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Autophagy in glioblastoma: A mechanistic perspective

Durgesh Meena [1], Sushmita Jha [1]

Affiliations

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Abstract

Glioblastoma (GBM) is one of the most lethal malignancies in humans. Even after surgical resection and aggressive radio- or chemotherapies, patients with GBM can survive for less than 14 months. Extreme inter-tumor and intra-tumor heterogeneity of GBM poses a challenge for resolving recalcitrant GBM pathophysiology. GBM tumor microenvironment (TME) exhibits diverse heterogeneity in cellular composition and processes contributing to tumor progression and therapeutic resistance. Autophagy is such a cellular process; that demonstrates a cell-specific and TME context-dependent role in GBM progression, leading to either the promotion or suppression of GBM progression. Autophagy can regulate GBM cell function directly via regulation of survival, migration, and invasion, or indirectly by affecting GBM TME composition such as immune cell population, tumor metabolism, and glioma stem cells. This review comprehensively investigates the role of autophagy in GBM pathophysiology.

Keywords: autophagy; glioblastoma; glioma stem cells; innate immunity; tumor metabolism; tumor microenvironment.