Review J Control Release. 2023 May 25;358:681-705. doi: 10.1016/j.jconrel.2023.05.016. Online ahead of print.

## Nanobiotechnology-based treatment strategies for malignant relapsed glioma

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Affiliations PMID: 37196900 DOI: 10.1016/j.jconrel.2023.05.016

## Abstract

Gliomas are the most aggressive and lethal tumors of the central nervous system, for which few therapeutic options exist. Surgical resection is the primary treatment for most gliomas; however, tumor recurrence is nearly inevitable. Emerging nanobiotechnology-based strategies have shown great prospects for early glioma diagnosis, physiological barrier traversing, postoperative regrowth suppression, and microenvironment remodeling. Herein, we focus on the postoperative scenario and summarize the key properties of the glioma microenvironment, especially its immune peculiarities. We elucidate the challenges of managing recurrent glioma. We also discuss the potential of nanobiotechnology in addressing the therapeutic challenges of recurrent glioma, including optimizing the design of drug delivery systems, enhancing intracranial accumulation, and restoring the anti-glioma immune response. The development of these technologies offers new opportunities for accelerating the drug development process and treating recurrent glioma.

**Keywords:** Anti-glioma immune response; Drug delivery system; Glioma microenvironment; Nanobiotechnology; Recurrent glioma.

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