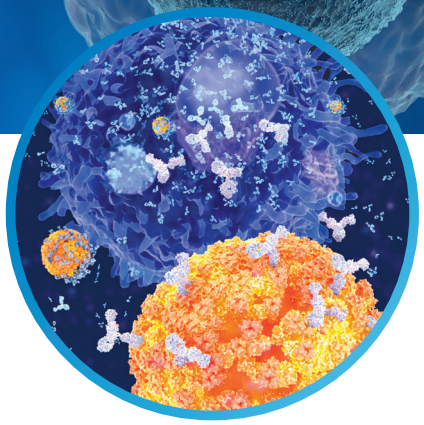

CAR CELL THERAPY

Publications

CyTOF® flow cytometry and Imaging Mass Cytometry™ are being used by researchers to identify immune signatures and functional characteristics of CAR (chimeric antigen receptor) cell products to overcome current limitations and improve the efficacy of CAR cell-based therapies.

CAR cell engineering

1. Avanzi, M.P. et al. “Engineered tumor-targeted T cells mediate enhanced anti-tumor efficacy both directly and through activation of the endogenous immune system.” *Cell Reports* 23 (2018): 2,130–2,141.
2. Fisher, J. et al. “Engineering γδT cells limits tonic signaling associated with chimeric antigen receptors.” *Science Signaling* 12 (2019): eaax1872.
3. Gang, M. et al. “CAR-modified memory-like NK cells exhibit potent responses to NK-resistant lymphomas.” *Blood* 136 (2020): 2,308–2,318.
4. Li, L. et al. “Transgenic expression of IL-7 regulates CAR-T cell metabolism and enhances *in vivo* persistence against tumor cells.” *Scientific Reports* 12 (2022): 12506.
5. Naeimi Kararoudi, M. et al. “Optimization and validation of CAR transduction into human primary NK cells using CRISPR and AAV.” *Cell Reports Methods* 2 (2022): 100236.
6. Wilk, A.J. et al. “Charge-altering releasable transporters enable phenotypic manipulation of natural killer cells for cancer immunotherapy.” *Blood Advances* 4 (2020): 4,244–4,255.

Imaging Mass Cytometry

1. Das, J.K. et al. “Elongation factor-2 kinase is a critical determinant of the fate and antitumor immunity of CD8+ T cells.” *Science Advances* 8 (2022): eabl9783.

Immunomonitoring

1. Corneau, A. et al. “Mass cytometry: a robust platform for the comprehensive immunomonitoring of CAR-T-cell therapies.” *British Journal of Haematology* 194 (2021): 788–792.
2. Good, C.R. et al. “An NK-like CAR T cell transition in CAR T cell dysfunction.” *Cell* 184 (2021): 6,081–6,100.e26.
3. Padgett, L.E. et al. “Naive CD8+ T cells expressing CD95 increase human cardiovascular disease severity.” *Arteriosclerosis, Thrombosis, and Vascular Biology* 40 (2020): 2,845–2,859.
4. Simonetta, F. et al. “Molecular imaging of chimeric antigen receptor T cells by ICOS-immunoPET.” *Clinical Cancer Research* 27 (2021): 1,058–1,068.
5. Weber, E.W. et al. “Transient rest restores functionality in exhausted CAR-T cells through epigenetic remodeling.” *Science* 372 (2021): eaba1786.

Longitudinal studies

1 Dhodapkar, K.M. et al. “Changes in bone marrow tumor and immune cells correlate with durability of remissions following BCMA CAR T therapy in myeloma.” *Blood Cancer Discovery* 3 (2022): 490–501.

2 Good, Z. et al. “Post-infusion CAR TReg cells identify patients resistant to CD19-CAR therapy.” *Nature Medicine* 28 (2022): 1,860–1,871.

3 Levine, L.S. et al. “Single-cell analysis by mass cytometry reveals metabolic states of early-activated CD8+ T cells during the primary immune response.” *Immunity* 54 (2021): 829–844.e5.

4 Melenhorst, J.J. et al. “Decade-long leukaemia remissions with persistence of CD4+ CAR T cells.” *Nature* 602 (2022): 503–509.

Preclinical studies

1 Anthony-Gonda, K. et al. “*In vivo* killing of primary HIV-infected cells by peripheral-injected early memory-enriched anti-HIV duoCAR T cells.” *JCI Insight* 7 (2022): e161698.

2 Dong, H. et al. “Memory-like NK cells armed with a neoepitope-specific CAR exhibit potent activity against NPM1 mutated acute myeloid leukemia.” *Proceedings of the National Academy of Sciences of the United States of America* 119 (2022): e2122379119.

3 Funk, C.R. et al. “PI3Kδ/γ inhibition promotes human CART cell epigenetic and metabolic reprogramming to enhance antitumor cytotoxicity.” *Blood* 139 (2022): 523–537.

4 Labanieh, L. et al. “Enhanced safety and efficacy of protease-regulated CAR-T cell receptors.” *Cell* 185 (2022): 1,745–1,763.e22.

5 Ye, L. et al. “A genome-scale gain-of-function CRISPR screen in CD8 T cells identifies proline metabolism as a means to enhance CAR-T therapy.” *Cell Metabolism* 34 (2022): 595–614.e14.

Other

1 Dou, J. et al. “Bi-order multimodal integration of single-cell data.” *Genome Biology* 23 (2022): 112.

2 Goldberg, L. et al. “Single-cell analysis by mass cytometry reveals CD19 CAR T cell spatiotemporal plasticity in patients.” *OncoImmunology* 11 (2022): 2040772.

3 Michelozzi, I.M. et al. “High-dimensional functional phenotyping of preclinical human CAR T cells using mass cytometry.” *STAR Protocols* 3 (2022): 101174.

4 Michelozzi, I.M. et al. “The enhanced functionality of low-affinity CD19 CAR T cells is associated with activation priming and polyfunctional cytokine phenotype.” *Blood* 136 (Supplement 1) (2020): 52–53.

5 Seo, H. et al. “BATF and IRF4 cooperate to counter exhaustion in tumor-infiltrating CAR T cells.” *Nature Immunology* 22 (2021): 983–995.

Learn more at **standardbio.com/mass-cytometry**

View our latest issue of Trending Now on CAR therapy.