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1: [Brain Pathol.](#) 2009 Oct;19(4):674-93.



Immunotherapy of diffuse gliomas: biological background, current status and future developments.

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Despite aggressive multimodal treatment approaches, the prognosis for patients with diffuse gliomas remains disappointing. Glioma cells often extensively infiltrate in the surrounding brain parenchyma, a phenomenon that helps them to escape surgical removal, radiation exposure and chemotherapy. Moreover, conventional therapy is often associated with considerable local and systemic side effects. Therefore, the development of novel therapeutic approaches is essential to improve the outcome of these patients. Immunotherapy offers the opportunity to specifically target residual radio- and chemoresistant tumor cells without damaging healthy neighboring brain tissue. Significant progress has been made in recent years both in understanding the mechanisms of immune regulation in the central nervous system (CNS) as well as tumor-induced and host-mediated immunosuppression elicited by gliomas. In this review, after discussing the special requirements needed for the initiation and control of immune responses in the CNS, we focus on immunological phenomena observed in glioma patients, discuss different immunological approaches to attack glioma-associated target structures and touch on further strategies to improve the efficacy of immunotherapy of gliomas.

Publication Types:

- [Research Support, Non-U.S. Gov't](#)

PMID: 19744040 [PubMed - in process]
