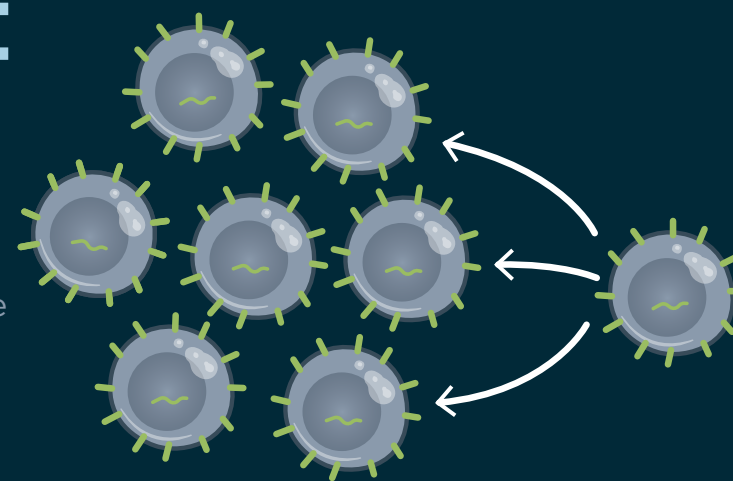# CELLULAR
TAKING AIM AT CANCER
CHALLENGES

Immunotherapy is a powerful treatment that harnesses the body's immune system in the fight against cancer. With optimized cell therapy, the result is an expanded population of T cells primed to recognize and eradicate malignant tumor cells that would otherwise escape immune detection.

1 LEUKAPHERESIS:

White blood cells are separated from a patient's blood sample.

Whole blood in
Plasma
White blood cells

SELECTION AND ACTIVATION:

T cells are isolated from the sample via centrifugal elutriation and confirmed by Coulter analysis of cell volume. The cells are activated using magnetic beads with antibodies against CD3 and CD28. Coulter analysis is used to monitor the transition from resting T cells to activated T cells, by tracking the accompanying increase in cell volume.

Bead
Anti-CD28
CD28
Anti-CD3
CD3/TCR
Resting T cell
Activated T cell

2
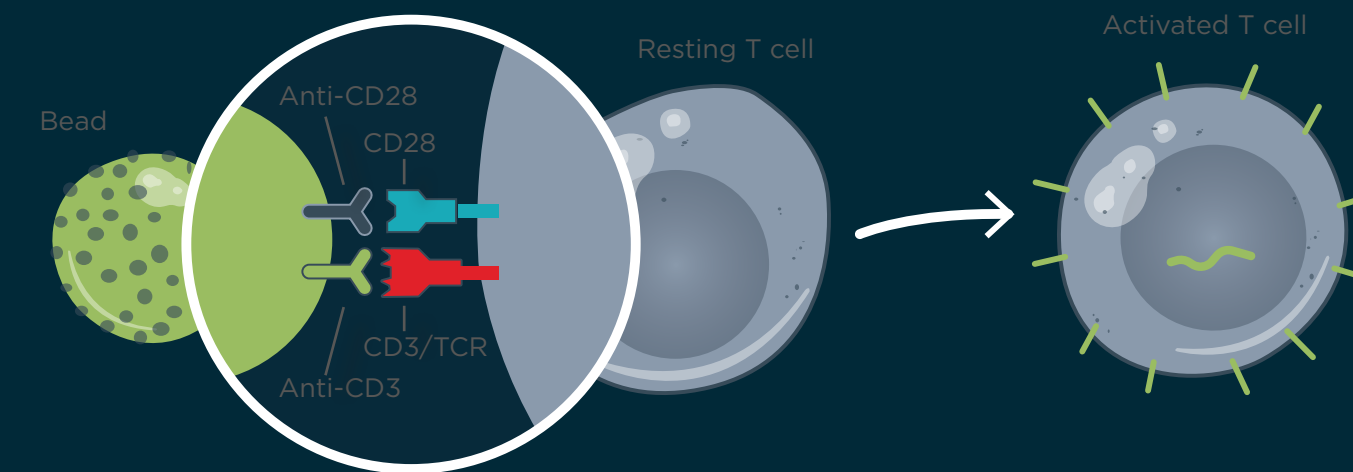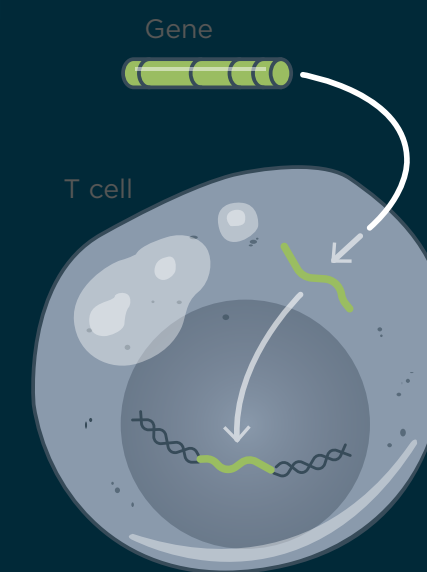
Gene
T cell

