



India's CAR T-Cell Therapy

[Source: TH](#)

Why in News?

The clinical trial results of India's first [Chimeric Antigen Receptor \(CAR\) T-Cell Therapy](#), published in *The Lancet Haematology*, report a **73% response rate** in leukemia and lymphoma patients.

What are the Key Findings of India's CAR T-Cell Therapy Clinical Trial?

- **High Success Rate:** The trial involved patients with relapsed or refractory B-cell cancers (**Leukemia** (cancer affecting bone marrow and blood) and **Lymphoma** (cancer of the lymphatic system)), who often have limited treatment options.
 - Among the patients analyzed, **73% showed a positive response to the therapy**, offering new hope for such cases.
- **Comparable to Global Therapies:** India's **CAR T-cell** therapy matches global effectiveness but is **20 times cheaper**, costing Rs 25 lakh compared to Rs 3-4 crore internationally, where total expenses can exceed Rs 8 crore.
- **Side Effects Observed:** The clinical trials of India's CAR T-cell therapy reported manageable side effects, with patients experiencing **neutropenia** (low white blood cells), **thrombocytopenia** (low platelets), and developing [anemia](#) (low red blood cells).
 - Some patients showed **cytokine release syndrome (CRS)**, causing fever and inflammation.
 - **Two treatment-related deaths** were reported, but overall, the **safety profile was considered manageable**.

What is CAR T-Cell Therapy?

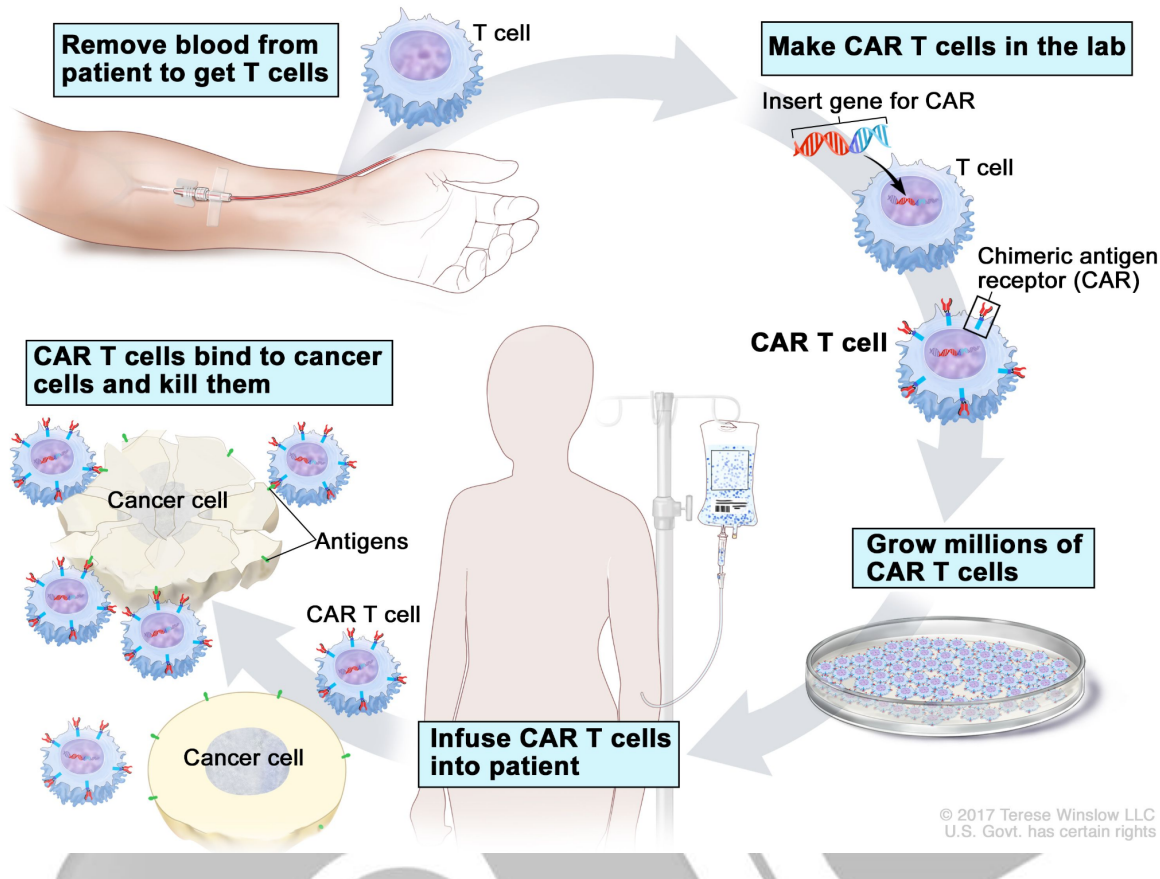
- **About:** CAR T-cell therapy is an advanced cancer treatment that modifies a patient's **T-cells (a type of immune cell)** to fight cancer more effectively.
- **Working:** A patient's T-cells are extracted from their blood and **genetically modified** (to recognize and attack cancer cells).
 - These modified cells, known as **Chimeric Antigen Receptor (CAR) T-cells**, are multiplied and reintroduced into the patient to **target B-cells and prevent relapses**.
- **Importance:** When B-cell tumors **relapse or become refractory** (return after treatment or do not respond to initial therapy), treatment options are limited, often leading to patient death.
 - Uncontrolled B-cell growth causes severe complications due to their role in **antibody production**.
 - India's CAR T-cell therapy provides an additional, patient-specific treatment option, as the modified T-cells remain in the body, offering long-term immunity against cancer recurrence.
 - It is a **patient-specific treatment**, making it highly precise compared to traditional chemotherapy.
- **NexCAR19:** In 2023, [NexCAR19](#) became India's first approved **indigenous CAR-T cell therapy**, developed through a collaboration between IIT Bombay, Tata Memorial Centre,

and **ImmunoACT** (a company incubated at IIT Bombay).

- As the world's most affordable CAR-T therapy, it positions India on the **global map for advanced cell and gene therapy**.

▪ **Implications:** Researchers are exploring CAR T-Cell Therapy applications and combination with immunotherapies, paving the way for broader adoption of **gene-modified cell treatments in India**.

CAR T-cell Therapy



UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Which one of the following statements best describes the role of B cells and T cells in the human body? (2022)

- (a) They protect the environmental allergens. body
- (b) They alleviate the body's pain and inflammation.
- (c) They act as immunosuppressants in the body.
- (d) They protect the body from diseases caused by pathogens.

Ans: (d)