

India's First Gene Therapy For Cancer

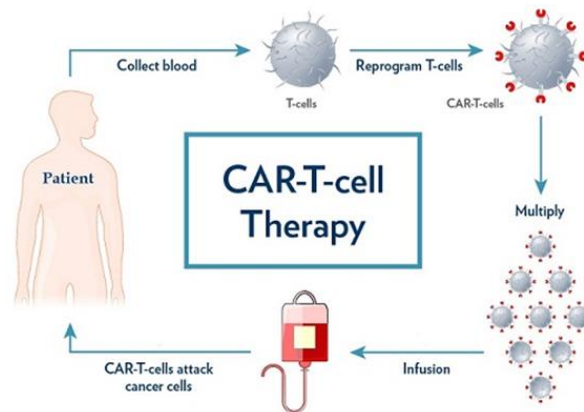
Why In News

- **President Droupadi Murmu** launched India's first indigenously-developed CAR T-cell therapy for **cancer treatment**, hailing it as a major breakthrough that provides "new hope for humankind" in the battle against the disease. Developed by the **Indian Institute of Technology (IIT) Bombay** and **Tata Memorial Centre**, the **gene-based therapy** is being rolled out in India at about one-tenth of its price outside the country, a senior official said.

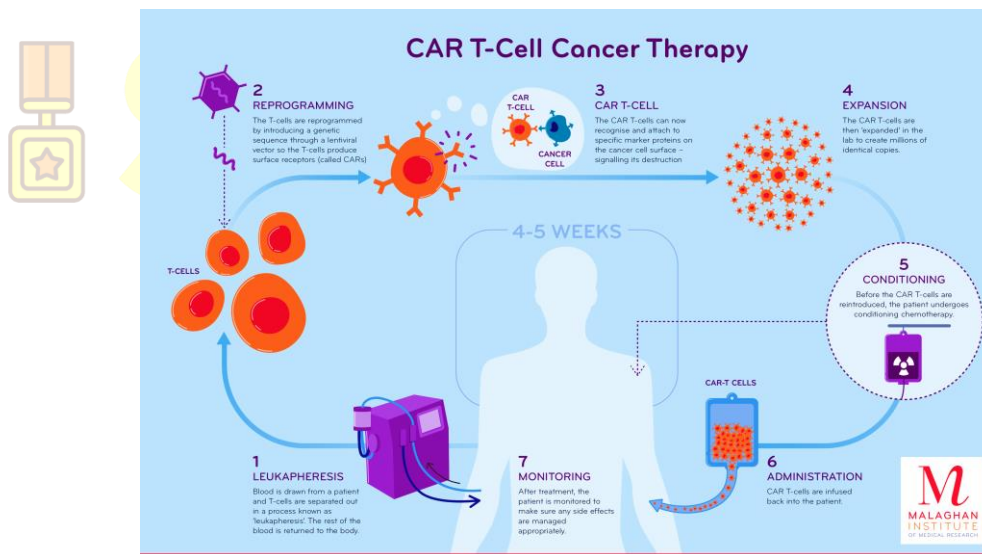


CAR T- Cell Therapy

- Speaking at the launch event at **IIT Bombay** here, Murmu said the **indigenous development** of the therapy was an example of the Make in India initiative.
- A **CAR T-cell therapy** involves modifying a patient's T cells (a type of immune system cell) in the laboratory and using them to attack and destroy cancer cells.
- The '**NexCAR19 CAR T-cell therapy**' is the country's first 'Made in India' CAR T-cell therapy which is expected to bring down the cost of treatment significantly. This therapy is considered a phenomenal advance in medical sciences, the president said in her speech.
- "The development of this therapy is also an example of the '**Make in India**' initiative and speaks volumes about Indian scientists and physicians," she said.

