



Chimeric Antigen Receptor T-Cell Therapy for Systemic Lupus Erythematosus: A Systematic Review

Pariya Valizadeh¹, Seyyed Erfan Nabavi¹, Mahdi Zavvar^{2*}

¹Student Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran

²Department of Medical Laboratory Sciences, School of Allied Medical Sciences, Tehran University of Medical Sciences, Tehran, Iran

OPEN ACCESS

*Corresponding Author:

Dept. of Medical Laboratory Sciences, School of Allied Medical Sciences, Tehran University of Medical Sciences, Tehran, Iran

ABSTRACT

Introduction: Systemic lupus erythematosus (SLE) is an autoimmune disease characterized by immune system activation, autoantibody formation, and organ inflammation. Current SLE treatments are often unsatisfactory. B cells play a key role in SLE, which can efficiently be reduced by CD19-targeted chimeric antigen receptor (CAR) T cells. CAR T cells accomplish this by targeting the surface molecule CD19, which is expressed in various B cells. This study aimed to systematically review the evidence on the efficacy and safety of CAR T-cell therapy in SLE patients, focusing on CD19-targeting CAR constructs.

Search Strategy: Adhering to PRISMA guidelines, a systematic search was performed across PubMed, Scopus, and Web of Science databases, and Google Scholar was utilized to incorporate gray literature to identify pertinent studies published between 2020 and 2024. Keywords such as "Chimeric antigen receptor T cell", "CAR T", "Lupus", "Lupus Erythematosus", and "Systemic Lupus" and their synonyms were used. Inclusion criteria included clinical trial studies using CAR T-cell therapy in SLE patients, focusing on CD19-targeting CAR. Articles with inconclusive results, review studies, animal/cell studies, and conference papers were excluded. Two authors independently screened the search results, and the third author reviewed the conflicts. The quality assessment of the studies was evaluated using the ROB 2 Tool, and relevant information was organized into an extraction table.

Results: Initially, 260 articles were discovered; after removing 117 duplicates and 122 irrelevant articles, 21 remained for full-text screening. Eventually, five articles were included in the study. Based on these studies, the symptoms of SLE in individuals who utilized this treatment were less. Consequently, CAR T-cell therapy using CD-19 targeting CAR constructions showed to be a tolerable and effective treatment option for individuals with SLE.

Conclusion and Discussion: Based on the results of the current study, CD19-targeted CAR T-cell therapy is a promising treatment for SLE. CAR T-cell therapy in SLE is short-lived and does not cause disease recurrence. This treatment offers a new option for safe, long-term remission, drug-free remission, and eliminating autoimmunity in patients with SLE. Nevertheless, further investigation is required to validate these findings in larger populations and enhance the manufacturing and administration procedures of CAR T-cell therapy for SLE.

Citation:

Valizadeh P, Nabavi SE, Zavvar M. Chimeric Antigen Receptor T-Cell Therapy for Systemic Lupus Erythematosus: A Systematic Review. *Iranian biomedical journal* 2024; 28(7): 308.

Keywords: Chimeric antigen receptor T cell, Systemic lupus erythematosus, Systematic review

