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Potential functions and therapeutic implications of glioma-resident mesenchymal stem cells

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Abstract

Mesenchymal stem cells (MSCs) are emerging crucial regulators in the tumor microenvironment (TME), which contributes to tumor progression and therapeutic resistance. MSCs are considered to be the stromal components of several tumors, their ultimate contribution to tumorigenesis and their potential to drive tumor stem cells, especially in the unique microenvironment of gliomas. Glioma-resident MSCs (GR-MSCs) are non-tumorigenic stromal cells. The phenotype of GR-MSCs is similar to that of prototype bone marrow-MSCs and GR-MSCs enhance the GSCs tumorigenicity via the IL-6/gp130/STAT3 pathway. The higher percentage of GR-MSCs in TME results in the poor prognosis of glioma patients and illuminate the tumor-promoting roles for GR-MSCs by secreting specific miRNA. Furthermore, the GR-MSC subpopulations associated with CD90 expression determine their different functions in glioma progression and $CD90^{low}$ MSCs generate therapeutic resistance by increasing IL-6-mediated FOXS1 expression. Therefore, it is urgent to develop novel therapeutic strategies targeting GR-MSCs for GBM patients. Despite that several functions of GR-MSCs have been confirmed, their immunologic landscapes and deeper mechanisms associated with the functions are not still expounded. In this review, we summarize the progress and potential function of GR-MSCs, as well as highlight their therapeutic implications based on GR-MSCs in GBM patients.

Keywords: Glioma; Glioma-resident mesenchymal stem cells; Mesenchymal stem cells; Tumor microenvironment; Tumor-promoting.