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Curcumin Blocks Brain Tumor Formation.

[Purkayastha S](#), [Berliner A](#), [Fernando SS](#), [Ranasinghe B](#), [Ray I](#), [Tariq H](#), [Banerjee P](#).

Department of Chemistry; The College of Staten Island (CUNY), Staten Island, NY 10314; The CSI/IBR Center for Developmental Neuroscience; The College of Staten Island (CUNY), Staten Island, NY 10314.

Turmeric, an essential ingredient of culinary preparations of southeast Asia, contains a major polyphenolic compound, named curcumin or diferuloylmethane, which eliminates cancer cells derived from a variety of peripheral tissues. Although in vitro experiments have addressed its anti-tumor property, no in vivo studies have explored its anti-cancer activity in the brain. Oral delivery of this food component has been less effective because of its low solubility in water. We show that a soluble formulation of curcumin crosses the blood-brain barrier but does not suppress normal brain cell viability. Furthermore, tail vein injection, or more effectively, intracerebral injection through a cannula, blocks brain tumor formation in mice that had already received an intracerebral bolus of mouse melanoma cells (B16F10). While exploring the mechanism of its action in vitro we observed that the solubilized curcumin causes activation of proapoptotic enzymes caspase 3/7 in human oligodendroglioma (HOG) and lung carcinoma (A549) cells, and mouse tumor cells N18 (neuroblastoma), GL261 (glioma), and B16F10. A simultaneous decrease in cell viability is also revealed by MTT [3-(4, 5-dimethylthiazolyl-2)-2, 5-diphenyltetrazolium bromide] assays. Further examination of the B16F10 cells showed that curcumin effectively suppresses Cyclin D1, P-NF-kB, Bcl(XL), P-Akt, and VEGF, which explains its efficacy in blocking proliferation, survival, and invasion of the B16F10 cells in the brain. Taken together, solubilized curcumin effectively blocks brain tumor formation and also eliminates brain tumor cells. Therefore, judicious application of such injectable formulations of curcumin could be developed into a safe therapeutic strategy for treating brain tumors.

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