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Advances in antibody-based drugs and their delivery through the blood-brain barrier for targeted therapy and immunotherapy of gliomas

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Abstract

Gliomas are highly invasive and are the most common type of primary malignant brain tumor. The routine treatments for glioma include surgical resection, radiotherapy, and chemotherapy. However, glioma recurrence and patient survival remain unsatisfactory after employing these traditional treatment approaches. With the rapid development of molecular immunology, significant breakthroughs have been made in targeted glioma therapy and immunotherapy. Antibody-based therapy has excellent advantages in treating gliomas due to its high specificity and sensitivity. This article reviewed various targeted antibody drugs for gliomas, including anti-glioma surface marker antibodies, anti-angiogenesis antibodies, and anti-immunosuppressive signal antibodies. Notably, many antibodies have been validated clinically, such as bevacizumab, cetuximab, panitumumab, and anti-PD-1 antibodies. These antibodies can improve the targeting of glioma therapy, enhance anti-tumor immunity, reduce the proliferation and invasion of glioma, and thus prolong the survival time of patients. However, the existence of the blood-brain barrier (BBB) has caused significant difficulties in drug delivery for gliomas. Therefore, this paper also summarized drug delivery methods through the BBB, including receptor-mediated transportation, nano-based carriers, and some physical and chemical methods for drug delivery. With these exciting advancements, more antibody-based therapies will likely enter clinical practice and allow more successful control of malignant gliomas.

Keywords: Antibody; Blood–brain barrier; Glioma; Immunotherapy; Targeted therapy.