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1: [BMC Cancer](#). 2009 Feb 14;9(1):54. [Epub ahead of print]



**Arrested neural and advanced mesenchymal differentiation of glioblastoma cells- comparative study with neural progenitors.**

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**ABSTRACT:** Background Although features of variable differentiation in glioblastoma cell cultures have been reported, a comparative analysis of differentiation properties of normal neural GFAP positive progenitors, and those shown by glioblastoma cells, has not been performed. Methods Following methods were used to compare glioblastoma cells and GFAP+NNP (NHA): exposure to neural differentiation medium, exposure to adipogenic and osteogenic medium, western blot analysis, immunocytochemistry, single cell assay, BrdU incorporation assay. To characterize glioblastoma cells EGFR amplification analysis, LOH/MSI analysis, and P53 nucleotide sequence analysis were performed. Results In vitro differentiation of cancer cells derived from eight glioblastomas was compared with GFAP-positive normal neural progenitors (GFAP+NNP). Prior to exposure to differentiation medium, both types of cells showed similar multilineage phenotype (CD44+, MAP2+, GFAP+, Vimentin+, Beta-III-tubulin+, Fibronectin+) and were positive for SOX-2 and Nestin. In contrast to GFAP+NNP, an efficient differentiation arrest was observed in all cell lines isolated from glioblastomas. Nevertheless, a subpopulation of cells isolated from four glioblastomas differentiated after serum-starvation with varying efficiency into derivatives indistinguishable from the neural derivatives of GFAP+NNP. Moreover, the cells derived from a majority of glioblastomas (7 out of 8), as well as GFAP+NNP, showed features of mesenchymal differentiation when exposed to medium with serum. **CONCLUSIONS:** Our results showed that stable co-expression of multilineage markers by glioblastoma cells resulted from differentiation arrest. According to our data up to 95% of glioblastoma cells can present in vitro multilineage phenotype. The mesenchymal differentiation of glioblastoma cells is advanced and similar to mesenchymal differentiation of normal neural progenitors GFAP+NNP.

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