

# WORLD DRUG DELIVERY AND NOVEL THERAPY SUMMIT

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#### Comparative study of effects of natural Curcumin and solid lipid curcumin particles on cell death and autophagy mechanism in cultured glioblastoma cells

Despite significant advancements in cancer therapies over the years, glioblastoma (GBM) remains largely incurable. Curcumin (Cur), a natural polyphenol, has potent anti-cancer effects against several malignancies, including metastatic brain tumors. However, its limited bio-availability reduces its efficiency for treating GBM. Recently, we have shown that solid lipid curcumin particles (SLCPs) have greater bio-availability and brain tissue penetration. The present study compares the efficiency of cell death by Cur and or SLCPs in cultured GBM cells derived from human (U-87MG) and mouse (GL261) or rat (F98) tissue. Several cell viability and cell death assays and markers proteins (MTT assay, annexin-V staining, TUNEL staining, comet assay, DNA gel electrophoresis, Western blot) and autophagy markers were investigated following treatment of Cur and or SLCP (25 μM) for 24-72 h. Relative to Cur, the use of SLCP increased more cell death, DNA fragmentation, produced longer DNA tails. Whereas, macroautophagy markers, such as Atg5, Atg7, Beclin-1, LC3A/B, mTOR, p-mTOR, as well as mitochondrial autophagy (mitophagy) markers, such as BNIP3/NIX, FUNDC1 and HIF-1α were inhibited by Cur and

or SLCP. Furthermore, we found a greater inhibition of these markers in the case of SLCP-treated cells in comparison to Cur-treated cells. We did not find such inhibition in the case of control glial (C6-glioma) and neuronal cell line (N2a). Overall, our result suggests that SLCP can be used to inhibit GBM growth and proliferation more than natural Cur via inhibiting autophagy mechanism.



Fig 1: Schematic diagram showing mechanism of inhibition of autophagy and induction of cell death in glioblastoma cells in vitro after treatment with curcumin and or solid lipid curcumin particles

#### Biography

Panchanan Maiti has completed his PhD from Defence Research and Development Organization, Ministry of Defence, Govt of India under Bharathiar University and Postdoctoral Studies from Dept. of Neurology and Dept. of Medicine, University of California at Los Angeles, CA, USA. Currently, he is the chief research scientist of Field Neurosciences Institute, St. Mary's of Michigan, and also hold adjunct faculty positions at Psychology, Neuroscience program, Central Michigan University, Dept. of Biology, Saginaw Valley State University and Laboratory instructor, brain research laboratory at Saginaw Valley State University, MI, USA. He has published more than 43 papers in reputed journals and has been serving as an editorial board member of several reputed journals.

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