

Calcium (Ca²⁺) Flux-Dependent Method to Detect and Isolate Tumor Reactive T Cell Receptors (TCRs)

Summary

The National Cancer Institute (NCI) seeks research co-development partners and/or licensees for a method to isolate and sequence tumor reactive T Cell Receptors (TCRs) from cancer specific T cells using calcium ion (Ca²⁺) flux as the marker of TCR ligation and activation.

NIH Reference Number

E-168-2018

Product Type

- Therapeutics

Keywords

- Adoptive Cell Transfer, ACT, Immunotherapy, Tumor, T Cell Receptor, TCR, Calcium Ion, Ca²⁺, Rosenberg

Collaboration Opportunity

This invention is available for licensing and co-development.

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Description of Technology

T cells with T cell receptors (TCRs) for cancer-specific antigens are used for adoptive cell therapy (ACT), wherein a patient's T cells are redirected against their own cancer. However, these isolated T cells may require further ex vivo manipulation to enhance their anti-tumor activity. The ex vivo manipulation of these T cells, or the selection of less functionally inert T cells, and genetic insertion of tumor specific TCRs may circumvent these limitations.

To address this issue, it is crucial to recognize, select, and isolate tumor reactive T cells from a plethora of other non-reactive ones. When re-infused into the patient, non-reactive T cells may impede the effectiveness of an immunotherapy. However, the current methodologies to identify, select, and isolate these tumor reactive T cells, are laborious,

time-consuming, and cost intensive.

Researchers at the National Cancer Institute (NCI) have developed a novel method which isolates and sequences tumor reactive TCRs from cancer specific T cells using calcium ion (Ca²⁺) flux as the marker of TCR ligation and activation. TCRs identified by this method were found to be tumor specific and can be used to redirect the patient's T cells against potential tumor targets. This method requires minimal manipulation, and drastically reduces the time and cost of the tumor specific TCR identification and isolation process. NCI seeks research co-development partners and/or licensees for this invention.

Potential Commercial Applications

- T-cell isolation for ACT or TCR therapy
- Personalized immunotherapy to treat cancer patients
- Research tool to identify mutation-specific TCRs

Competitive Advantages

- Rapid and cost-effective method for tumor specific TCR identification and isolation
- Widely applicable to different types of cancers
- Limited off-target effects
- Patient-specificity to improve efficacy of ACT

Inventor(s)

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Development Stage

- Discovery (Lead Identification)

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number 62/902,184, Filed 18 Sep 2019

Related Technologies

- [E-229-2014 - T-Cell Therapy Against Patient-Specific Cancer Mutations](#)
- [E-233-2014 - T-Cell Therapy Against Patient-Specific Cancer Mutations](#)
- [E-067-2017 - A Rapid Method of Isolating Neoantigen-specific T Cell Receptor Sequences](#)
- [E-061-2020 - Extremely Rapid Method to Isolate Neoantigen Reactive T Cell Receptors \(TCRs\)](#)

Therapeutic Area

- Cancer/Neoplasm

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