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Human dendritic cell subsets in the glioblastoma-associated microenvironment

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Abstract

Glioblastoma (GBM) is the most aggressive type of glioma (Grade IV). The presence of cytotoxic T lymphocyte (CTLs) has been associated with improved outcomes in patients with GBM, and it is believed that the activation of CTLs by dendritic cells may play a critical role in controlling the growth of GBM. DCs are professional antigen-presenting cells (APC) that orchestrate innate and adaptive anti-GBM immunity. DCs can subsequently differentiate into plasmacytoid DCs (pDC), conventional DC1 (cDC1), conventional (cDC2), and monocyte-derived DCs (moDC) depending on environmental exposure. The different subsets of DCs exhibit varying functional capabilities in antigen presentation and T cell activation in producing an antitumor response. In this review, we focus on recent studies describing the phenotypic and functional characteristics of DC subsets in humans and their respective antitumor immunity and immunotolerance roles in the GBM-associated microenvironment. The critical components of crosstalk between DC subsets that contribute significantly to GBM-specific immune responses are also highlighted in this review with reference to the latest literature. Since DCs could be prime targets for therapeutic intervention, it is worth summarizing the relevance of DC subsets with respect to GBM-associated immunologic tolerance and their therapeutic potential.

Keywords: Antitumor immunity; Conventional (cDC2); Conventional DC1 (cDC1); Crosstalk; Glioblastoma; Immunotolerance; Monocyte-derived DCs (moDC); Plasmacytoid DCs (pDC); Therapeutic intervention.