Recent developments on immunotherapy for brain cancer.

Wainwright DA, Nigam P, Thaci B, Dey M, Lesniak MS.

The University of Chicago, Chicago, IL, USA.

Abstract
Introduction: Brain tumors are a unique class of cancers since they are anatomically shielded from normal immunosurveillance by the blood-brain barrier, lack a normal lymphatic drainage system and reside in a potently immunosuppressive environment. Of the primary brain cancers, glioblastoma multiforme (GBM) is the most common and aggressive in adults. Although treatment options include surgery, radiation and chemotherapy, the average lifespan of GBM patients remains at only 14.6 months post-diagnosis. Areas covered: A review of key cellular and molecular immune system mediators in the context of brain tumors including TGFB, cytotoxic T cells, Tregs, CTLA-4, PD-1 and IDO is discussed. In addition, prognostic factors, currently utilized immunotherapeutic strategies, ongoing clinical trials and a discussion of new or potential immunotherapies for brain tumor patients are considered. Expert opinion: Current drugs that improve the quality of life and overall survival in patients with brain tumors, especially for GBM, are poorly effective. This disease requires a reanalysis of currently accepted treatment strategies, as well as newly designed approaches. Here, we review the fundamental aspects of immunosuppression in brain tumors, new and promising immunotherapeutic drugs as well as combinatorial strategies that focus on the simultaneous inhibition of immunosuppressive hubs, both in immune and brain tumor cells, which is critical to consider for achieving future success for the treatment of this devastating disease.