

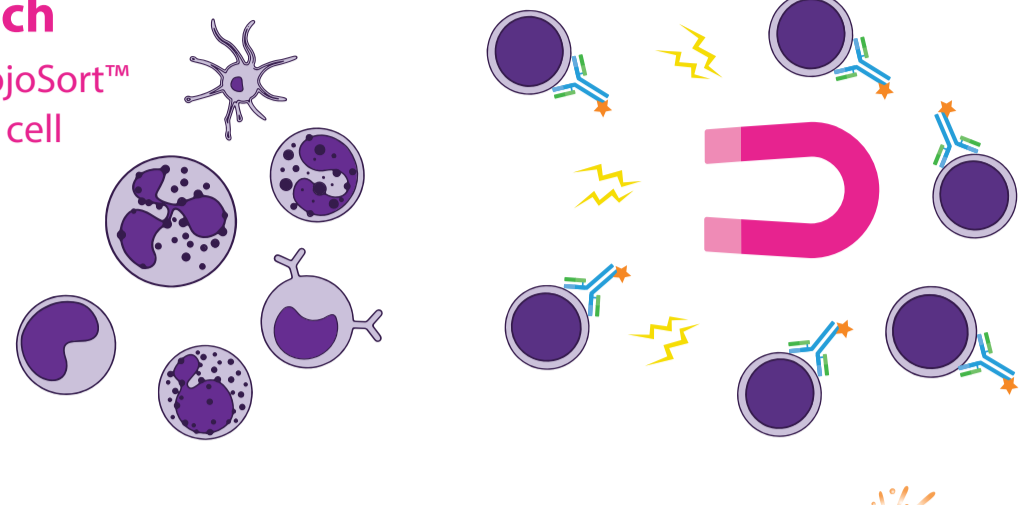
End-to-End Solutions for T Cell Bioprocessing

T cells play a central role in cancer immunotherapies. CAR-T cell therapy is one such cell-based therapeutic approach in which strict early manufacturing controls of *ex vivo* bioprocessing of T cells are required to seamlessly transition from R&D to a cell product. Early controls include using products manufactured under GMP conditions or partnering with vendors with the capability to convert RUO products into GMP versions. This ensures use of qualified and traceable raw materials to achieve controlled, consistent, and well-documented T cell manufacturing workflows.

Learn how we can supply your cell manufacturing and analytical needs:
[biolegend.com/en-us/cell-culture](https://www.biolegend.com/en-us/cell-culture)

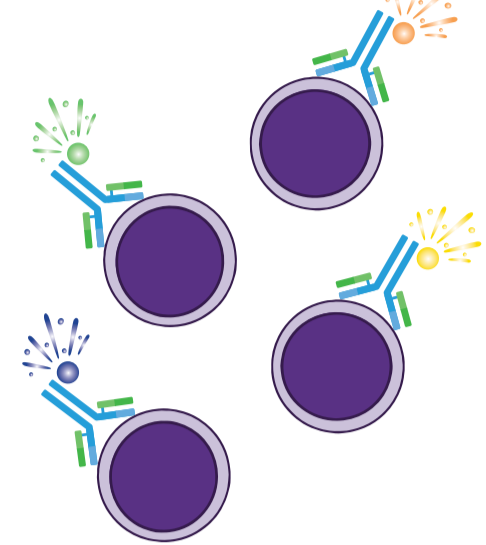
Isolate and Enrich

Select T cells using **MojoSort™** magnetic bead-based cell isolation kits.



