



What you should know about CAR T-cell therapy

Chimeric antigen receptor (CAR) T-cell therapy

What is CAR T-cell therapy?

CAR T-cell therapy is a new treatment to fight some cancers. It involves using your body's own immune system to treat your cancer. In August of 2017, the Federal Drug Administration (FDA) approved this treatment for some blood cancers. The treatment is also available in some clinical trials at Dana-Farber Cancer Institute (DFCI).

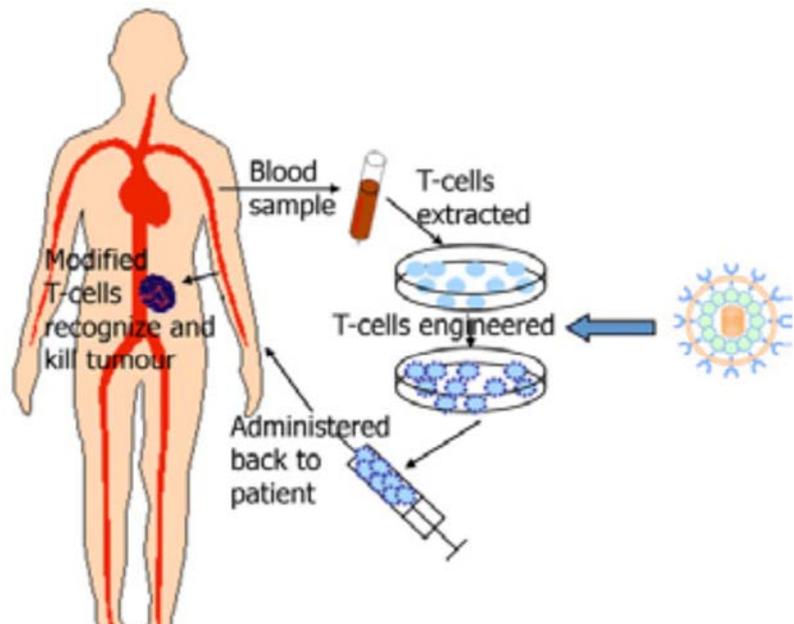
How it works

The immune system is made up of specific cells and organs that protect your body from germs, health problems and abnormal cancer cells. CAR T-cell therapy changes your immune system and helps the body's know how to fight certain cancers.

CAR T-cell therapy changes some of your body's T cells, which are taken from your own blood.

In a lab, your T-cells will be reprogrammed to make special receptors called chimeric antigen receptors (CARs). When these CARs are placed back into your body through an IV catheter, the receptors should help your T cells find and destroy cancer cells.

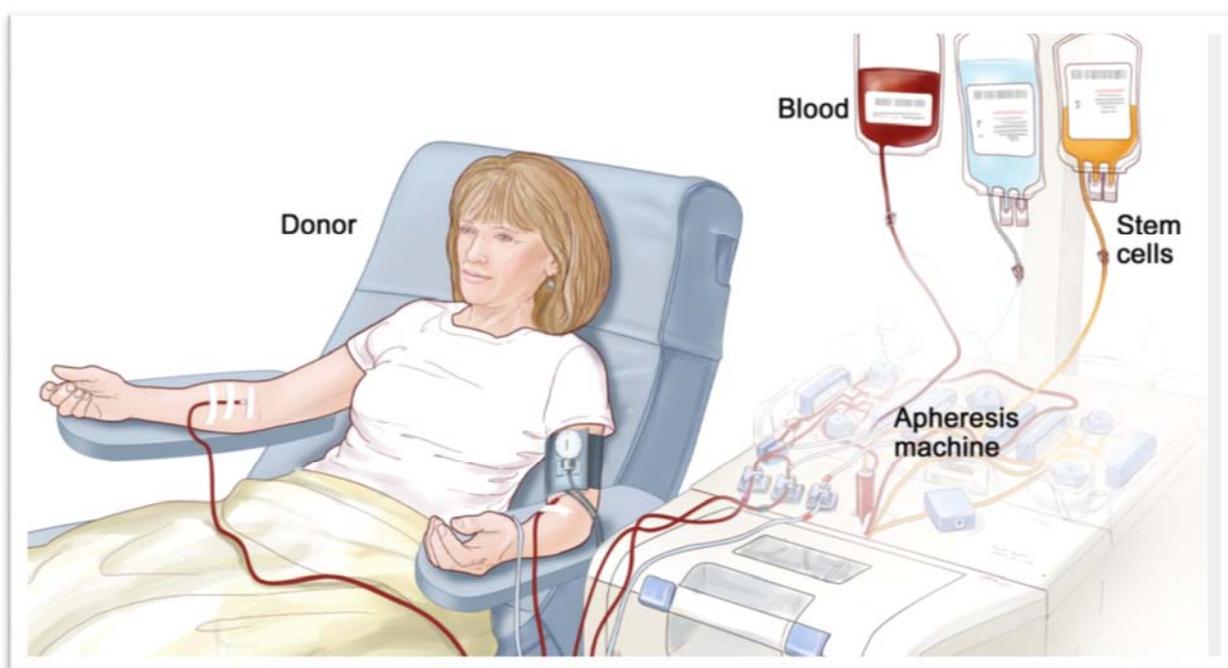
Throughout this process, careful measures are in place to make sure you are safe.



