François M. Vallette, J Cancer Sci Ther, 3:7
doi: http://dx.doi.org/10.4172/1948-5956.S1.02

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference & Exhibition on
Cancer Science & Therapy
15-17 August 2011 Las Vegas, USA

Molecular targeting of cancer stem cells by the small molecule dichloroacetate (DCA) through the disruption of the OCT4/PKM2 complex

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It has been postulated that solid tumors originate from a relatively small number of cells called cancer stem cells (CSC). Numerous studies have shown that brain tumor cancer stem cells were highly resistant to cell death and as such might contribute to tumor recurrence by eluding anti-cancer treatments. Like neural stem cells, cancer stem cells form *in vitro* structures called neurospheres. Using a proteomic approach based on two-dimensional DIGE and MALDI-TOF/TOF mass spectrometric identification, we have compared neurospheres derived from rat neural stem cells (NSC) with that derived from rat glioma (CSC) . The major pathway highlighted by this proteomic analysis is glucose metabolism. Inhibition of aerobic glycolysis *in vitro* altered the survival of CSC but not that of NSC. Strikingly, decreasing the non-oxidative glucose metabolism by Dichloroacetate (DCA), a PDK inhibitor, specifically depleted the stem cells population and impaired the growth of tumors *in vivo*. We found that DCA induced CSC differentiation rather than death, through the disruption of a PKM2/OCT4 complex in rat and human glioma. This work has important implications in the treatment of human brain tumors.

Biography

François M. Vallette has completed his Ph.D at the age of 26 years from Paris VII University and did postdoctoral studies in the Department of Cell Biology of NYU Medical Center. Currently, he is the director of the Department of Oncogenesis and Targeted Therapies in the Nantes Angers Cancer Research Center in France. He has published more than 80 papers in reputed journals and serving as associate or editorial board member in several journals.