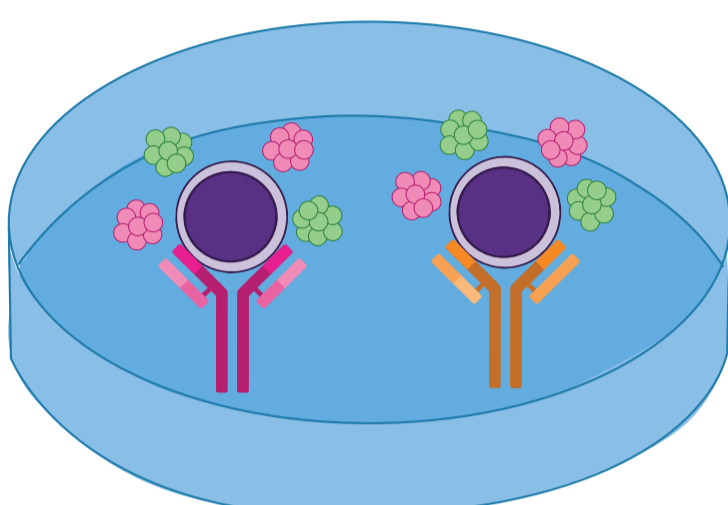
Phenotype

Confirm T cells with our **GMP ancillary reagents for staining and GMP flow cytometry antibodies.**



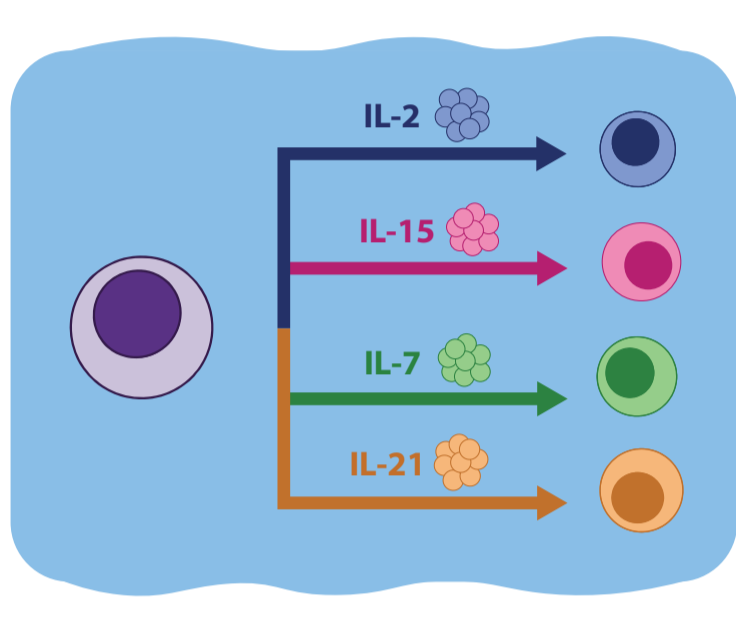
Proliferate

Stimulate T cells with **GMP recombinant proteins** and **GMP serum-free anti-CD3** and **anti-CD28** functional antibodies.



Differentiate and Expand

Culture T cells with **GMP serum-free antibodies** and **GMP cell culture media and supplements**. Use **GMP recombinant proteins** and growth factors to maintain or differentiate your cells: **IL-2**, **IL-7**, **IL-15**, **IL-21**, and **TGF-β**.

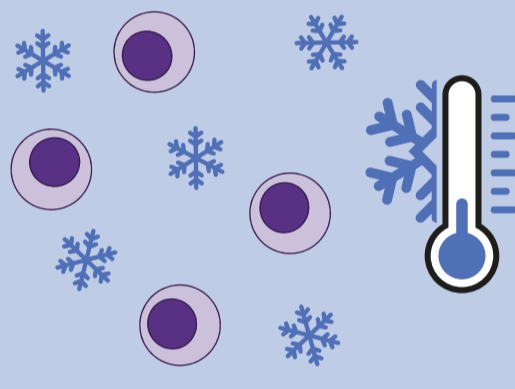


Advance to Application

Processed T cells undergo further manufacturing, such as cryopreservation and quality control measures, prior to chimeric antigen receptor (CAR) incorporation.

Cryopreserve

Protect the qualities of cultured T cells using our **Cell-Vive™** Chemically-defined Low DMSO Cryopreservation, GMP solution.



