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Singapore develops innovative non-integrating CAR T vector system

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Single cell mutli-omics shows a promising application of a novel CAR-T product which will be essential for precision cell therapy development and cost-effective CAR T cell manufacturing



Proteona, a Singapore-based single-cell precision medicine company, has announced the publication of the results of a long-term collaboration with researchers at the German Cancer Research Center (DKFZ) and its National Center for Tumor Diseases (NCT) to develop and characterize an innovative non-integrating CAR T vector system. T

The study, published in the journal Science Advances, characterized the novel CAR T cells using Proteona's ESCAPE™ CAR T assay, a single cell multi-omics product designed for in-depth characterization of CAR T cell therapy products and patient samples.

While CAR T cells are traditionally made using viral vectors, the DKFZ researchers were able to develop a novel method to make CAR T cells using engineered DNA vectors that cut the production time by two weeks and reduce viral vector-related toxicity.

To compare CAR T cells made using the new method to those made with conventional methods, the researchers used Proteona's ESCAPE CAR T assay to comprehensively compare cell populations across thousands of measurements per cell.

They found that the novel CAR T cells are more similar to unmodified T cells than they are to traditionally produced CAR T cells and, that genes showing the largest expression differences between the novel and traditional CAR T products relate to low immunogenicity and high cancer-killing capacity. Flow cytometry, the most commonly used analysis in CAR T production, could not differentiate between the two types of CAR T cells.

Proteona was the first company to provide a commercial single cell multi-omics assay specifically designed for CAR T cell analysis. The assay comes with a panel of 25 antibodies that measure key protein markers required for CAR T cell characterization. Simultaneously, it measures the expression of thousands of genes, providing rich data for detecting subtle biological differences. Proteona supports data analysis with MapSuite™, a collection of artificial-intelligence-based tools and a curated single-cell disease database that accelerate data analysis and interpretation.