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GBM immunotherapy: Exploring molecular and clinical frontiers

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Abstract

GBM is the most common, aggressive, and intracranial primary brain tumor; it originates from the glial progenitor cells, has poor overall survival (OS), and has limited treatment options. In this decade, GBM immunotherapy is in trend and preferred over several conventional therapies, due to their better patient survival outcome. This review explores the clinical trials of several immunotherapeutic approaches (immune checkpoint blockers (ICBs), CAR T-cell therapy, cancer vaccines, and adoptive cell therapy) with their efficacy and safety. Despite significant progress, several challenges (viz., immunosuppressive microenvironment, heterogeneity, and blood-brain barrier (BBB)) were experienced that hamper their immunotherapeutic potential. Furthermore, these challenges were clinically studied to be resolved by multiple combinatorial approaches, discussed in the later part of the review. Thus, this review suggests the clinical use and potential of immunotherapy in GBM and provides the holistic recent knowledge and future perspectives.

Keywords: Clinical trials; Combination therapy; Conventional treatments; GBM biomarkers; Heterogeneity in TME; Immunotherapy; Resistance.

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