Chimeric antigen receptor (CAR)-T cells targeting IL-13Rα2 positive human solid cancers

Technology Summary

Chimeric antigen receptor (CAR)-T cell therapy has become a promising immunotherapeutic strategy for the treatment of various blood cancers such as leukemia and lymphoma, but it has shown limited activity against solid cancers. Improving the targeting of solid tumors by CAR-T cells would be a major advance in CAR-T immunotherapy. To accomplish this, FDA inventors have developed chimeric antigen receptors (CARs) specifically targeting cells expressing IL-13Rα2.

IL-13Rα2 is a high affinity receptor for cytokine interleukin-13 (IL-13), is a known tumor antigen, and is a potential target for cancer immunotherapy. The FDA inventors have shown that IL-13Rα2 is overexpressed in a variety of human solid tumors, including malignant gliomas, head and neck cancer, Kaposi's sarcoma, renal cell carcinoma, ovarian carcinoma, breast cancer, and pancreatic cancer. They used phage display technology to isolate a high affinity single chain fragment variable fragment (scFv) that specifically binds IL-13Rα2. This scFv was cloned into a lentiviral vector fused with CD3ζ domain and co-stimulatory endo-domains of CD28 and 4-1BB. This vector was then used to create therapeutics CAR-T cells that kill IL-13Rα2 positive solid tumors.

Potential Commercial Applications

- Cellular CAR-T therapeutic for treating IL-13Rα2 expressing cancers
- Improved targeting of solid tumor by CAR-T cells

Competitive Advantages

- Novel anti-IL-13Rα2 scFv isolate using phage display technology.
- Targeting with anti-IL-13Rα2 svFc rather than IL-13 should be more specific for tumor cells versus normal cells with IL-13R

Development Stage: In vivo animal data

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Intellectual Property:

U.S. provisional application 63/169,575 was filed April 1, 2021

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Product Area: CAR-T, Cellular therapeutics, cancer, biologic, oncology, solid tumors

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