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Inhibition of angiogenic factor- and tumour-induced angiogenesis by gamma linolenic acid.

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Abstract

Angiogenesis, the formation of new blood vessels, is an essential feature of malignant tumour development. Gamma linolenic acid (GLA), a n-6 polyunsaturated fatty acid (PUFA), inhibits the growth and metastasis of a variety of tumour cells, including breast, prostate, pancreatic cancer and hepatoma cells and also has anti-metastatic effects on endothelial cells. In the current study, we tested whether GLA inhibited angiogenesis induced by tumour cells. A rat aortic ring assay and in vitro tube formation of human vascular endothelial cells were used to determine angiogenesis (spontaneous, angiogenic factor- and tumour cells-induced). Inclusion of GLA in this 3-D matrix culture system significantly inhibited angiogenesis from aortic rings in a concentration-dependent manner. The results from tube formation of vascular endothelial cell further confirmed that GLA suppressed angiogenesis. Furthermore, in the cell motility assay (phagokinetic assay and endothelial wounding assay), a significant reduction of the motility of vascular endothelial cells by GLA was seen. It is concluded that gamma linolenic acid inhibits angiogenic factor and tumour-induced angiogenesis in vitro at least in part via its inhibitory effect on the motility of vascular endothelial cells.

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