

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.

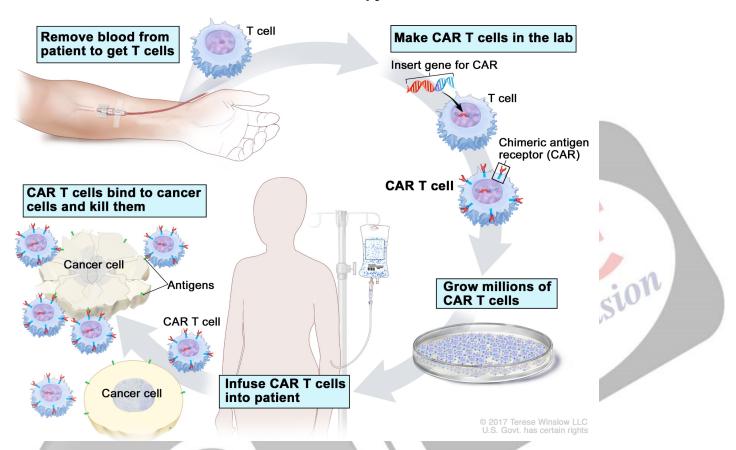
What is CAR T-Cell Therapy?

- 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)