Graphic used with permission from The Stiliyan Petrov Foundation (SPF), with reference to the Department of Haematology at the University College London, UK. www.thestiliyanpetrovfoundation.com/cart-t-cell.html

Steps before the actual treatment

- You will first be checked by your DFCI cancer care team to find out if CAR T- cell therapy is right for you.
- If the treatment is right for you, your cancer care team will make an appointment for you to have *apheresis*. Apheresis is a one- day procedure at the **Kraft Family Blood Donor Center at Dana-Farber Cancer Institute and Brigham and Women’s Hospital**, found in the Jimmy Fund Building at Dana-Farber.
- During apheresis a machine collects your T-cells. It separates cell parts. Then returns unneeded blood back to you. This can be done with 2 IV’s placed in both arms as in the picture below or your cancer team may suggest a central line. A central line is a catheter placed into a large vein often in the neck or chest.
- After the T-cells are collected, they are engineered to express a CAR protein that will target your cancer. The cells are then prepared for infusion back into your body. This part of the step may take a few weeks.



The infusion of the CAR T cells

- When your health care team is told that your CAR T- cells are ready, they will call you to discuss your treatment plan.
- You may need chemotherapy(chemo), in the days before getting your CAR T- cells. This is to help make an environment in your immune system where the new cells can spread out and attack your cancer. You may get this chemo in one of three ways:
 - Outpatient
 - Specific inpatient admission
 - As part of your admission to get your CAR T- cells

- When your CAR T- cells are ready, you will be admitted to Brigham and Women's Hospital.
- Your CAR T cells will be infused through a central line. You will get drugs to stop a reaction. This step takes about 15 mins.
- Your cancer team will check you closely. You will get drugs to lessen side effects. Your response will depend many factors; cancer type, cancer location, dose of treatment and your overall health. You may stay in the hospital for a few days or a few weeks, based on your response.

Things that may happen hours or days after your CAR T- cell infusion

- **Cytokine release syndrome.** In some people, the immune system is activated as the CAR T- cells travel through the body. Substances called *cytokines* are released into the blood stream. You may feel like you have the flu; with a high fever and/or chills. Other symptoms are low blood pressure, trouble breathing or confusion. These symptoms may be mild or severe. Your cancer team will watch you closely. You may need oxygen, IV fluids, and/or drugs (such as steroids) to keep your fever down. In severe cases, you may get specialized drugs designed to stop the effect of the cytokines. Some patients are moved to the Intensive Care Unit for closer monitoring. Before your infusion, talk with your doctor and cancer team. Based on your cancer and treatment plan, ask what side affects you should expect.
- **Neurotoxicity.** In some patients, the nerve system and brain may be affected by CAR T -Cells. Early symptoms are confusion, trouble speaking and extreme tired. Symptoms may progress to seizures or unconsciousness. This may be from brain swelling. Your cancer team will check you closely. Treatment may involve specific drugs to treat the symptoms and/or steroids. Some patients need to be transferred to the Intensive Care Unit for closer monitoring.
- In very rare or severe cases, these side effects may be fatal. More often, when these side effects last for many days to many weeks, they often do resolve.

Things that may happen days or weeks after CAR T-cell infusion

- **B-Cell Aplasia.** B cells are an immune system cell. Lymphomas involves B cells. CAR T- cells may target normal B cells and tumor B cells. This may cause a big drop in the number of normal B cells in your body. Since B cells prevent germs, you may need a drug called *immune globulin* to support your immune system. You may get this drug for many months or even years after your CAR T-cell infusion.
- **Tumor Lysis Syndrome.** CAR T-cell therapy is designed to target your cancer cells. In some cases, this process destroys large amounts of tumor quickly. When the cancer cells die, they are released into your bloodstream. This can result in shifts of fluid and minerals, that may lead to kidney damage. Your team will have a treatment plan for you, if needed. This may involve chemo before T-cell infusion, IV fluids, and/or drugs to help the body clear the cancer cells and protect the kidneys.

After you leave the hospital

You will get a CAR T-Identification card. Keep this with you always.

You should call your Dana-Farber doctor if you have any symptoms of **cytokine release syndrome or neurotoxicity** (see above). If your symptoms are severe, go to the emergency room as you make that call.

- Symptoms of cytokine release syndrome can be like an acute infection. The symptoms can be severe and happen quickly. This is considered an emergency that needs urgent medical treatment. Sometimes this can be life-threatening. **Seek immediate medical care.**

IMPORTANT REMINDER

During the first 2-3 months after getting CAR T -cells, if you visit any doctor (such as the emergency room), let them know you recently received CAR T-cell therapy.

It is important they call your DFCI CAR -T doctor and/or the number on your CAR T- identification card.

THIS SPACE RESERVED FOR WRITTEN COMMENTS OR NOTES FOR THE PATIENT AND FAMILY:

The information in this document includes some, but not necessarily all, of the possible side effects of this therapy. The side effects listed in this teaching sheet may not be the same ones you experience. Your side effects may be different, depending on how often you receive treatment (your schedule) and how many cells you receive (your dosage). Side effects may also differ if you are taking other drugs. Please speak with your doctor or nurse if you have questions about possible side effects. This document should not take the place of conversations with members of your health care team. If you experience any significant change in your health during or after treatment, contact a member of your health care team right away.

