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Cancer stem cells from peritumoral tissue of glioblastoma multiforme: the possible link between tumor development and progression

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In glioblastoma multiforme (GBM), cancer stem cells (CSCs) are thought to be responsible for gliomagenesis, resistance to treatment and recurrence. Unfortunately, the prognosis for GBM remains poor and recurrence frequently occurs in the peritumoral tissue within 2 cm from the tumor edge. In this area, a population of CSCs has been demonstrated which may recapitulate the tumor after surgical resection. In the present study, we aimed to characterize CSCs derived from both peritumoral tissue (PCSCs) and GBM (GCSCs) in order to deepen their significance in GBM development and progression. The stemness of PCSC/GCSC couples obtained from four human GBM surgical specimens was investigated by comparing the expression of specific stem cell markers such as Nestin, Musashi-1 and SOX2. In addition, the growth rate, the ultrastructural features and the expression of other molecules such as c-Met, pMet and MAP kinases, involved in cell migration/invasion, maintenance of tumor stemness and/or resistance to treatments, were evaluated. Since it has been recently demonstrated the involvement of the long non-coding RNAs (lncRNAs) in the progression of gliomas, the expression of H19 lncRNA, as well as of one of its two mature products miR-675-5p, was assessed in neurospheres. Our results show significant differences between GCSCs and PCSCs in terms of proliferation, ultrastructural peculiarities and, at a lower extent, stemness profile. These differences might be important in view of their potential role as a therapeutic target.

Keywords

Glioblastoma cancer stem cells, peritumoral cancer stem cells, stemness markers, proliferation markers, invasiveness markers, H19 lncRNA and miR-675-5p, ultrastructure

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