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1: [J Neurooncol](#). 2009 Aug 5. [Epub ahead of print]



Stem cell associated gene expression in glioblastoma multiforme: relationship to survival and the subventricular zone.

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Current therapies for glioblastoma (GBM) target bulk tumor through measures such as resection and radiotherapy. However, recent evidence suggests that targeting a subset of tumor cells, so-called cancer stem cells, may be critical for inhibiting tumor growth and relapse. The subventricular zone (SVZ), which lines the ventricles of the brain, is thought to be the origin for the majority of neural stem cells and potentially cancer stem cells. Therefore, we assessed the relationship between tumor contact with the SVZ as determined by MRI, cancer stem cell gene expression and survival in 47 patients with GBM. Using DNA microarrays, we found that genes associated with cancer stem cells were not over-expressed in tumors contacting the SVZ. Contact with the SVZ trended with shorter survival (median 358 versus 644, $P = 0.066$). Over-expression of CD133 (prominin-1) and maternal embryonic leucine zipper kinase (MELK) was associated with shorter survival, whereas mitogen activated protein kinase 8 (MAPK8) was associated with longer survival (P values 0.008, 0.005 and 0.002 respectively). Thus we found no evidence of a stem-cell derived genetic signature specific for GBM in contact with the SVZ, but there was a relationship between stem cell gene expression and survival. More research is required to clarify the relationship between the SVZ, cancer stem cells and survival.

PMID: 19655089 [PubMed - as supplied by publisher]
