

Tumor-Initiating Cells in Malignant Brain Tumors

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Abstract

Stem cells have the unique ability to differentiate into the many specialized cells of the body. During adulthood, stem cells remain in the organism and maintain the ability to repair and replenish injured or dead cells when necessary. In some cancers however, stem cells are implicated as the driving force of tumorigenesis. The cancer stem cell (CSC) hypothesis states that only a small fraction of cells within a tumor has the capacity to regenerate and maintain the heterogeneity seen in the tumor they were derived from.

Cancer stem cells were first identified as being associated with acute myeloid leukemia model 15 years ago, and since then, have been detected in a variety of tumors. In malignant gliomas such as glioblastoma multiforme (GBM), a GBM-CSC population with increased levels of resistant to chemotherapy and radiation therapy is thought to be responsible for malignancy and tumor recurrence.

To test the CSC hypothesis, it is necessary to identify these cells. If the model proves to be valid, developing CSC specific therapies would target the root of cancer growth. Overall, understanding the cells involved in brain tumor development, dispersal, and prevention, is the focus of this dissertation.