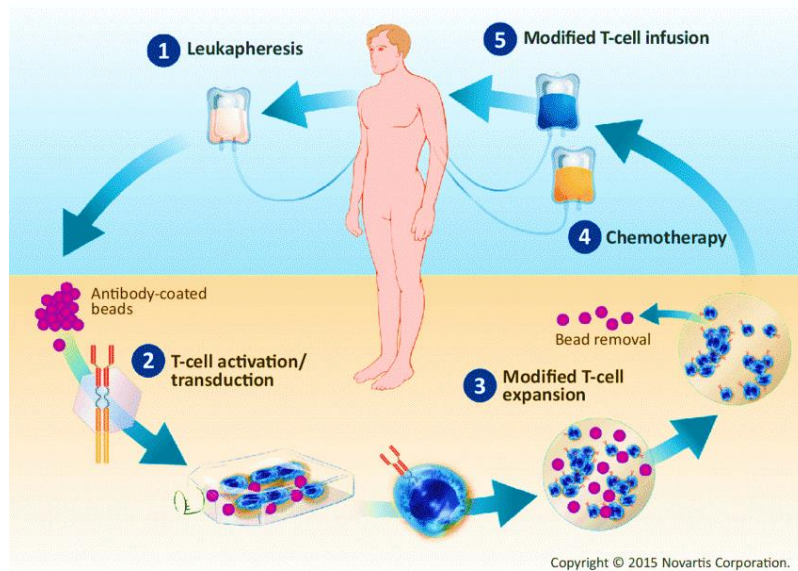


- "The launch of India's first gene therapy is a major breakthrough in our battle against cancer. As this line of treatment, named CAR T-cell therapy, is **accessible and affordable**, it provides a new hope for the whole of humankind," Murmu added. Sudeep Gupta, director of the Tata Memorial Centre, said the CAR T-cell therapy was enormously expensive and out of the reach of an overwhelming majority of people.

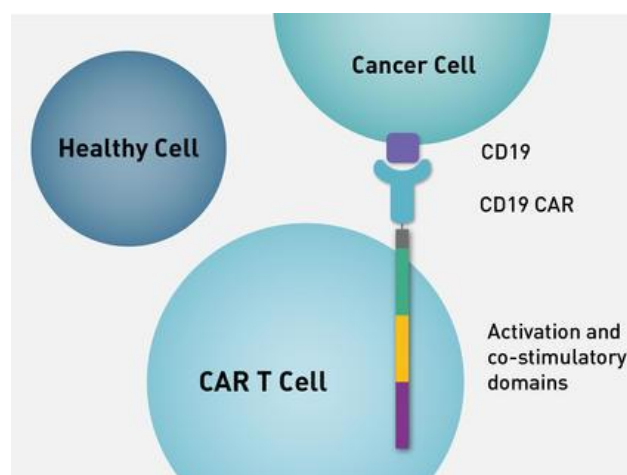


- **NexCar19 needs** to be custom manufactured for every patient under the most stringent conditions, but it has been rolled out at approximately one-tenth of the price at which it is available outside India, he said.
- IIT Bombay director Prof Subhasis Chaudhuri said the treatment costs approximately **Rs 4 crore abroad against Rs 30 lakh in India**. The low-cost CAR T-cell therapy is a huge achievement for the country and for cancer patients, and places India firmly on the global map of cell and gene therapy, he said.

- "Just like Chandrayaan-3 that launched India's entry into elite space club, the CAR-T cell therapy heralds India's entry into the cell and genetic engineering group," Chaudhuri said.



