Investigational CAR-T Cell Therapies

CAR-T cell therapies that target CD19, CD22, CD30, and CD33 are in development for patients with lymphoma and chronic lymphocytic leukemia (CLL). Clinical trials are ongoing to study the safety and efficacy of these CAR T cell therapies for lymphoma.

General CAR-T cell therapies, including those based on malignant (ACAR-T) or clinical trials involving the use of CART for certain CAR-T cell therapies and treatments in some subtypes of lymphoma. There are also second generation CAR-T cell therapies that may improve their effectiveness in treating lymphoma.

The Benefits of Participating in a Clinical Trial

Clinical trials are not a test for patients. Every drug approved today had to be tested in clinical trials before it was approved for general use, and all new and emerging treatments for lymphoma and chronic lymphocytic leukemia (CLL) are tested on patients in clinical trials before patients can use them in the future. Participating in a clinical trial can help to improve the health of patients for many years to come. Clinical trials offer both benefits and risks. Patients in clinical trials may be able to try new treatments that are not otherwise available to all patients. However, the new treatment being tested may not be more effective than others already available. Some patients may not benefit from clinical trials, and the side effects of clinical trial participation may worsen the health of the patient enrolled in a clinical trial.

Commonly Asked Questions

How is CAR-T cell therapy different from stem cell transplantation?

Both stem cell transplantation and CAR-T cell therapy are chemo therapies, and many of the steps in the procedures are similar, including conditioning therapy, and the collection and storage of the stem cells. However, CAR-T cell therapy and stem cell transplantation differ in many ways. Autologous transplantation is not immunotherapy (producing the body’s own immune response), but gives a patient autologous stem cells (either own stem cells) or allogeneic stem cells (from a family member or unrelated donor). Patients are given cancer-killing T cells which are modified to produce CAR T cells that target and destroy lymphoma cells. Allowing T cells to home to the tumor site, and controlling the T cells to avoid damage to healthy cells that express those receptors of the CART T cell. Additionally, the chemotherapy prior to CART T cells is generally less intense than the chemotherapy prior to transplants, which can have side effects, and the side effects caused by cytokine release syndrome (CRS) are unique to CART cell therapy.

Is the procedure covered by insurance?

Before undergoing this procedure, check with your medical insurance provider to see what costs the provider will cover and what costs you will be responsible for paying. The medical center can help to arrange for additional information to determine if your insurance will cover these procedures. If there is a dispute about coverage or compensation is denied, ask your insurance provider about their appeals process. If a dispute cannot be resolved, contact your state insurance commissioner or your attorney to discuss your case.

Questions to Ask Your Doctor

Which symptoms should I call my healthcare provider about or go to the emergency room if I experience any of the following?

- Fatigue, rapid heartbeat, nausea, feeling short of breath, and/or fever.

What costs will I be responsible for paying?

You will need to seek immediate attention for any of the following:

- Signs or symptoms associated with CRS including fever, chills, or fever.
- Signs or symptoms associated with bone marrow suppression including fatigue, low blood pressure, or fever.
- A recent or active infection
- Kidney conditions
- Liver conditions
- Neurologic conditions (such as seizure, stroke, or loss of memory)
- Low blood pressure
- Infection
- Kidney conditions
- Liver conditions
- Neurologic conditions

What should I do to take care of myself during and after CAR-T cell therapy?

- Will I still be able to work?
- Will I need to be tested?
- Do I need a new insurance plan?
- Can these side effects be prevented or controlled?
- What is the goal of this treatment? What are the expected benefits?
- How will this treatment affect my normal daily activities (work, driving, childcare, etc.)?
- Would CAR-T cell therapy be a good treatment option for me?
- Will I need to be tested?
- How will we know if the CAR-T therapy is working? What tests will be performed?
- What are the side and possible side effects of this treatment?
- Can these side effects be prevented or controlled?
- What treatment will I need to manage these side effects?
- Will I require bridging therapy? If so, what type?
- How will this treatment affect my daily activities (work, driving, childcare, etc.)?
- How will I be able to see a child of mine on my trial and after treatment?
- Can I still be a caregiver or driver or do I need to take a new test?
CAR T-Cell Transport

Leukapheresis

The first step of CAR T-cell therapy is to obtain some of your T-cells, a type of white blood cell. White blood cells work as part of the immune system to help the body fight infections. This process is called leukapheresis and usually takes about three to four hours.

• During leukapheresis, your blood is often removed through a central line in which a catheter is inserted underneath your collar bone, referred to as “pheresis catheter.” Sometimes, an intravenous (IV) line may be used instead.

• Your blood is then passed through a machine that separates your lymphocytes, included T-cells, from the other blood cells. Your T-cells are then isolated from the other cells.

• The rest of your blood cells are returned to your body through the pheresis catheter or an IV line inserted in the arm.

The apheresis product containing your lymphocytes are sent to a processing center (lab) where the T cells are separated from the bone, referred to as “pheresis catheter”. Sometimes, an intravenous (IV) line may be used instead.

• The CAR T cells are then grown at the processing center for one to four hours.

• This gives the CAR T cells the chance to grow and expand to fight your lymphoma.

The rest of your blood cells are returned to your body through the pheresis catheter or an IV line inserted in the arm.

T-Cell Engineering

The purpose of the chemotherapy is to suppress the immune system so that the immune system does not inhibit your CAR T-cells once they are infused.

• The engineered T cells are then grown at the processing center for one to four hours.

• This gives the CAR T cells the chance to grow and expand to fight your lymphoma.

Lymphodepleting Chemotherapy

A few days prior to your CAR T-cell infusion, you will receive 3 to 4 consecutive days of chemotherapy as an outpatient.

• The symptoms can include flu-like symptoms, fever, low blood pressure, and body aches.

• You may be given acetaminophen (Tylenol) and/or diphenhydramine (Benadryl) before the infusion to prevent allergic reactions to the preservative in the CAR T-cell product.

• CAR T-cell therapy is typically given as an outpatient treatment in most patients.

• If you have a central line in which a catheter is inserted underneath your collar bone, referred to as “pheresis catheter,” your T-cells will be separated from the other blood cells and sent to the processing center.

• During leukapheresis, your blood is removed through a central line in which a catheter is inserted underneath your collar bone, referred to as “pheresis catheter.” Sometimes, an intravenous (IV) line may be used instead.

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T-Cell Infusion

A day or two after completing chemotherapy, you will receive your CAR T-cells as an outpatient in the treatment center. This can be done either as an inpatient or as an outpatient depending on the facilities available at your treatment center.

• The infusion of CAR T cells takes less than one hour.

• The infusion of CAR T cells can cause mild to moderate side effects.

• The symptoms can include flu-like symptoms, fever, low blood pressure, and body aches.

• You will be monitored for 2 to 4 hours after the infusion of the CAR T-cells.

• Other side effects may include severe or life-threatening reactions.

• If you have a central line in which a catheter is inserted underneath your collar bone, referred to as “pheresis catheter,” your T-cells will be separated from the other blood cells and sent to the processing center.

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The engineered T-cells are then grown at the processing center for one to four hours. Once the CAR T cells are available, the cells are then infused into your body to start the treatment process.