Fred Hutch Cancer Center

CD4+ T cell markers, compositions, and methods for cancer therapy

Business Opportunity
Exclusive license
Sponsored Research
Start-up

Technology Type
Immuno-Oncology
Cell Therapy
Therapeutic

State of Development
Preclinical in vitro, preclinical in vivo

Patent Information
WO2023164439A2, patent pending

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Tech ID
21-188

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Brief Description
Markers, methods, and compositions for identifying CD4+ T cells (or T cell receptor genes thereof) with tumor antigen specificity, tumor neoantigen specificity, and/or tumor-infiltrating capacity.

Technology Overview
While cancer immunotherapies have historically focused on CD8+ T cells, tumor antigen specific CD4+ T cells are required for the efficacy of immune checkpoint inhibitors in murine models and there is growing support for their importance in treating human cancers with immunotherapy. Researchers at Fred Hutchinson Cancer Center have discovered a set of markers that characterize tumor reactive CD4+ T cells and subpopulations thereof in solid tumor samples. The researchers also found a significant correlation between the presence of these cells and overall survival in a cohort of melanoma patients. In addition to uses for prognosis, the identification of markers for these cell populations enables a variety of significant therapeutic applications.

Applications
- Markers can help detect and selectively expand CD4+ T cells with neoantigen specificity and/or tumor infiltrating capacity
- CD4+ T cells expressing a TCR specific for a tumor neoantigen or tumor antigen can be used in a T cell (e.g., polyclonal) therapy
- TCRs from tumor infiltrating CD4+ T cells may be sequenced, and the sequence information can inform other therapies (e.g., engineered TCR or CARs expressing antigen binding domain derived from these CD4+ neoantigen expressing cells); or soluble molecules comprising of binding domain from such a TCR or engineered TCR

Advantages
- The disclosed markers permit selecting for CD4+ T cells of interest and against bystander cells, improving the ability to enrich (from about 2-fold to about 20-fold better than conventional TIL culture methods), maintain, and expand these cells of interest
- CD4+ T cells in the tumor are prognostic, since they correlated with the transcriptional states of CD8+ T cells and macrophages, maturation of B cells, patient survival and modification of tumor microenvironment (e.g., CXCL13+ CD4+ T cells in melanoma and breast cancer)