Chimeric Antigen Receptor T Cell (CAR-T) Therapy

Individualized CAR-T therapy uses a patient's own immune system to fight certain types of cancers. A patient's T cells are extracted and reprogrammed outside of the body to recognize and fight cancer cells and other cells expressing a particular antigen.

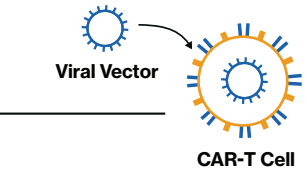
How CAR-T Therapy Works

1. Leukapheresis

A patient's white blood cells, including T cells, are extracted through a specialized blood filtration process (leukapheresis). The T cells are then cryopreserved and sent to our manufacturing facility for reprogramming

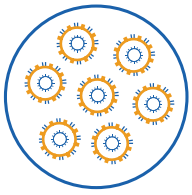
2. Reprogrammed cells

Using an inactive virus (viral vector), T cells are genetically encoded to recognize cancer cells and other cells expressing a specific antigen



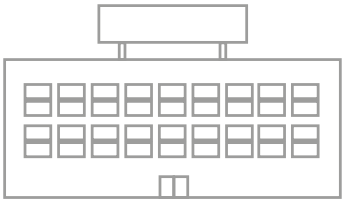
3. Expansion

Newly created CAR-T cells undergo expansion

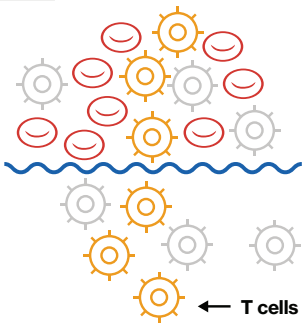


4. Quality Check

Strict quality testing occurs prior to the release and shipment of the CAR-T cells back to the patient



Manufacturing Facility

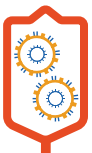


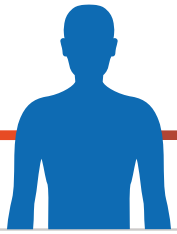
5. Lymphodepleting chemotherapy

Lymphodepleting chemotherapy is given to the patient to reduce the level of white blood cells and help the body accept the reprogrammed CAR-T cells

6. Cell Infusion

Deliver reprogrammed CAR-T cells into the patient's blood

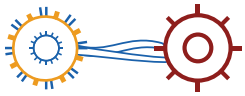




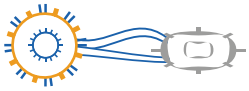
7. Cell Death

Within the patient's body, the CAR-T cells have the potential to recognize the patient's cancer cells and other cells expressing a specific antigen and attach to them, which may initiate direct cell death

CAR-T cells attach to cancer cells



Cell death is initiated



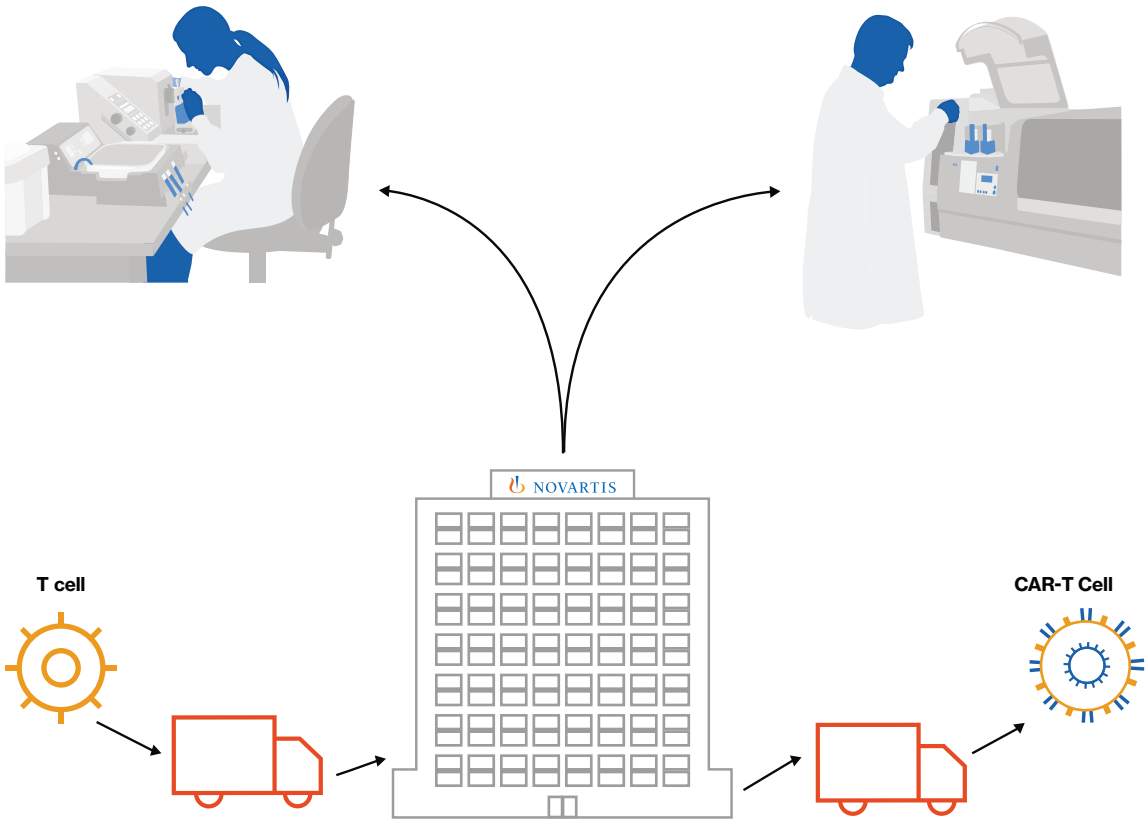
NOVARTIS

CAR-T therapies are manufactured for each individual patient

For decades, researchers have pursued various ways to utilize the human immune system to fight cancer. Through these researchers' innovation and perseverance, autologous CAR-T therapies were discovered.

In contrast to typical small molecule or biologic products, autologous CAR-T therapies are specifically manufactured for each individual patient and require a paradigm shift in the approach to manufacturing, logistics and administration.

Through a collaboration with the University of Pennsylvania (Penn), Novartis made an early commitment to the emerging field of CAR-T therapies. Its facility in Morris Plains, New Jersey, was the first manufacturing site approved by the FDA for immunocellular therapy production in the US, and has manufactured CAR-T cells for hundreds of patients in global clinical trials.



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