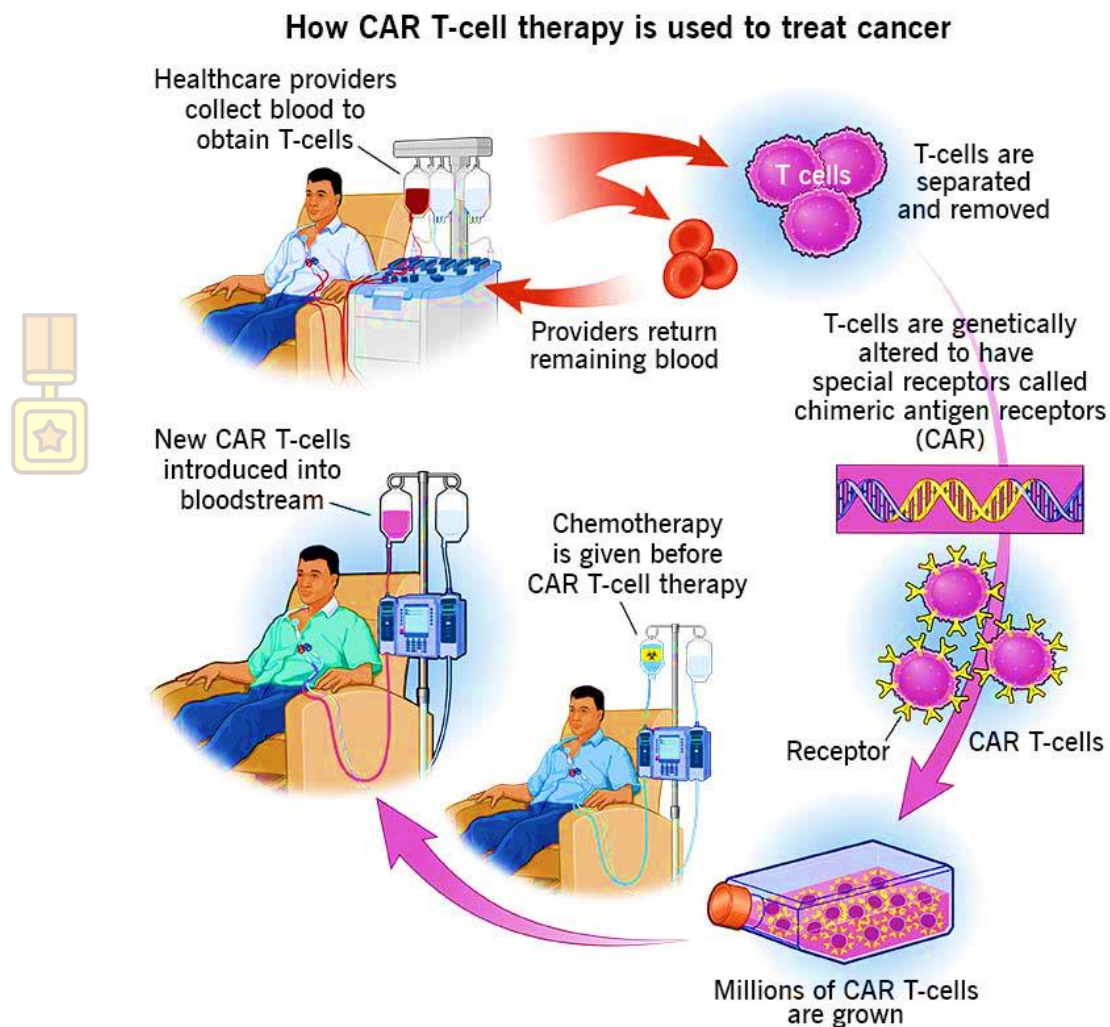
- Gupta said the treatment will help some **20,000 Indians every year**, and its rollout is a milestone in the field of cancer care and genetic engineering. "This treatment is not only a scientific achievement of the highest order, but also has immense practical application. **NexCAR19** will save many, many lives and wipe many, many tears," he said.



- Director of Tata Memorial Centre Dr. Sudeep Gupta said, "This **CAR-T Cell Therapy product** will save many lives at much lower cost compared to the cost of such products available outside India. We hope that in years to come, our collaboration will lead to the development of other Cell and Gene Therapy products that will help our patients with various cancers."

CAR-T Cell Therapy

- **CAR-T cell therapy**, also known as **chimeric antigen receptor T-cell therapy**, is a type of immunotherapy that uses a patient's own immune system to fight cancer.
- 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).
- CAR-T cell therapies, often referred to as '**living drugs**'.



- **Procedure:** It is a complex and personalised treatment process that involves:
- **Collecting T cells:** T cells, a type of white blood cell that helps fight infection, are extracted from the patient's blood through a process known as Apheresis.

- **Genetic Engineering:** In the laboratory, the T cells are genetically modified to express a special protein called a chimeric antigen receptor (CAR) on their surface.
- This CAR is designed to recognize and bind to a specific antigen (marker) found on cancer cells.
- **Expansion:** The engineered T cells are multiplied in large numbers in the lab.
- **Infusion:** The expanded CAR-T cells are then infused back into the patient's bloodstream, where they can identify and attack cancer cells that express the targeted antigen.