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The nontoxic natural compound Curcumin exerts anti-proliferative, anti-migratory, and anti-invasive properties against malignant gliomas.

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Abstract

ABSTRACT:

BACKGROUND: New drugs are constantly sought after to improve the survival of patients with malignant gliomas. The ideal substance would selectively target tumor cells without eliciting toxic side effects. Here, we report on the anti-proliferative, anti-migratory, and anti-invasive properties of the natural, nontoxic compound Curcumin observed in five human glioblastoma (GBM) cell lines in vitro.

METHODS: We used monolayer wound healing assays, modified Boyden chamber trans-well assays, and cell growth assays to quantify cell migration, invasion, and proliferation in the absence or presence of Curcumin at various concentrations. Levels of the transcription factor phospho-STAT3, a potential target of Curcumin, were determined by sandwich-ELISA. Subsequent effects on transcription of genes regulating the cell cycle were analyzed by quantitative real-time PCR. Effects on apoptosis were determined by caspase assays.

RESULTS: Curcumin potently inhibited GBM cell proliferation as well as migration and invasion in all cell lines contingent on dose. Simultaneously, levels of the biologically active phospho-STAT3 were decreased and correlated with reduced transcription of the cell cycle regulating gene c-Myc and proliferation marking Ki-67, pointing to a potential mechanism by which Curcumin slows tumor growth.

CONCLUSIONS: Curcumin is part of the diet of millions of people every day and is without known toxic side effects. Our data show that Curcumin bears anti-proliferative, anti-migratory, and anti-invasive properties against GBM cells in vitro. These results warrant further in vivo analyses and indicate a potential role of Curcumin in the treatment of malignant gliomas.

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