The Curry Spice Curcumin Selectively Inhibits Cancer Cells Growth \textit{In Vitro} and in Pre-Clinical Model of Glioblastoma.

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\textbf{Introduction:} Current literature has shown that the natural compound curcumin inhibits cell growth in a variety of cancer cells in vitro. However, the in vivo efficacy of curcumin in gliomas, a common and aggressive type of brain cancer, remains non-established. \textbf{Objectives:} the aim of this work was to evaluate apoptosis, selectivity, efficacy and safety of curcumin from in vitro (U138MG, U87, U373 and C6 cells) and in vivo (C6 implants) models of gliomas. \textbf{Methods:} In vitro, MTT, flow cytometry and caspases activation were assessed to estimate cell viability; JC-1 assay for determination of mitochondrial function; Western blotting was performed for analysis of bcl-xL, NFkappaB-p65 and p-Akt/Akt. In vivo, C6 glioma-implanted rats were treated with curcumin or vehicle, and tumor size, histopathological parameters and tissue toxicity were determined by histochemistry. \textbf{Results:} In vitro, curcumin inhibited proliferation, migration and induced cell death in liquid and soft-agar growing gliomas. Curcumin did not affect viability of primary astrocytes, suggesting selectivity to cancerous cells. In U138MG and C6 cells, curcumin decreased the constitutive activation of PI3K/Akt and NFkappaB pathways, downregulated the NFkappaB-regulated protein bcl-xl, and induced mitochondrial dysfunction. Cells developed an early G2/M arrest followed by sub-G1, apoptotic bodies’ formation and caspase-3 activation. Curcumin also enhanced the antiglioma effect of the chemotherapeutics cisplatin and doxorubicin. In vivo, curcumin (50 mg.Kg\(^{-1}\).d\(^{-1}\) i.p.) decreased brain tumors in 9/11 animals against 0/11 in the vehicle-treated group. None evidence of tissue toxicity was detected. \textbf{Conclusions:} Data presented here are provocative for further testing curcumin efficacy in human gliomas. \textbf{Keywords:} Curcumin, glioblastoma, apoptosis, in vitro, pre-clinical.