

CNS Neurol Disord Drug Targets. 2025 Sep 22. doi: 10.2174/0118715273386112250912172648.

Online ahead of print.

Nanoparticle-Based Approaches for Glioblastoma Treatment: Advances and Future Prospects

Anjali Rana ¹, Arun Mittal ¹, Chetan Vashist ¹, Sangeet Sharma ¹, Shivam Rajput ¹,
Sathvik Belagodu Sridhar ², Rishabha Malviya ^{3 4}

Affiliations

PMID: 40993928 DOI: [10.2174/0118715273386112250912172648](https://doi.org/10.2174/0118715273386112250912172648)

Abstract

CNS diseases have recently received a lot of focus. Glioblastoma multiforme (GBM) has the worst prognosis among various cancers. With its aggressive nature and potential for recurrence, GBM is a major concern in neuroscience. Radiotherapy, chemotherapy, and surgical removal are currently employed methods for treating GBM. The blood-brain barrier (BBB) is a major obstacle to effective medication delivery into the central nervous system (CNS), which is a major concern in the treatment of GBM. Nanotechnology helps transport active chemicals to brain tissue, a major glioma treatment challenge. Technology advancements in nanotechnology have the potential to facilitate the trans-BBB delivery of medicinal medications to the central nervous system. To treat illnesses associated with the central nervous system (CNS), it is possible to manage several types of nanoparticles (Nps). Novel therapeutic approaches are being explored, with NPs attracting interest as a potential tool for the targeted eradication of brain tumours. The review article reviewed the relevant literature on the utilisation of NPs for the treatment of Glioblastoma. The articles were obtained through various databases, including ScienceDirect, Scopus, PubMed and Google Scholar. It studies current treatment strategies for Glioblastoma, different NPs treating GBM with their mechanism by crossing the BBB, and various relevant patents of NPs drug delivery were analysed. This review article collects data about various nanoparticles used in GBM, with their mechanism of action. This review discusses the role of nanoparticulate systems in the effective treatment of GBM. It can be concluded from the literature that therapeutic agents can be delivered into the central nervous system through the blood-brain barrier with the use of nanotechnology, and so can be effectively used for the management of GBM.

Keywords: Glioblastoma; blood brain barrier; cancer.; central nervous system; nanoparticle; targeted therapy; targeted treatment.

Copyright© Bentham Science Publishers; For any queries, please email at epub@benthamscience.net.

[PubMed Disclaimer](#)