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Immunosuppressive mechanisms and therapeutic interventions shaping glioblastoma immunity

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Abstract

Plasticity is a hallmark of aggressive tumors, including glioblastoma (GBM), enabling tumor cells and the tumor microenvironment (TME) to adapt to diverse niches and evade treatment. Here, we discuss how innate and adaptive immune players cooperate in time and space to create an immunosuppressive TME that supports GBM growth and confers resistance to conventional treatments and immunotherapies. We highlight how therapeutic interventions reshape the TME, underscoring the need for targeted approaches to overcome resistance. We introduce the concepts of local TME priming and TME rewiring as necessary foundations for achieving more effective and durable clinical responses in the future.

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