CLL SOCIETY
Resource Library

CAR-T THERAPY

Chimeric Antigen Receptor T-cell (CAR-T) therapy is a potent cellular immune treatment that genetically trains an individual's immune system (specifically, the T-cells, a type of white blood cell) to both recognize and attack cancerous cells. CAR-T cells are specially manufactured in a laboratory for each individual using their own unique cells. These manufactured cells are trained to target and destroy a surface protein called CD19 which is found on various types of blood cancer cells, including chronic lymphocytic leukemia (CLL) and small lymphocytic lymphoma (SLL). CLL and SLL cells are known for being able to hide very well from the immune system which allows them to survive and grow. To help the immune system better locate these cells, the re-engineered T-cells have artificial receptors on them called CARs which help the person's immune system to better detect and destroy the cancer.

WHY IS IT IMPORTANT TO UNDERSTAND CAR-T THERAPY?

It is common for those with the disease to eventually stop responding to other available treatments over time. CAR-T therapy has shown promising results in treating very challenging cases of the disease where the disease has returned after multiple different treatments, and few other options remain available. Those with CLL or SLL should be aware of and seek to understand all available therapies for the disease to help plan for what next treatment options are available.

HOW ARE CAR-T CELLS MADE?

The person needing CAR-T therapy is given an intravenous (IV) line which is connected to a specialized machine that collects blood. This machine then separates the T-cells from the blood and then returns the remaining blood components back to the person's body. This process is called leukapheresis. After that, the collected T-cells are sent to a laboratory for further processing where the T-cells are genetically reengineered. These newly reengineered T-cells are multiplied until millions of them are then ready to be infused back into the bloodstream of the person who is undergoing the CAR-T therapy. After the CAR-T cells are infused, they will then identify, attack, and eliminate the cancerous cells while also helping to prevent their reoccurrence.

HOW IS CAR-T THERAPY ADMINISTERED?

CAR-T is administered via an infusion through an IV that is inserted into the vein. CAR-T infusions typically last less than an hour and can be carried out either in an inpatient or outpatient hospital setting. Following the infusion, the individual is closely monitored for a few weeks to detect any toxic reactions that may occur due to the rapid death of cancer cells caused by the CAR-T cells.

WHAT ARE SOME ADVANTAGES OF CAR-T THERAPY?

CAR-T therapy provides a treatment option without the risk of graft versus host disease, which is associated with bone marrow transplants. Graft versus host disease occurs when an individual receives stem cells from another person, which can result in the transplanted cells attacking the new host. Since CAR-T therapy uses the person's own immune cells, there is no risk of this potentially life-threatening complication. Another advantage of CAR-T therapy is it is the ultimate short-duration therapy because it is a single infusion that can provide many years of remission.

WHAT ARE SOME POSSIBLE DISADVANTAGES ASSOCIATED WITH CAR-T THERAPY?

One of the main disadvantages is that CAR T-cell production is a slow process. A batch of CAR-T cells is individually made for each person who needs them "on-demand" and can take as long as four weeks to manufacture in the laboratory setting.

Another disadvantage is that CAR-T therapy may cause the excessive release of inflammatory chemicals called cytokines when it is working. This can lead to a condition known as cytokine release syndrome (CRS), which can cause a range of symptoms from mild to life-threatening. Symptoms of CRS associated with CAR-T Therapy may include the following:

- Fatigue/severe tiredness
- Fevers higher than 100.4 degrees Fahrenheit
- Nausea
- Chills
- Low blood pressure
- Rapid heart rate
- Headache
- Rash

CAR-T THERAPY (continued)

- Scratchy throat
- Shortness of breath
- Neurological events (ranging from mild confusion to seizures) can occur occasionally

Although side effects of CAR-T therapy can be unpleasant, worrisome, and in rare cases dangerous, they can almost always be fully and quickly resolved with supportive treatments.

Another disadvantage is that with successful CAR-T therapy there may be some abnormally low blood cell counts and there can be a prolonged loss of all B-cells (including the healthy ones). B-cells are a type of white blood cell whose function is to make antibodies to fight off infections. Therefore, this loss of B-cells impairs the body's ability to prevent and fight off infection. Should this occur, immunoglobulin replacement therapy may be necessary, and those who receive CAR-T should take additional infection control measures.

CLL SOCIETY MISSION

CLL Society is an inclusive, patient-centric, physician-curated nonprofit organization that addresses the unmet needs of the chronic lymphocytic leukemia and small lymphocytic lymphoma (CLL/SLL) community through patient education, advocacy, support, and research.

WHAT SHOULD BE TAKEN INTO CONSIDERATION WHEN DETERMINING IF CAR-T THERAPY MIGHT BE A GOOD TREATMENT OPTION?

CAR-T therapy might be the best treatment option when the individual:

- Is well enough to tolerate a short duration of a potentially challenging therapy, and
- Has a care partner who can provide support during the CAR-T process, and
- Desires a type of treatment that offers a possible deep and long response, or
- Has no other treatment options that are likely to work or provide a deep and long-lasting response.

CAR-T is a powerful cellular-based therapy that may offer some individuals living with the disease the hope for deep and durable remissions. Talk to your healthcare team to determine if CAR-T might be a viable treatment option for you at some point in your cancer journey.