

NIH Clinical Center Patient Education Materials

Chimeric Antigen Receptor (CAR) T-Cells

What are CAR T-Cells?

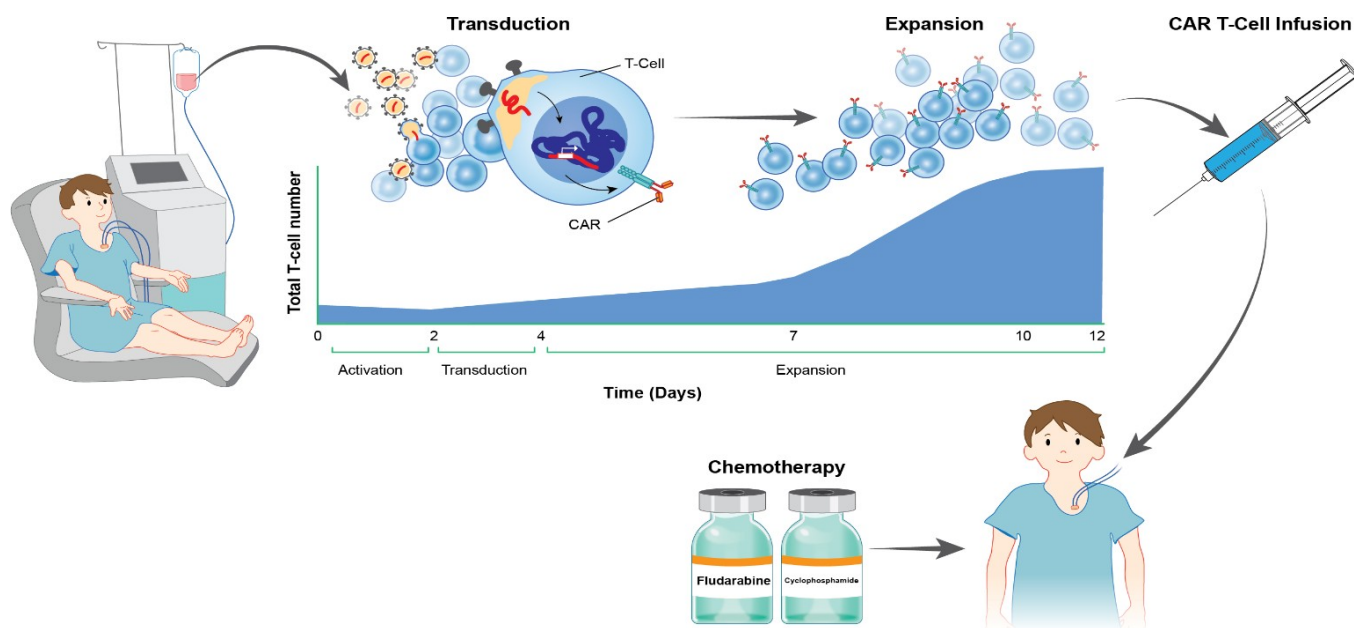
Chimeric antigen receptor (CAR) T-cells are infection and disease fighting white blood cells that have been collected from your immune system and changed in a lab to target and help fight cancer.

What is the goal of CAR T-Cell Therapy?

The goal for CAR T-cell therapy is to redesign your immune system to recognize and destroy cancer cells.

How are CAR T-Cells Made?

CAR T-cells are made by removing the white blood cells called lymphocytes, from your body through a process called apheresis. Apheresis involves putting a catheter into a vein and then directing the blood through a machine which removes the white blood cells. The lymphocytes are then sent to a lab. In the lab, an inactive virus and a specific gene are used to make your CAR T-cells. This process is called transduction. The CAR T-cells will be grown in the lab in large numbers to be used for your therapy. This growth of the cells is called expansion.



(Image from NIH Medical Arts)

Before CAR T-Cells...

You might take a short course of chemotherapy before getting your CAR T-cells depending on the protocol you are on. The goal of chemotherapy is to prepare the body to receive CAR T-cells but may not kill all the cancer cells left behind in your body. You are more likely to get chemotherapy if you have cancers of the blood cells, such as leukemia, lymphoma, and myeloma.

What happens the day I get my CAR T-Cells?

The day you receive your CAR T-cells will be like a normal day. Your nurse will take your vital signs. You will take your daily medications and you will be able to eat your meals. Before you get your CAR T-cells, your nurse may give you Tylenol® and Benadryl® to help prevent an allergic reaction.

How are the CAR T-Cells given to me?

Your CAR T-cells will be given as an infusion.

Where will I get my infusion and how long will it take?

The infusion will take place in your room on the unit. Usually the cells will be infused within an hour. This time can be shorter or longer depending on the protocol you are on. Your nurse will check your vital signs often during and after the infusion.

Will I have side effects from the CAR T-cells infusion?

Generally, patients do well after the infusion. However, you may feel these symptoms:

- Fever
- Itching
- Fast heart rate
- Cytokine Release Syndrome

Please tell your medical care team right away if you experience any of these symptoms.

What is Cytokine Release Syndrome?

After CAR T-cell therapy, your white blood cells will be stimulated and will release inflammatory cytokines. Cytokines are proteins that allow cells to communicate with one another. These cytokines affect your immune response to the cancer. An increased inflammatory response from the cytokines is called Cytokine Release Syndrome (CRS). This inflammatory response can range from mild to life threatening side effects after CAR T-cell therapy.

What do you need to know about Cytokine Release Syndrome?

The signs and symptoms of CRS may occur any time after your CAR T-cell infusion, but will generally occur within 1-2 weeks after your infusion. Sometimes CRS may occur up to several weeks after the infusion. This is why it is important for you to know signs and symptoms of CRS so you can notify your provider.

Common signs and symptoms of CRS include:

- Low blood pressure
- Fever (sometimes high fevers)
- Chills and flu-like symptoms
- Headache
- Fast heart beat
- Shortness of breath
- Muscle aches
- Changes in thinking or behavior (confusion or memory loss)
- Seizures

What symptoms can I expect from Cytokine Release Syndrome?

Your medical care team will treat your CRS related symptoms. You may receive fluid through your IV or central line to help raise your blood pressure. If your blood pressure remains low after the fluids, you may be transferred to the intensive care unit for closer monitoring. You may receive medications through your IV or central line to help increase your blood pressure. Some of these medications can only be given in the intensive care unit.

What are additional treatments for Cytokine Release Syndrome?

The treatments that you receive will depend on your symptoms. If you have a high fever, you may receive Tylenol®. You may also need oxygen if you have shortness of breath. In severe cases of CRS, your medical care team may give you a medication called tocilizumab. Your medical care team may also give you steroids to help control your body's response.

What happens after my CAR T-Cell infusion?

After your CAR T-cell infusion, you may stay in the hospital for observation. This will help your medical care team to monitor and treat any related side effects. Once you leave the hospital, you and your caregiver will need to look for signs of CRS. If untreated, CRS can be life threatening. It is very important for you to contact your medical care team or go to your local emergency room if you have any CRS signs or symptoms while you are at home.

This information is prepared specifically for persons taking part in clinical research at the National Institutes of Health Clinical Center and may not apply to patients elsewhere. If you have questions about the information presented here, talk to a member of your medical care team.

Products/resources named serve as examples and do not imply endorsement by NIH. The fact that a certain product/resource is not named does not imply that such product/resource is unsatisfactory.

National Institutes of Health Clinical Center

Bethesda, MD 20892

04/18/19

[Questions about the Clinical Center?](#)

