Drug Delivery Nanosystems for the Localized Treatment of Glioblastoma Multiforme.


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Glioblastoma multiforme is one of the most prevalent and malignant forms of central nervous system tumors. The treatment of glioblastoma remains a great challenge due to its location in the intracranial space and the presence of the blood-brain tumor barrier. There is an urgent need to develop novel therapy approaches for this tumor, to improve the clinical outcomes, and to reduce the rate of recurrence and adverse effects associated with present options. The formulation of therapeutic agents in nanostructures is one of the most promising approaches to treat glioblastoma due to the increased availability at the target site, and the possibility to co-deliver a range of drugs and diagnostic agents. Moreover, the local administration of nanostructures presents significant additional advantages, since it overcomes blood-brain barrier penetration issues to reach higher concentrations of therapeutic agents in the tumor area with minimal side effects. In this paper, we aim to review the attempts to develop nanostructures as local drug delivery systems able to deliver multiple agents for both therapeutic and diagnostic functions for the management of glioblastoma.

KEYWORDS: chemotherapy; contrast agents; drug delivery; gene delivery; glioblastoma multiforme; local treatment; mesoporous silica nanoparticles; nanoparticles; theranostics

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