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Human gamma-delta (γδ) T cell therapy for glioblastoma: A novel alternative to overcome challenges of adoptive immune cell therapy

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Abstract

Glioblastoma is the most common brain malignancy with devastating prognosis. Numerous clinical trials using various target therapeutic agents have failed and recent clinical trials using check point inhibitors also failed to provide survival benefits for glioblastoma patients. Adoptive T cell transfer is suggested as a novel therapeutic approach that has exhibited promise in preliminary clinical studies. However, the clinical outcomes are inconsistent, and there are several limitations of current adoptive T cell transfer strategies for glioblastoma treatment. As an alternative cell therapy, gamma-delta (γδ) T cells have been recently introduced for several cancers including glioblastoma. Since the leading role of γδ T cells is immune surveillance by recognizing a broad range of ligands including stress molecules, phosphoantigens, or lipid antigens, recent studies have suggested the potential benefits of γδ T cell transfer against glioblastomas. However, γδ T cells, as a small subset (1-5%) of T cells in human peripheral blood, are relatively unknown compared to conventional alpha-beta (αβ) T cells. In this context, our study introduced γδ T cells as an alternative and novel option to overcome several challenges regarding immune cell therapy in glioblastoma treatment. We described the unique characteristics and advantages of γδ T cells compared to conventional αβ T cells and summarize several recent preclinical studies using human gamma-delta T cell therapy for glioblastomas. Finally, we suggested future direction of human γδ T cell therapy for glioblastomas.

Keywords: Adoptive cell transfer; Gamma-delta (γδ) T cells; Glioblastoma; Immunotherapy.