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Stem cell transplantation in brain tumors: A new field for molecular imaging?

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Abstract

Neural stem cells have been proposed as a new and promising treatment modality in different pathologies of the central nervous system, including (malignant) brain tumors. The underlying mechanism remains elusive. Monitoring these cells is currently done by different modes of molecular imaging, like optical imaging, magnet resonance imaging and positron emission tomography, representing a novel technology for visualizing metabolism and signal transduction to gene expression. In this new context, the microenvironment of (malignant) brain tumors and the blood brain barrier gains increased interest. The authors give a unique overview about the current molecular imaging techniques used in different therapeutic experimental brain tumor models in relation to neural stem cells. Such molecular imaging of gene-engineered neural stem/progenitor cells are currently used to trace the location and temporal level of expression of therapeutic and endogenous genes in malignant brain tumors closing the gap between in vitro and in vivo integrative biology of disease in neural stem cell transplantation.

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