CELL INTRINSIC MODULATION OF TLR FUNCTION FOR CELL THERAPY

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PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20230303642	09/28/2023	2019-151

BRIEF DESCRIPTION

This invention provides a means of selectively modulating individual Toll-like receptor (TLR) signaling pathways by introducing mutations in the trafficking protein Unc93b1. The desired cell population (e.g., T cells, dendritic cells) is removed from a patient and maintained in vitro, subjected to genomic editing at precise locations within the coding region of Unc93b1, and then reimplanted into the patient. Depending on the indication to be treated, a given TLR signaling pathway can either be enhanced or inhibited by changing the target sequence in Unc93b1. Uses for this invention include, but are not limited to, 1) boosting immune responses to pathogens or tumors, and 2) initiating tissue repair programs in immune cells. It includes TLR3, 5, 7, 9.

SUGGESTED USES

Selective modulation of specific TLR signaling pathways could be utilized for multiple clinical applications. Enhanced TLR7 signaling in CD8 T cells or CAR T cells will provide a strong and sustained costimulatory response, which will be beneficial in cancer immunotherapy contexts. Similarly, enhanced TLR7 signaling in dendritic cells will promote cytokine production and overall enhanced immunity. Such applications could be highly beneficial not only when attempting to elicit responses against tumors but also more generally in efforts to induce anti-viral responses or enhance the efficacy of vaccines.

ADVANTAGES

The power of this approach is the ability to induce responses in specific cell types. In regulatory T cells, sustained TLR7 signaling induces cell expansion and expression of genes important for tissue repair. Such re-programmed Tregs could be delivered to promote healing in various chronic inflammation models, such as COPD (chronic obstructive pulmonary disease).

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Chimeric TLR9/TLR4 Reporter Cell Line

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OTHER INFORMATION

KEYWORDS

Toll-Like Receptors

CATEGORIZED AS

- **Biotechnology**
  - Proteomics

RELATED CASES

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