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

Summary (1024-character limit)
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