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Neuroinflammation in Glioblastoma: The Role of the Microenvironment in Tumour Progression

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Abstract

Glioblastoma (GBM) stands as the most aggressive and lethal among the main types of primary brain tumors. It exhibits malignant growth, infiltrating the brain tissue, and displaying resistance toward treatment. GBM is a complex disease characterized by high degrees of heterogeneity. During tumour growth, microglia and astrocytes, among other cells, infiltrate the tumour microenvironment and contribute extensively to gliomagenesis. Tumour-associated macrophages (TAMs), either of peripheral origin or representing brain-intrinsic microglia, are the most numerous nonneoplastic populations in the tumour microenvironment in GBM. The complex heterogeneous nature of GBM cells is facilitated by the local inflammatory tumour microenvironment, which mostly induces tumour aggressiveness and drug resistance. The immunosuppressive tumour microenvironment of GBM provides multiple pathways for tumour immune evasion, contributing to tumour progression. Additionally, TAMs and astrocytes can contribute to tumour progression through the release of cytokines and activation of signalling pathways. In this review, we summarize the role of the microenvironment in GBM progression, focusing on neuroinflammation. These recent advancements in research of the microenvironment hold the potential to offer a promising approach to the treatment of GBM in the coming times.

Keywords: TAMs; astrocytes; glioblastoma; microglia; neuroinflammation; tumour microenvironment.

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