T-Cell Therapy Against Patient-Specific Cancer Mutations

Summary
Scientists at the National Cancer Institute developed a method to identify T cells that specifically recognize immunogenic mutations expressed only by cancer cells. NCI seeks parties interested in collaborative research to co-develop or license T-cell therapy against cancer mutations.

NIH Reference Number
E-229-2014

Product Type
• Therapeutics

Keywords
• T-cell, cholangiocarcinoma, immunogenic, Tran, Rosenberg

Collaboration Opportunity
This invention is available for licensing and co-development.

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Description of Technology
Human cancers contain genetic mutations that are unique to each patient. Some of the mutated peptides are immunogenic, can be recognized by T cells, and therefore, may serve as therapeutic targets.

Scientists at the National Cancer Institute's Surgery Branch developed a method to identify T cells that specifically recognize immunogenic mutations expressed only by cancer cells. The scientists identified cancer-specific mutations from a patient with widely metastatic cholangiocarcinoma by sequencing tumor samples and comparing with normal cells. Using tandem minigene constructs encoding all of the mutations expressed by a patient's tumor, the inventors identified T cells that recognized the immunogenic mutations from the same patient. These mutation-reactive T cells have the potential to eliminate the cancer cells while sparing normal tissues since normal tissues do not express the mutations. The mutation-reactive T cells were expanded in vitro, and then
infused as a highly pure population back into the same patient. The patient experienced tumor regression when treated with this approach.

**Potential Commercial Applications**
- Personalized immunotherapy with mutation-reactive T cells for mediating tumor regression in patients with immunogenic mutations;
- Mutation-reactive T cell therapy especially beneficial for cancer patients refractory to other therapies;
- A research tool to identify patient-specific immunogenic mutations in the tumor.

**Competitive Advantages**
- This patient-specific therapy has the potential application to most epithelial cancers, which account for about 90% of cancer deaths in the United States;
- Personalized mutation-specific T cells recognize mutations harboring tumor cells only and spare normal tissues. This therapy has no tissue toxicities comparing to traditional chemotherapy and radiotherapy;
- The infusion of a highly pure population of these mutation-specific T cells may maximize therapy and result in regression of all target lesions.

**Inventor(s)**
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**Development Stage**
- Clinical

**Publications**
Tran E, *et al.* [24812403]
Robbins P, *et al.* [23644516]
Tran E, *et al.* [25046408]

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**Therapeutic Area**
- Cancer/Neoplasm

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