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Effect of dietary GLA+/-tamoxifen on the growth, ER expression and fatty acid profile of ER positive human breast cancer xenografts.

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Abstract

Gamma linolenic acid (GLA) possesses a number of selective anti-tumour properties including modulation of steroid receptor structure and function. We have investigated the effect of dietary GLA on the growth, oestrogen receptor (ER) expression and fatty acid profile of ER+ve human breast cancer xenografts. Experimental diets A, B, C, D were commenced after subcutaneous implantation of 40 female nude mice with the MCF-7 B1M cell line (Group A = control diet: B = control diet + GLA supplement: C = control diet + tamoxifen: D = control diet + GLA + tamoxifen; 10 mice/group). The mice were terminated when tumour cross-sectional area reached 250 mm². ER H-scores were assessed by immunohistochemical assay and fatty acid profiles by gas-liquid chromatography of termination tumour samples. Groups C and D displayed significantly slower tumour growth ($p = .0002$, $p = .0006$) with trend for slower growth in B ($p = .065$) compared to control Group A. ER was significantly reduced in all groups compared to A ($p < .0001$) with Group D (combined therapy) displaying markedly lower ER expression than with either therapy alone ($p = .0002$). There were significantly raised levels of tumour GLA and metabolites in the two groups (B and D) receiving GLA ($p < .0001$). This xenograft model of ER+ve breast cancer has demonstrated significantly lower tumour ER expression in those groups receiving GLA, an effect which appears to be additive to the reduced ER expression resulting from tamoxifen alone. The effects of GLA on ER function and the possibility of synergistic inhibitory action of GLA with tamoxifen via enhanced down-regulation of the ER pathway require further investigation.

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