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Gamma-linolenic acid (GLA) is cytotoxic to 36B10 malignant rat astrocytoma cells but not to 'normal' rat astrocytes.

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Abstract

This study compares the effect of gamma-linolenic acid (GLA) and its precursor linoleic acid (LA) on survival of 36B10 malignant rat astrocytoma cells and 'normal' rat astrocytes. GLA was cytotoxic to 36B10 cells but not to astrocytes. By contrast, LA supplementation did not affect the survival of either cell types. There were minor differences in the uptake, distribution and use of radiolabelled GLA and LA by the 36B10 cells and astrocytes. GLA and LA supplementation increased the total polyunsaturated fatty acid (PUFA) content of the cells indicating increased oxidative potential. However, elevated levels of 8-isoprostane, an indicator of increased oxidative stress, were only observed in the GLA supplemented 36B10 cells. Addition of the antioxidant trolox to GLA-enriched 36B10 cells blocked the cytotoxic effect. Further, GLA enhanced the radiation sensitivity of the astrocytoma cells but not the astrocytes; trolox blocked the GLA-mediated increase in astrocytoma cell radiosensitivity. LA did not affect the radiation response of either cell type. While cyclooxygenase inhibitors did not affect GLA cytotoxicity, they blocked the enhanced radiation response of GLA-supplemented cells. The lipoxygenase inhibitor NDGA did not affect the toxicity produced by GLA. Thus, GLA is toxic to the neoplastic astrocytoma cells but not to normal astrocytes.

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