

Aqueous ethanolic extract of *Tinospora cordifolia* as a potential candidate for differentiation based therapy of glioblastomas

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Glioblastomas are the most aggressive primary brain tumors and their heterogeneity and complexity often renders them non responsive to various conventional treatments. Search for herbal products having potential anti-cancer activity is an active area of research in the Indian traditional system of medicine i.e., Ayurveda. *Tinospora cordifolia*, is used in various ayurvedic decoctions as panacea to treat several body ailments. The current study investigated the anti-brain cancer potential of 50% ethanolic extract of *Tinospora cordifolia* (TCE) using C6 glioma cells. Using immunocytochemistry, western blotting, quantitative Real time PCR analysis and morphometric analysis, we observed that TCE significantly reduced cell proliferation in dose dependant manner and induced differentiation in C6 glioma cells as well as enhanced expression of senescence marker, mortalin and its translocation from perinuclear to pancytoplasmic spaces. Further, TCE showed anti-migratory potential as depicted by wound scratch assay along with reduced expression of plasticity markers, NCAM and PSA-NCAM and downregulation of MMP2 and MMP9. On analysis of the cell cycle and apoptotic markers, TCE treatment was seen to arrest the C6 cells in G0/G1 and G2/M phase, suppressed expression of G1/S phase specific protein cyclin D1 and anti-apoptotic protein bcl-xl expression, thus further supporting its anti-proliferative and apoptosis inducing potential. Differentiation based therapies focus on the development of agents which cause terminal differentiation of cancer cells thus leading to the eventual elimination of tumorigenic cells and regain normal cellular homeostasis. Present study provides the first evidence for the presence of anti-proliferative, differentiation-inducing and anti-migratory/anti-metastatic potential in TCE against glioma cells and the possible signaling pathways.

Biography

Gurcharan Kaur has completed her Ph.D. from Jawaharlal Nehru University and postdoctoral training from All India Institute of Medical Sciences, New Delhi, India. She has served in various capacities as Co-ordinator and Dean, Faculty of Life Sciences, Guru Nanak Dev University, Amritsar, India, a premier organization recognized as the 'University with Potential for Excellence' by University Grants Commission, India. She has published more than 65 research papers in reputed journals and serving as an editorial board member of repute. She has been elected fellow, Indian Academy of Neurosciences in the year 2011.

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