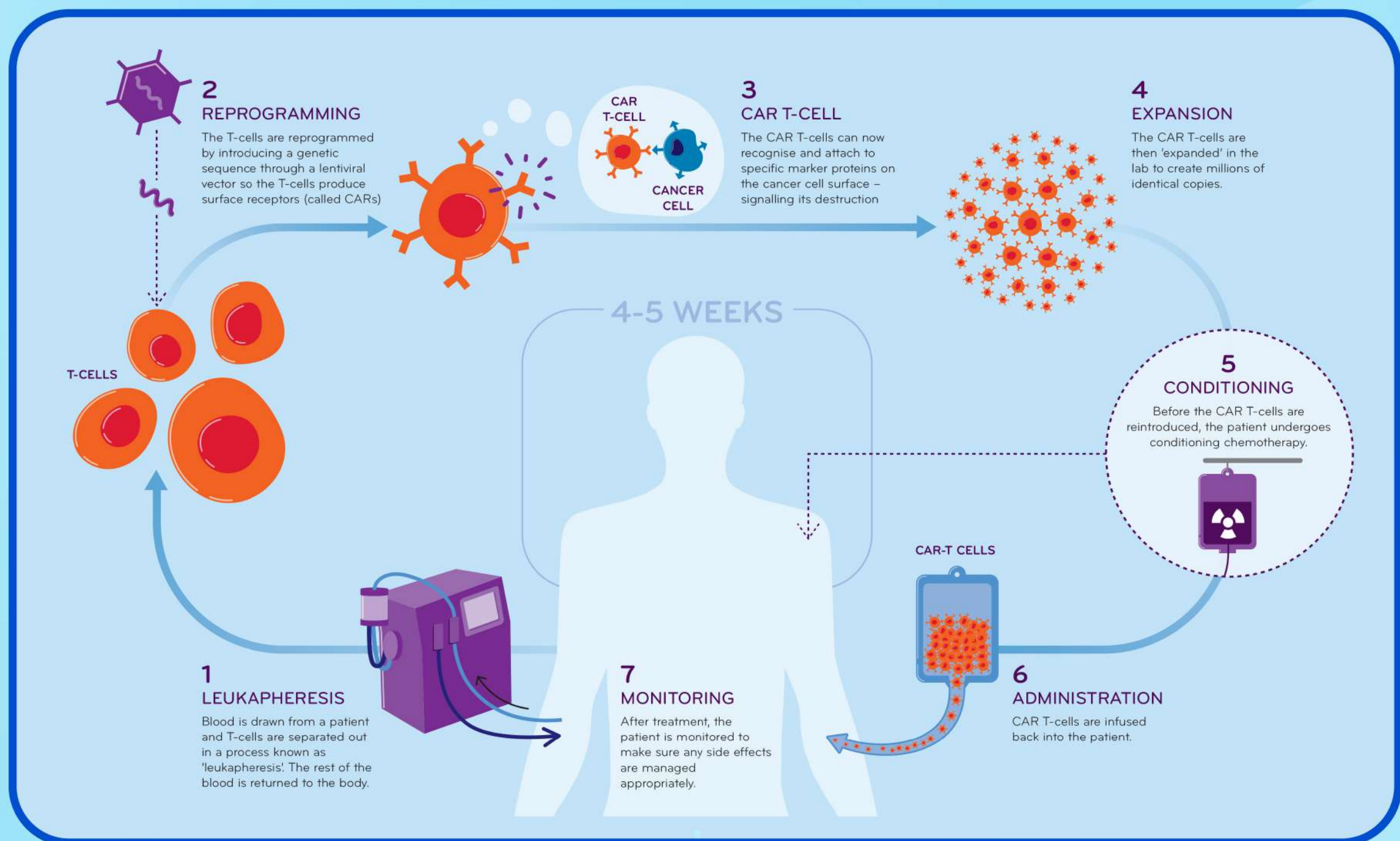




CAR T-Cell Cancer Therapy



WHAT ARE CAR T-CELLS?

Chimeric antigen receptor (CAR) T-cell therapies represent a quantum leap in the sophistication of cancer treatment. Unlike **chemotherapy** or **immunotherapy**, which require mass-produced injectable or oral medication, CAR T-cell therapies use a **patient's own cells**.

They are modified in the laboratory to activate T-cells, a component of immune cells, to attack tumours. These modified cells are then infused back into the patient's bloodstream after conditioning them to multiply more effectively.

The cells are even more specific than targeted agents and directly activate the patient's **immune system** against cancer, making the treatment more clinically effective. This is why they're called **'living drugs'**.



HOW DOES THE THERAPY WORK?

In CAR T-cell therapy, the **patient's blood** is drawn to harvest T-cells which are immune cells that play a major role in **destroying tumour cells**.

Researchers modify these cells in the laboratory so that they express specific proteins on their surface, known as **chimeric antigen receptors (CAR)**.

They have an affinity for proteins on the surface of tumour cells. This modification in the cellular structure allows CAR T-cells to effectively bind to the tumour and destroy it. The final step in the tumour's destruction involves its clearance by the patient's immune system.

WHERE IS IT USED?

As of today, CAR T-cell therapy has been approved for **leukaemias** (cancers arising from the cells that produce white blood cells) and **lymphomas** (arising from the lymphatic system).

These **cancers** occur through the unregulated reproduction of a single clone of cells, that is, following the **cancerous transformation** of a single type of cell, it produces millions of identical copies. As a result, the target for CAR T-cells is consistent and reliable.

CAR T-cell therapy is also used among patients with cancers that have returned after an initial successful treatment or which haven't responded to previous combinations of **chemotherapy** or **immunotherapy**.

Its response rate is variable. In certain kinds of leukaemias and lymphomas, the efficacy is as **high as 90%**, whereas in other types of cancers it is significantly lower.

WHAT ARE CONVENTIONAL CANCER THERAPIES?

The **three** major forms of treatment for any cancer are **surgery** (removing the cancer), **radiotherapy** (delivering ionising radiation to the tumour), and **systemic therapy** (chemotherapy-administering medicines that act on the tumour only).

Surgery and radiotherapy have been refined significantly over time whereas advances in systemic therapy have been **unparalleled**. A new development on this front, currently holding the attention of many researchers worldwide, is the **CAR T-cell therapy**.