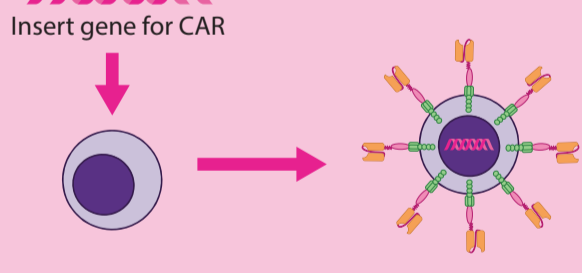
Profile the Potency

Perform quality control of T cell products with our suite of phenotypic and analytical tools. Confirm that cells exhibit the desired phenotypes prior to engineering and performing applications:

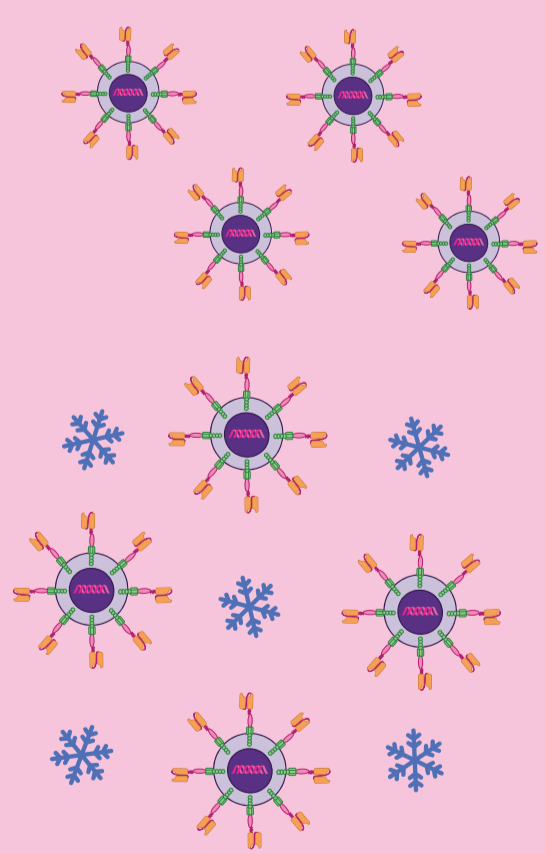
Application	The Right Tool
Ensure the viability and purity of enriched cells	Flow cytometry reagents
Monitor target cell killing	
Analyze cytokines secreted by cells	ELISA and LEGENDplex™
QC monitor T cell processing	Researchers can specify QC assays. All of our products are compliant to ISO 13485:2016 to ensure well-documented RUO and GMP products.
Conduct comprehensive (multiomic) analysis of proteins and DNA/RNA	TotalSeq™

Engineer the CAR-T Cell

Activated T cells are genetically modified using either viral vectors or non-viral gene delivery methods to express the CAR.

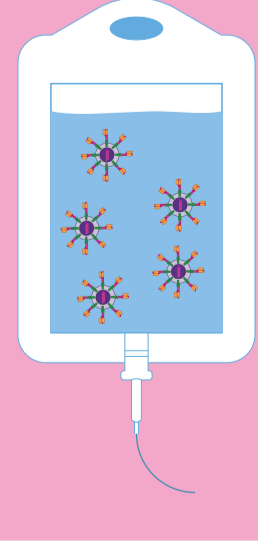


Genetically engineered CAR-T cells undergo expansion and strict quality control.



Freeze CAR-T cells with a cryopreservation medium.

CAR-T cells are thawed and infused into the patient. The patient is monitored for any adverse reactions to the CAR-T cell therapy.



Immunotherapy-based treatments for cancer now consist of a number of approaches: CAR cell therapy, monoclonal antibodies (mAbs), vaccines, checkpoint inhibitors, and cytokines. Discover how our scientist-created reagents are powering immunotherapy research.

References:
1. Abou-El-Nein, Mohamed et al. "Scalable Manufacturing of CAR-T cells for Cancer Immunotherapy." Blood cancer discovery vol. 2,5 (2021): 408-422. doi:10.1158/2643-3230.BCD-21-0084.
2. Mukherjee, Anirban Goutam et al. "Role of Immune Cells and Receptors in Cancer Treatment: An Immunotherapeutic Approach." Vaccines vol. 10,9 1493. 7 Sep. 2022, doi:10.3390/vaccines10091493.