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Stemness features in peritumor tissue of glioblastoma

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It has been recently shown that glioblastomas (GBMs) contain stem-like cells (CSCs) in both the tumor core and the tissue surrounding the tumor border. Nevertheless, these CSCs show diverse tumorigenic potential and distinct genetic anomalies. In agreement with these data, using immunohistochemical analysis, we found apparently normal cells expressing the stem cell marker nestin in GBM peritumor tissue at a distance of <1 cm and between 1 and 3.5 cm from the tumor edge. In addition, the same cell type revealed cytoplasmic immunoreactivity for GD3 ganglioside, which belongs to the predominant ganglioside species involved in the early developmental stages of the nervous system. In our experience, peritumor tissue harbored a florid microvascular proliferation with the same characteristics as those seen in GBM. Endothelial cells of microvessels expressed nestin, GD3 ganglioside and CD105, a membrane glycoprotein which is an accessory component of the transforming growth factor beta receptor complex. CD105 has been reported to distinguish between normal vessels and malignant neovascularisation. Endothelium of microvessels and hyperplastic microvessels was surrounded by pericytes, showing a positivity for alpha smooth muscle actin and for NG2 (neuro-glial proteoglycan 2), which is associated with neural progenitors. At present, pericytes are thought to be multipotent stem cells capable of migrating, rapidly adapting and differentiating along multiple lineages. Our findings indicate the presence of cells endowed with stemness features in both cellular and vascular compartments of GBM peritumor tissue. This might be a crucial event in the process of transformation of the areas surrounding the tumor.

Key words

Nestin, NG2, GD3, CD105, glioblastoma, peritumor tissue