

Brain Tumor Stem Cells

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Cancers are composed of heterogeneous cell populations ranging from highly proliferative immature cells to more differentiated cells of various cell lineages. Recent advances in stem cell research have allowed for the demonstration of the existence of cancer stem cells in acute myeloid leukemia, breast cancer, and, most recently, in brain tumors. Each of these has some similarities with the normal stem cells in the corresponding organs. In brain tumors, putative cancer stem cells have been identified from glioblastoma multiforme, medulloblastoma and ependymoma. These tumor-derived cells self-renew under clonal conditions, and differentiate into neuron- and glia-like cells as well as into abnormal cells with mixed phenotypes. The tumor stem cells, but not the rest of tumor cells form secondary tumors by transplantation into immunodeficient mouse brain. In this review, we discuss the cellular and molecular relationships between brain tumor stem cells and normal neural stem cells, and also the possible clinical implications of brain tumor stem cells.