Anti-Hla-A2 Chimeric Antigen Receptor

Tech ID: 32701 / UC Case 2021-150-0

TECHNOLOGY DESCRIPTION

Organ transplantation, tissue&cell transplantation, and bone marrow transplantation are significant advances in modern medicine, saving lives in patients with end-stage organ dysfunction and other diseases. However, patients must live with immunosuppression after transplant to prevent organ or tissue rejection or graft-versus-host disease. Unfortunately, it leaves patients susceptible to infectious complications and higher risks of malignancies. Therefore, strategies to reduce the burden of immunosuppression would greatly benefit patients' health.

One strategy is to induce immune tolerance. Regulatory T cells (Tregs) are a subpopulation of T cells that suppress immune response to maintain self-tolerance and prevent autoimmune disease. Currently, there are no approved Tregs cell therapies for transplant indications. Pre-clinical models have shown promise of Tregs in suppressing graft rejection and promoting transplant tolerance. A few early-phase clinical trials are underway, but all use polyclonal Tregs or donor alloantigen-reactive Tregs enriched by in vitro culture with donor tissue.

Unfortunately, polyclonal Tregs have undefined specificity and are less potent and likely to confer global immunosuppression due to the need for a high dose. Donor alloantigen reactive Tregs enriched by in vitro culture with donor tissue involve a complex culturing process. Besides, donor alloantigen-reactive Tregs may be functionally altered or induced to migrate out of the peripheral blood following transplant. This novel invention has overcome all these challenges.

This invention is a method of engineering regulatory T cells (Tregs) with a chimeric antigen receptor (CAR) targeting donor-derived human leukocyte antigen-A2 (HLA-A2) and some associated compositions to create new CAR-Tregs (chimeric-antigen-receptor regulatory T cells) therapeutics for use by companies developing therapeutics for transplant recipients to induce immune tolerance. The system is currently in the pre-clinical stage of development. These CAR-Tregs offer specificity, potency, and reliability advantages over polyclonal Tregs and donor alloantigen reactive Tregs. This novel invention is a valuable approach that enables transplant rejection suppression, immune tolerance promotion, and immunosuppression burden reduction or elimination.

ADVANTAGES

This novel invention offers the following advantages:

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OTHER INFORMATION

KEYWORDS

organ transplant, cell transplant, tissue transplant, transplant, graft vs host disease, GvHD, transplant rejection

CATEGORIZED AS

- **Medical**
  - Disease: Autoimmune and Inflammation

RELATED CASES

2021-150-0

- Defined donor alloantigen specificity
- Greater therapeutic Tregs donor alloantigen reactivity and potency
- Reliable approach to engineer alloantigen specific Tregs
- Being cloned from a human hybridoma with previously undisclosed sequence
- Functionality supported by preclinical transplant models with direct clinical relevance

STAGE OF DEVELOPMENT

Extensive preclinical studies complete

RELATED MATERIALS

▶ Precision Engineering of an Anti-HLA-A2 Chimeric Antigen Receptor in Regulatory T Cells for Transplant Immune Tolerance - 09/20/2021

DATA AVAILABILITY

Additional preclinical data available under CDA

PATENT STATUS

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Anti-Dpp6 Car For Targeted Regulatory T Cell Therapy For Inflammation In Pancreatic Islets And Central Nervous System

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