T cell Receptor Sequencing to Predict Clinical Outcome with Cancer Immunotherapy

Tech ID: 25590 / UC Case 2014-092-0

INVENTION NOVELTY
This blood-based companion diagnostics contains a method of assessing and monitoring T cell receptor diversity and frequency during the course of cancer immunotherapy administering immune checkpoint inhibitors. This approach can be used as a prediction of patient responsiveness to treatment and as a prognosis for survival outcome.

VALUE PROPOSITION
Cancer immunotherapy, especially use of immune checkpoint inhibitors against CTLA-4 or PD-1, is emerging as a powerful approach in treatment of cancer. Yet, there is a lack of biomarkers to determine whether a patient will respond to a given immunotherapy, or the effect of treatment on their overall survival. Investigators at UCSF have identified that maintenance of high-frequency T cell clones is associated with a better outcome following immunotherapy. They have demonstrated that the patient’s T cell clonotype frequency can be monitored through a non-invasive blood test, and can be used to inform treatment decisions. This novel invention provides the following advantages: 1. Non-invasive test to predict responsiveness to cancer immunotherapy; 2. Novel tool to rapidly provide a survival prognosis to patients undergoing treatment; 3. Method for designing a personalized treatment plan for patients.

TECHNOLOGY DESCRIPTION
The frequency of T cell clones will be monitored through genetic sequencing of recombined T cell receptors, which can be detected from a sample of the patient’s blood. A patient’s T cell clonotype profile will be generated before, as well as during or after a given cancer immunotherapy treatment. The number of T cell clones that change in frequency over time will be analyzed and used to predict responsiveness to the treatment and long-term survival.

LOOKING FOR PARTNERS
To develop and commercialize the technology as a blood-based companion diagnostic tool to predict clinical response of a patient to treatment of a cancer by an immune checkpoint pathway inhibitor

STAGE OF DEVELOPMENT
Pre-clinical

RELATED MATERIALS
- Improved survival with T cell clonotype stability after anti-CTLA-4 treatment in cancer patients. Sci Transl Med 6, 238.

DATA AVAILABILITY
Patient data validated

PATENT STATUS

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ADDITIONAL TECHNOLOGIES BY THESE INVENTORS
- T Cell Signature Predictive of Clinical Outcome with Immunomodulatory Treatment
- Prospective Isolation Of Tumor-Reactive Cytotoxic CD4+ T Cells For Bladder Cancer Therapy
- NOVEL ANTIGEN TARGETS IN AUTOIMMUNE DISEASES (LUPUS AND TYPE I DIABETES) USEFUL FOR VACCINE DEVELOPMENT AND TREATMENT