microalgae as food supplement for human health, including diabetes, obesity, dyslipidemia and cancer. Breast cancer is the most common women cancer in industrialized countries and environmental factors, such as differences in diet are likely to have an important influence on cancer emergence. Although widely studied, the effect of DHA on breast cancer development is unclear and the cellular mechanisms involved remain largely unknown. Our first study show that DHA incorporation in MDA-MB-231 breast cancer cell line has an anti-proliferative effect, induces apoptosis via a transient increase in caspase-3 activity and the promotion of nuclear

condensation, and reduces the invasive potential of MDA-MB-231 cells. In a second part, a proteomic approach was used to investigate changes in protein expression induced by DHA. This show the upregulation of Keratin, type II cytoskeletal 1 (KRT1), catalase and lamin-A/C. Furthermore, siRNA against KRT1 were able to reverse the DHA-induced inhibition of cell invasion. Finally a transcriptomic analysis confirms that DHA treatment of MDA-MB-231 cells affect lipid metabolism, apoptosis pathway and invasion/migration pathway. The fine analysis of RNAseq results is currently underway. In conclusion DHA may have beneficial effects as a result of slowing the proliferation of tumor cells, and minimizing their metastatic potential and appear as a potential adjuvant to conventional cancer therapy.

Biography

Chenais B is currently leading his career as a Professor in Molecular Genetics and Biochemistry in Le Mans University, France, since February 2005. He has completed his PhD from Paris-XI University as a fellow of the French National League against Cancer. Working as an assistant professor at the School of Pharmacy of Reims University from 1994 to 2005, he studied leukemia cell differentiation pathways. He has published more than 50 papers in reputed journals and has been serving as an editorial board member of several publications such as Gene, Oncology reports, and Open Journal of Genetics.

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