

HAVING CHIMERIC ANTIGEN RECEPTOR T-CELL (CAR T-CELL) THERAPY

WHAT'S IN THIS FACTSHEET?

This is a very brief guide to a type of therapy you may receive if your stem cell transplant, or other treatment, is unsuccessful. We've provided some information here about what CAR T-cell therapy is, how your own cells are used to make it and the possible side effects. There's also information about where you can get support and further information if you need it.

WHAT ARE CAR T-CELLS?

T cells are a type of white blood cell that form an important part of your immune system. They recognise abnormal cells, such as cancer cells, and destroy them. This is done using proteins on their surface called receptors. They bind to proteins found on cancer cells but not on normal cells. Sometimes, cancer cells can survive by disguising themselves from being recognised by T cells.

When scientists change the DNA of T cells to make them produce a new type of receptor, called a Chimeric Antigen Receptor (CAR), they become CAR T-cells. These CAR T-cells are more efficient at binding to and removing cancer cells. They also send out signals that attract other immune cells and cause them to rapidly reproduce near the cancer cells. This increases the chance of all the cancer cells being removed.

WHO CAN HAVE CAR T-CELL THERAPY?

CAR T-cell therapy has been approved to treat children and young adults with B cell acute lymphoblastic leukaemia (ALL) and adults with large cell lymphoma living anywhere in the UK. In both cases, it's only offered after other treatments have been unsuccessful.

There are lots of other CAR T-cell therapies being tested in clinical trials right now. If the results are positive, these therapies may be available to a wider range of patients in the future. CAR T-cell therapy is currently only available in a few UK hospitals, meaning patients may need to travel to receive treatment. It may be available at more hospitals in the future.

CAN I JOIN A CLINICAL TRIAL?

Clinical trials are a type of medical research study. They test new treatments in a group of patients before they're approved for the NHS to use. They're based in either one or a few hospitals throughout the country and can only accept patients based on the type of blood cancer they have and their treatment history. Unfortunately, if you don't meet the medical criteria the trial needs, you won't be able to take part. Your medical team will be able to talk to you about suitable trials when the time comes.

WILL CAR T-CELL THERAPY REPLACE STEM CELL TRANSPLANTS?

For some patients, it's possible that CAR T-cell therapy may become an alternative to stem cell transplants in the future. Other patients are likely to only be offered the treatment if their transplant is unsuccessful. However, it's difficult to make predictions at this early stage.

WHAT WILL HAPPEN?

To your cells:

An apheresis machine will separate your white blood cells from the rest of your blood. Your blood will be passed through a small tube into the machine, the white blood cells will be collected, and the rest of your blood is returned to your other arm through a similar tube. The process can take a few hours and it may need to be done more than once. Your white blood cells are then sent to the laboratory, where the T cells are isolated and modified.

At the laboratory, researchers will create your new CAR T-cells by modifying the DNA of your T cells.

The cells will then be grown until there is enough of them to form your treatment. This can take a few weeks, but when they're ready, your cells will be frozen and sent back to the hospital, ready for you to receive.

To you:

Around 10 days before your CAR T-cell treatment is due, you will be given a course of chemotherapy known as conditioning therapy. This removes any cancerous cells and prepares your body for the CAR T-cells.

On your planned treatment day, your new CAR T-cells will be thawed and delivered to you via your central line. It's a similar process to having a blood transfusion. Afterwards, you will be monitored in hospital for a few weeks while you recover. Once discharged, you will need to stay within an hour's drive of the hospital for a further four weeks.

ARE THERE ANY SIDE EFFECTS OF TREATMENT?

CAR T-cell therapy is a very intensive treatment that will have a big physical and emotional impact on your life. After treatment, your medical team will monitor you closely because most side effects develop within the first few days – but some could occur up to eight weeks later. Side effects will vary from person to person but may include the following:

- **Cytokine release syndrome (CRS)**

When CAR T-cells enter your body, they activate other cells in your immune system that help remove cancer cells. If this signalling isn't controlled properly it can cause an inflammatory response across the whole body, known as cytokine release syndrome. CRS can cause high fevers and low blood pressure, and in very extreme cases has been known to be fatal.

- **Neurological problems**

You may feel drowsy, have a headache, or find it difficult to do some mental tasks and remember things. These are all due to your body's immune response to the CAR T-cells.

- **Low B cell count**

Some CAR T-cell therapies target cancerous B cells, but they may destroy healthy B cells as well. These cells are part of your immune system and help fight infections, which means after treatment you may be at risk of picking up an infection.

Your medical team will talk to you about these side effects in more detail and give you advice on what to do if they start to develop. If you have any questions, they will be happy to answer them too.

You can read more about CAR T-cell therapy on the NHS website - england.nhs.uk/cancer/cdf/car-t-therapy/

Where can I get more information and support?

If you or a loved one are affected by a stem cell or bone marrow transplant, there are many ways in which we can support you.

Find information

Our website has lots of helpful information about what it's like to go through a transplant. Download or order our booklets for free, and find further support at: anthony Nolan.org/patientinfo

Need to talk?

The Patient Services team at Anthony Nolan are here for you. Call us on 0303 303 0303 or email patientinfo@anthony Nolan.org

Get connected

Find support from other patients and their families by joining our Patient and Families forum at: anthony Nolan.org/forum

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The information contained in this factsheet is correct at the time of being published (September 2019). We plan to review this publication within three years. For updates or the latest information, visit anthony Nolan.org

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