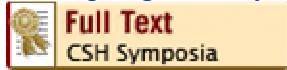




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Cancer Stem Cells in Brain Tumor Biology.

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Tumors are aberrant organ systems containing a complex interplay between the neoplastic compartment and recruited vascular, inflammatory, and stromal elements. Furthermore, most cancers display a hierarchy of differentiation states within the tumor cell population. Molecular signals that drive tumor formation and maintenance commonly overlap with those involved in normal development and wound responses—two processes in which normal stem cells function. It is therefore not surprising that cancers invoke stem cell programs that promote tumor malignancy. Stem-cell-like cancer cells (or cancer stem cells) need not be derived from normal stem cells but may be subjected to evolutionary pressures that select for the capacity to self-renew extensively or differentiate depending on conditions. Current cancer model systems may not fully recapitulate the cellular complexity of cancers, perhaps partially explaining the lack of power of these models in predicting clinical outcomes. New methods are enabling researchers to identify and characterize cancer stem cells. Our laboratory focuses on the roles of brain tumor stem cells in clinically relevant tumor biology, including therapeutic resistance, angiogenesis, and invasion/metastasis. We hope that these studies will translate into improved diagnostic, prognostic, and therapeutic approaches for these lethal cancers.

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