Elovl2 and PUFA Synthesis is Controlled by ERα

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The polyunsaturated fatty acids (PUFA) have been proposed to have a beneficial impact on human health. Among these, the polyunsaturated fatty acid (PUFA) DHA (22:6 (n-3)) has been shown to have potential advantageous effects for treating breast cancer at a molecular level. DHA is an omega-3 acid that is endogenously obtained from a process of fatty acid elongation and desaturation from the essential FA precursor ALA (α-linolenic acid). The key enzymes performing this function are ELOVL (Elongation of very long chain fatty acids) proteins, namely the ELOVL 5 and ELOVL2 and the desaturases, (which introduce a carbon double bond) FADS2 and FADS1. In the context of proliferative action of DHA and breast cancer, we are interested in weather endogenous synthesis of DHA is modified by the induction of ERα.

To verify the hypothesis, the relative expression of Elovl2 transcript in ERα-ablated mice compared to wild type was examined. Our results show that in uterus there indeed is a down regulation of Elovl2 in the ERα ko mice.

Preliminary studies in the MCF7 cell line shows that the ERα agonist PPT induces Elovl2 expression and that the ERα antagonist ICI 182,780 reduces it. In primary hepatic culture from wild type mice the same could be seen. Unravelling the molecular mechanisms of PUFA metabolism associated to breast cancer progression could elucidate potential molecular targets for drug therapy.