CAR T-cell therapy for glioblastoma: ready for the next round of clinical testing?

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The outcome for patients with glioblastoma (GBM) remains poor, and there is an urgent need to develop novel therapeutic approaches. T cells genetically modified with chimeric antigen receptors (CARs) hold the promise to improve outcomes since they recognize and kill cells through different mechanisms than conventional therapeutics. Areas covered: This article reviews CAR design, tumor associated antigens expressed by GBMs that can be targeted with CAR T cells, preclinical and clinical studies conducted with CAR T cells, and genetic approaches to enhance their effector function. Expert commentary: While preclinical studies have highlighted the potent anti-GBM activity of CAR T cells, the initial foray of CAR T-cell therapies into the clinic resulted only in limited benefits for GBM patients. Additional genetic modification of CAR T cells has resulted in a significant increase in their anti-GBM activity in preclinical models. We are optimistic that clinical testing of these enhanced CAR T cells will be safe and result in improved anti-glioma activity in GBM patients.

KEYWORDS: Glioblastoma; T cells; chimeric antigen receptor; gene therapy; immunotherapy; tumor microenvironment

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