

Cell Therapy

- Transfer of a specific cell type(s) into a person to treat or prevent a disease
- Can treat cancers of the blood and bone marrow, cancers of the lymphatic system, plasma cell disorders, and other conditions that affect the body's ability to make healthy cells
- The source of the cells used for cell therapy come from one of two places:
 - **Autologous cell therapy:** cells are collected from the individual's own body. Cells are removed, modified outside the body, then the processed cells are returned to the body.
 - **Allogeneic cell therapy:** cells used are from someone other than the patient, such as a healthy and compatible (or matched) donor.

CAR-T vs TIL vs TCR

	Chimeric Antigen Receptor (CAR) T-Cell Therapy	T Cell Receptor (TCR) Cell Therapy	Tumor-Infiltrating Lymphocytes (TILs)
# Approved Products	7	1	1
Mechanism	Genetically engineer T cells from patient to express entirely new receptor proteins called chimeric antigen receptors (CAR) that attacks cancer cells	Genetically engineer T cells from patient to express a specific T cell receptor (TCR) that can recognize and attack cancer cells	Piece of tumor is collected and TILs are multiplied in lab and returned to patient to continue attacking tumor in larger numbers
Advantages	Precise targeting and high efficacy in blood cancers	Potentially more versatile than CAR-T, can target a wider range of cancers	No genetic engineering, which may lead to more natural tumor-targeting and less toxicity
Challenges	Limited in its ability to target solid tumors	Off-target toxicity	T-cell exhaustion
Entries on clinicaltrials.gov	2,459	245	933

Efficacy Data Summary

- Efficacy rates vary by product; however median reported response rate for all trials leading to a CAR-T therapy approval was shown to be 66.4% (range 25%-90%)
 - Several CAR-T have shown 40-50% survival at 5 year mark
- TCR Cell Therapy product (afamitresgene autoleucel) showed ORR of 43.2% while TIL product (lifileucel) was 31.5%

Barriers to Broader Expansion

- Data shows that as few as 15-20% of eligible CAR-T patients actually receive treatment, with barriers including:
 - Patient travel / re-location
 - Side effects / toxicity
 - Need for caregiver support
 - Developmental cost for pharmaceutical manufacturers
 - Manufacturing capacity
 - Financial cost for employer groups
 - Socioeconomic disparities