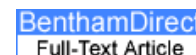


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Therapeutic Window, a Critical Developmental Stage for Stem Cell Therapies.

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Abstract

In children, cancers are the deadliest of diseases and second only to accidents as the leading cause of death. The deadliest of the brain cancers are the malignant gliomas. Approximately two-thirds of children can survive less malignant types of brain cancers, however, in approximately 67% of these survivors recurs under the current regimes of surgery followed by administration of high doses toxic drugs and exposure to high doses of radiation. Even more distressing is that fortunate survivors are generally left with life-long cognitive disabilities. A new medical approach is desperately needed. Stem cells, with their natural ability to seek out brain tumors, could be used to accurately deliver therapy directly to the cancer sparing normal tissues for suppression of tumor growth. Despite exciting initial reports, clinical potency of stem cell therapy in animal brain tumor models has to date proven disappointing. Attempts to extrapolate the animal study results to humans are stymied by the fact that stem cells are heterogeneous, resulting in differences in their efficacy. Indeed, therapeutic success relies on an effective strategy to select for a stem cell sub-population within some particular stage of the development at which they are competitive and capable of targeting brain tumors. To improve this during developmental path, concept of a 'therapeutic window' is proposed. The "therapeutic window" for stem cells or more specifically a "biochemical therapeutic window" can be determined from biochemical assays and a "biological therapeutic window" from biological assays or even a molecular window for genetic description. Taken together, we can use selective processes to generate more effective stem cells to treat cancers as is clearly needed today.

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