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T Cell Therapy Targeting EBV-Associated Diseases and Cancer

Scientists from the Davis and Mackall labs at Stanford have discovered T cell receptor molecules targeting a novel antigen upregulated in cancer. This discovery has potential value for cancer-targeting therapies, particularly CAR T therapies. Currently, a limited number of CAR T therapies indicated for a narrow range of cancer types are in the clinic, so expanding the repertoire of antigens and cancers that CAR T cells can successfully target is critical for broader utilization of this powerful technology.

Researchers profiled the specificities of tumor-infiltrating T cells from lung cancer patients and discovered T cells targeting a novel antigen associated with Epstein-Barr Virus (EBV) and upregulated in lung cancer. Specifically, these T cell receptors recognize a peptide derived from the EBV protein LMP2 as well a similar peptide derived from human TMEM161A that is overexpressed on cancer cells. The T cell receptor sequences could be used as the basis for cancer treatments including cell therapies or molecular therapies that target this cancer antigen. In addition, cells or molecules recognizing this EBV-related antigen could also help treat chronic active EBV and EBV-associated autoimmune diseases like lupus.

Stage of Development: Novel antigens and receptors profiled in lung cancer patients and T cell activation by antigens tested

in vitro

Applications

- Treatment of cancers such as nasopharyngeal cancer, gastric cancer, and B-cell lymphomas

- Treatment of chronic active EBV and EBV-associated autoimmune diseases like systemic lupus erythematosus and autoimmune hemolytic anemia

Advantages

- Receptors identified by profiling tumor-infiltrating T cells in human patients, suggesting potential for efficacy against solid tumors
- Potential for broad applicability to multiple cancers and diseases sharing the novel EBV-associated antigen

Publications

- Shin-Heng Chiou et al [Global analysis of shared T cell specificities in human non-small cell lung cancer enables HLA inference and antigen discovery](#) *Immunity* March 9, 2021.
- Tseng, D. et al [Discovery of a novel shared tumor antigen in human lung cancer](#) *J. Clin. Oncol.* 38, 3087–3087 (2020).

Patents

- Published Application: [WO2021217077](#)
- Published Application: [20230348559](#)

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