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Synergistic effect of curcumin on temozolomide inhibition of cancer stem cell-like properties and reduced chemoresistance of Glioblastoma C6

Ahmad R. Bassiouny and Amira Zaky
Alexandria University, Egypt

Glioblastoma multiforme (GBM) is a heterogeneous disease and most aggressive malignant primary brain tumor in Egypt, with poor prognosis. Epithelial–mesenchymal transition (EMT), a critical process of cancer invasion and metastasis, is associated with stemness property of cancer cells. Although Oct4, Sox2 and Nanog, three core regulatory factors essential to the self-renewal of stem cells and are expressed in several cancers, the role of *Oct4/Nanog* signaling in tumorigenesis is still elusive.

MicroRNAs (miRNAs), are highly conserved small RNA molecules, which serve as master regulators of gene expression and have potential as a therapeutic strategy against cancer. However, the role of miRNAs in GBM-associated cancer stem cells (CSCs) remains mostly unclear. Our aim is to investigate whether Oct4, Sox2 and Nanog, are coexpressed in human gliomas, and whether their expression might be linked to carcinogenesis and the formation of CSCs. In this study, real-time PCR was employed to measure the expression level of miR-145 & 10 in rat C6 glioma cells. Using curcumin as a therapeutic-adjuvant when used in combination with Temozolomide, it significantly inhibited their tumorigenic and CSC-like abilities and facilitated their differentiation into CD133(-)-non-CSCs and redeemed miR-145 normal level. It showed a parallel, elevated expression of *Oct4* and *Nanog* in GBM that the expression of miR145 (a tumor-suppressive miRNA) is inversely correlated with the levels of Oct4 and Sox2 in GBM-CD133 (+) cells. We showed that silencing of miRNA-10b by curcumin treatment or by siRNA mediated knockdown experiments in cells resembling the mesenchymal subtype of GBM reduces its growth, and invasion while promoting apoptosis *in vitro*.

Biography

Ahmad Bassiouny has completed his PhD from University of Nebraska Medical Center, USA and postdoctoral studies from Max-Plank Institute, Germany. He is a full professor of Molecular Therapeutics. He is the PI of GESP Grant with Professor Detlef Gabel, University of Bremen, Germany: Targeting cancer stem cells by triggering liposomal drug release with boron cluster compounds. April 2011-April 2013. He is also the principal investigator of national grant from STDF project # 513: Cellular and molecular mechanisms controlling spinal cord regeneration after lesion in mammals and amphibians; the two extremes of the regenerative capacity and the impact of pain on neural networks plasticity, Egypt and Co-PI of STDF project ID: 4237: "Study on possible APE1-mediated molecular mechanism(s) implication in neuroinflammation". He has been chosen to be included in the special 30th Pearl Anniversary Edition of Who's Who in the World, 2013.

arbassiouny@yahoo.com