Discovery of Gene Overexpression Combinations to Improve Therapeutic T Cell Constructs with Pooled CRISPR Knockin Screens

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INVENTION NOVELTY

Scientists at UCSF have developed a method for highly parallel testing of gene knockins/overexpression in combination with a cancer-specific T cell receptor (TCR) or chimeric antigen receptor (CAR). The method enables researchers to evaluate what constructs can improve anti-tumor efficacy of conventional T-cell therapies.

VALUE PROPOSITION

T cell-based immunotherapies have shown success in some malignancies but still are not efficient in most cancers, especially solid tumors. New T cell constructs are needed to overcome this hurdle. Immune cellular therapies have so far been driven by altering the specificity of T cells, such as through altering CARs or TCRs. The proposed method adds a second and a third gene to CAR constructs in order to increase their fitness, functionality, and resistance to exhaustion. This invention can be used to screen combinations of different overexpressed natural or synthetic (e.g. chimeric receptor) genes and their ability to improve CAR T cell functionality.

This novel invention provides the following advantages:

- Versatile system that can be used to improve functionality of TCRs, CARs, or other tumor-specific receptors
- Ability to screen thousands of different constructs at the same time

RELATED MATERIALS

- Pooled Knockin Targeting for Genome Engineering of Cellular Immunotherapies - 04/30/2020

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

T Cell Constructs, Screening Tool, CRISPR, Gene Combinations

CATEGORIZED AS

- Medical
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