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The use of neural stem cells in cancer gene therapy: predicting the path to the clinic.

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Abstract

Gene therapy is a novel means of anticancer treatment that has led to preliminary positive results in the preclinical setting, as well as in clinical trials; however, successful clinical application of this approach has been hampered by the inability of gene delivery systems to target tumors and to deliver a therapeutic payload to disseminated tumor foci efficiently. Along with viral vector systems, various mammalian cells with tropism for tumor cells have been considered as vehicles for delivery of anticancer therapeutics. The discovery of the inherent tumor-tropic properties of neural stem cells (NSCs) has provided a unique opportunity to develop targeted therapies that use NSCs as a vehicle to track invasive tumor cells and deliver anticancer agents selectively to diseased areas. Many *in vivo* and *in vitro* studies have demonstrated that the targeted migration of NSCs to infiltrative brain tumors, including malignant glioma, provides a potential therapeutic approach. In this review, the development of NSCs as targeted carriers for anticancer gene therapy is discussed, and barriers in the path to the clinic, as well as approaches to overcoming such barriers are presented.

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