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CAR-T THERAPY FOR LONG-LASTING HIV TREATMENT

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INTRODUCTION

Chimeric Antigen Receptor (CAR) T-cell therapies are already successful in hematologic malignancies and show great promise as a treatment and curative strategy for HIV. Adoptive transfer of CAR-genetically engineered effector T cells can overcome the limitations of virus-specific cytotoxic T lymphocytes (CTLs) that develop during natural infection to control disease and prevent reactivation from latency from becoming a clinically significant event.

OBJECTIVE

Understand the use of CAR-T therapy for the long-term treatment of HIV.

METHODOLOGY

Literature review based on data collected from the PubMed and SciELO platforms, of which 4 articles were used to construct this simple summary. Furthermore, the inclusive criteria were free access to the topic, titles and abstracts associated with the topic published since 2019 in the English language.

DISCUSSION

The long-term persistence of HIV-specific CAR T cells is critical to achieving lasting control of infection in the absence of ART, however the success of this technique is challenged by limited antigen due to low cell surface expression of viral proteins, paucity of cells chronically infected during antiretroviral therapy, as well as the latent HIV reservoir (replication-competent cells). Interest in CAR T cells as a treatment for other diseases followed the clinical course of CD19-targeted CAR T cells in B cell malignancies, thus several HIV-specific CAR T cells are being evaluated in ongoing clinical trials with the aim that these cells become resistant to infections. The resistance of CAR T cells is due to the disruption of HIV co-receptors or the expression of entry inhibitors, but the therapeutic obstacle is the persistence of the engineered cells in vivo, which determines the response to treatment. Strategies to increase CAR T cell persistence: (A) CAR design with inclusion and choice of costimulatory domain. (B) T cell phenotype. (C) Effective lymphodepleting preconditioning before CAR T cell infusion. (D) Receptor engagement since target antigen is crucial for CAR T cells to persist after infusion. Furthermore, for CAR T cells to expand, the CAR or T cell receptor has to engage with the specific antigen. CAR T cells, compared with endogenous cytotoxic T cells, can function independently of MHC to target HIV-infected cells, which confers greater safety and long-term persistence in peripheral blood.

CONCLUSION

CAR T-therapy for long-lasting HIV treatment has been widely studied and is promising for the possible cure of HIV, since CAR T cells persist in vivo and reach latent HIV reservoirs, preventing their reactivation.