Intranasal delivery of stem cell-based therapies for the treatment of brain malignancies.

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**Abstract**

**INTRODUCTION:** Glioblastoma (GBM) is the most aggressive malignant brain cancer in adults, and its poor prognosis and resistance to the existing standard of care require the development of innovative therapeutic modalities. The local delivery of stem cells as therapeutic carriers against glioma has produced encouraging results, but encounters obstacles with regards to the repeatability and invasiveness of administration. Intranasal delivery of therapeutic stem cells could overcome these obstacles, among others, as a noninvasive and easily repeatable mode of administration. Areas covered: This review describes nasal anatomy, routes of stem cell migration, and factors affecting stem cell delivery to hard-to-reach tumors. Furthermore, this review discusses the molecular mechanisms underlying stem cell migration following delivery, as well as possible stem cell effector functions to be considered in combination with intranasal delivery. Expert opinion: Further research is necessary to elucidate the dynamics of stem cell effector functions in the context of intranasal delivery and optimize their therapeutic potency. Nonetheless, the technique represents a promising tool against brain cancer and has the potential to be expanded for use against other brain pathologies.

**KEYWORDS:** CNS delivery; Glioblastoma; intranasal delivery; malignant glioma; stem cells

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