

Accelerating decisions in immunotherapy with predictive single-cell response

Isoplexis helps researchers target the right therapies early to the highest-urgency cancer patients.

The IsoLight platform's predictive single-cell response enables quality assessments of T cell immunotherapies, as well as improved assessment of clinical response and mechanism of action in patient samples.

Broader challenges in cancer immunotherapy

Toxicity, low or no response, and relapse are major challenges of immune-based cancer therapies faced on both manufacturing and clinical development pathways toward success in patient outcome. Confounding factors with respect to specifications for toxicity and potentially lethal side effects in chimeric antigen receptor (CAR) T cell therapies are related to the complex functional responses of these engineered T cells. Isoplexis provides actionable potency, safety, and patient-difference metrics by assessing deep T cell functional response in patients, accelerating decisions toward clinical success downstream, and enhancing scalability.

Differentiating responders and nonresponders in complex T cell treatments

More important than simply asking questions is asking the right ones. In contrast to conventional bulk activity readouts that show similar patient activity, the function of single T cells can identify important T cell functional groups, which leads to improved information to ensure improved clinical outcomes. With more than 40 secreted protein targets in its panel, Isoplexis is capable of building a clear metric of polyfunctional strength to differentiate responders from nonresponders and to predict patient response in the clinic^{1,2}.

The IsoCode assay linked product function to patient outcome in several T cell immunotherapy-based presentations and publications in 2017 (full list available at collaborations@isoplexis.com). Conventional bulk cytokine readouts and ELISAs mask important differentiating T cell metrics in subsets of highly functional T cells. The IsoCode assay's improved sensitivity of detection uncovers important polyfunctional T cell subsets that help identify critical patient differences (Fig. 1).

These functional T cell groups are uncovered by the powerful IsoCode assay (also known as a single-cell barcode chip (SCBC) in the scientific literature), which provides deep depth of data (i.e., 40 or more secreted functional proteins per cell) for the first time. Over 12,000 microchambers on the chip are used to capture and isolate single cells. ELISA-based antibody barcode array is then used to capture deep functional analysis on ≥ 40 secreted proteins simultaneously per cell³.

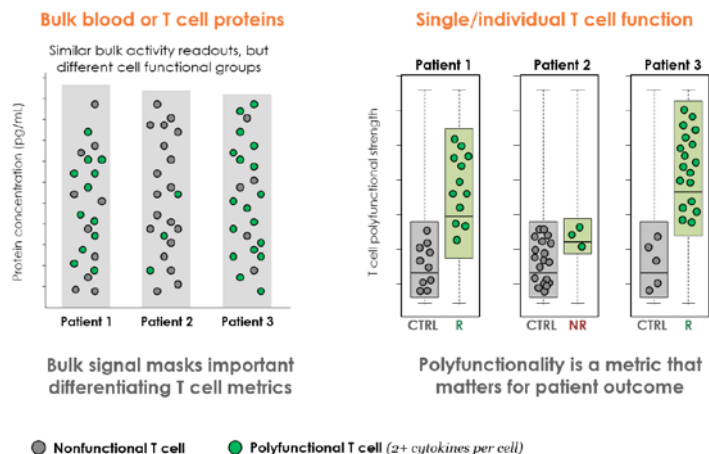


Figure 1: Asking the right questions. The function of single T cells can reveal important T cell functional groups, thereby leading to improved information to ensure improved clinical outcome. Center lines, median; box edges, first to third quartiles; whiskers, min/max; CTRL, control (nonspecific response); R, responder; NR, nonresponder. Higher polyfunctional strength indicates higher potency and a greater response in cell therapy, leading to improved patient outcome.

The IsoSpeak integrated software and informatics pipeline enables validated analysis in larger trials, making the processing of complex images and high-dimensional data straightforward. Thus complex T cell data become understandable, and IsoCode helps scientists identify differences in patient responses that can be applied to the most important immunotherapy challenges.

CAR-T and checkpoint inhibitors

Isoplexis has been collaborating with biopharma and trial-center leaders in the field to facilitate the implementation of more effective T cell therapy-based patient detection. With the IsoCode assay, researchers are able to predict complete or partial responses in patients with non-Hodgkin's lymphoma, with statistical significance². Furthermore, researchers are able to reveal functional clusters of CAR-T cells and distinct landscapes across donors, guiding more sensitive CAR-T product pre-infusion quality assessments⁴. In addition, data obtained with the IsoCode assay were used to measure the function of tumor-infiltrating lymphocytes in order to predict patient response in subjects receiving anti-PD-1 blocking therapy¹.

Elevate your data with IsoLight

Isoplexis enables researchers to accelerate the fight against cancer by providing a clear and simple approach to understanding the metrics that determine patient outcome. The IsoCode assay can help

optimize manufacturing and administration decisions geared toward poly-functional potency, and ensure consistency at scale through deeper T cell characterization and specifications.

Later this year, Isoplexis will introduce its IsoLight automated system, which offers a simple, integrated solution for running IsoCode assays in the lab in high-throughput mode. The easy-to-use technology takes less than 10 minutes of hands-on time, has built-in bioinformatics for intuitive data analysis, and can measure up to 36 analytes per single cell. Isoplexis strives to elevate your data and improve the field of immuno-oncology.

1. Mackay, S. *et al.* *J. Clin. Oncol.* **35**, (suppl 7S), abstract 49 (2017).
2. Rossi J. *et al.* Polyfunctional anti-CD19 CAR T cells determined by single-cell multiplex proteomics associated with clinical activity in patients with advanced non-Hodgkin's lymphoma [Abstract]. Presented at the 107th Annual Meeting of the American Association for Cancer Research, Washington, DC, USA, Apr 1–5, 2017.
3. Lu, Y. *et al.* *Proc. Natl. Acad. Sci. USA* **112**, 607–615 (2015).
4. Xue, Q. *et al.* Single-cell proteomic assessment of CD19 CAR-T cells reveals a complex landscape of polyfunctional antigen-specific response. Presented at FOCIS 2017, Chicago, Illinois, USA, June 14, 2017.

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