TRANSDUCTION:

Viral vectors, such as a lentiviral or retroviral vectors, insert genes expressing cancer-targeting chimeric antigen receptors (CARs) into T cells. The CAR consists of an antigen-recognition exodomain and costimulatory signaling domains that amplify T-cell activation.

Linker
VH
VL
Hinge
Two costimulation domains

3

6 PATIENT INFUSION:

The modified T cells are infused into a conditioned patient. They search and destroy cancer cells expressing the antigen targeted by the CAR.

5 CELL ANALYSIS:

Immunophenotyping is confirmed with flow cytometry analysis of the modified cells. Sterility, safety, and potency of the cell product are tested.

CELL EXPANSION:

Ex vivo expansion of cells in a bio-reactor. Critical culture parameters such as cell density, size, volume, and viability are monitored daily. Mean cell volume changes can be used to monitor the population size. Once the target population size is reached, the magnetic beads are washed out and the cells concentrated.
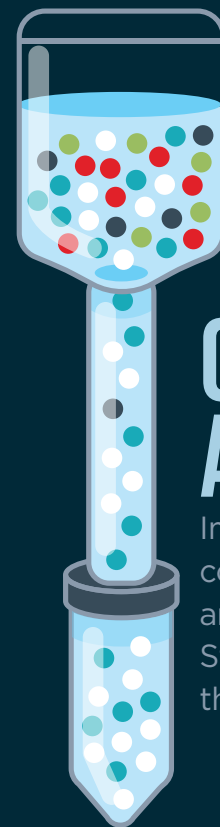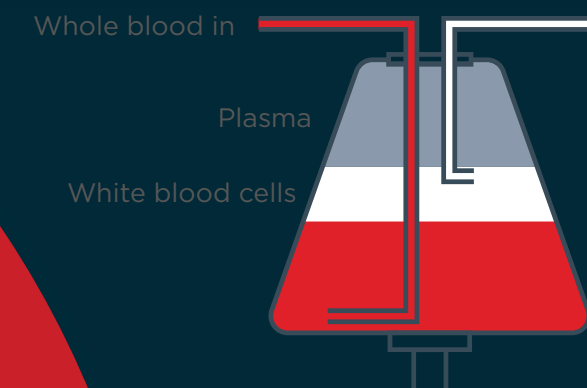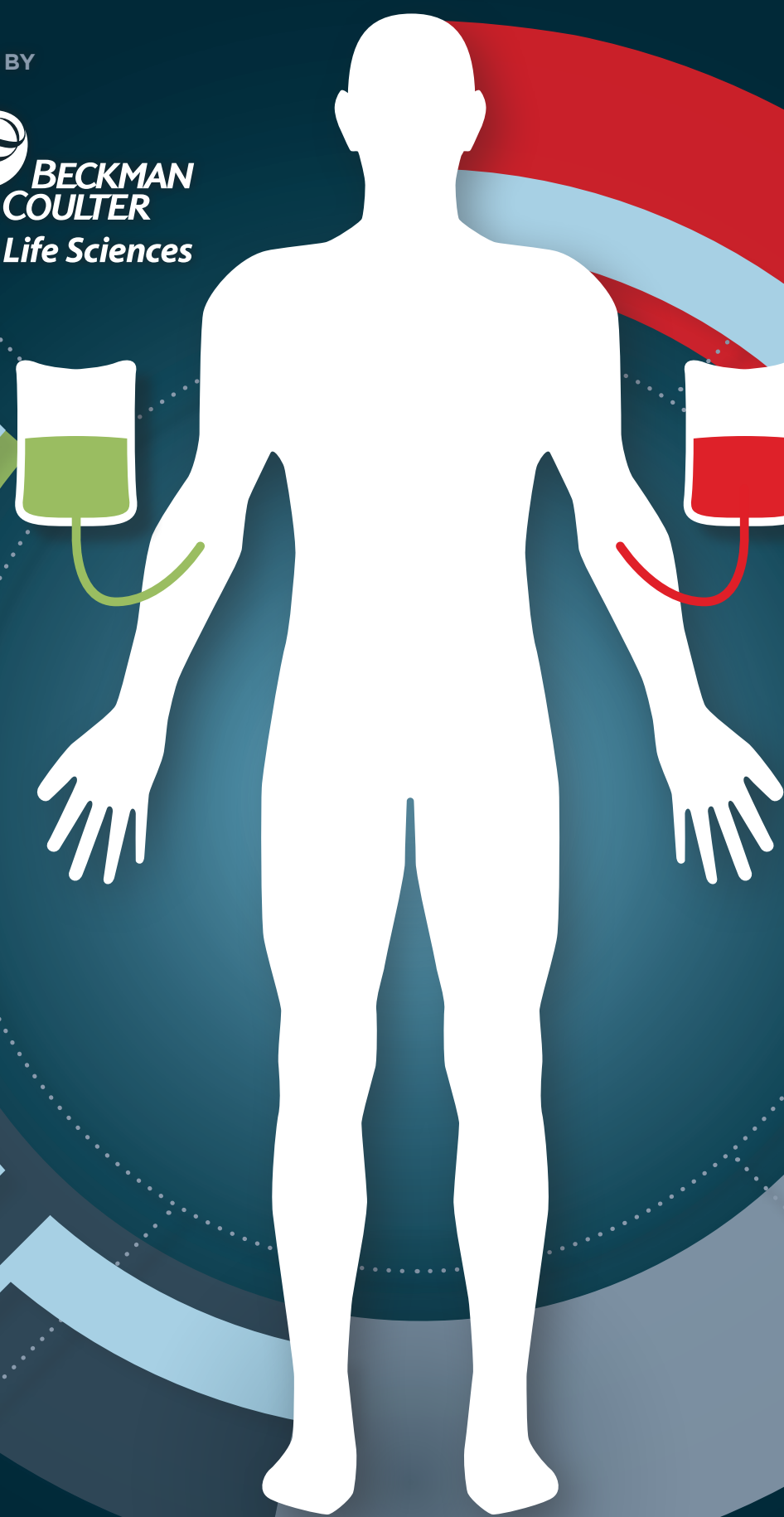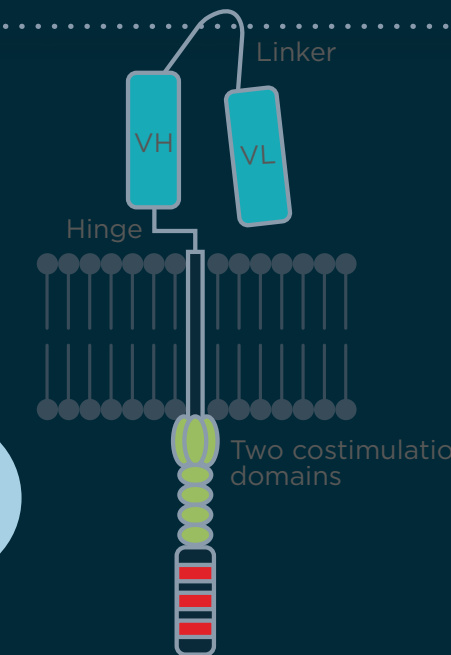
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TAKING AIM AT CANCER