

CAR-T therapy

CAR-T therapy is a new type of cancer treatment that uses the immune system to kill cancer cells.



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What is CAR-T therapy?

CAR-T therapy works by taking some T cells out of your blood (T cells are part of your immune system and help protect you from infection and disease), genetically modifying them in a lab so they're much better at finding and killing cancer cells, and then putting them back into your blood to fight the cancer.

How is CAR-T therapy given?

There are several stages in the process of having CAR-T therapy, which takes several weeks:

- T cells are taken from your blood, using a tube inserted into a vein in your arm. This takes two to three hours.
- T cells are taken to a laboratory and genetically modified, turning them into CAR-T cells. This takes two to three weeks.

- CAR-T cells are put back into your bloodstream, through a drip. This takes a few hours.
- CAR-T cells attack and kill cancer cells in the body. You'll be closely monitored after having CAR-T therapy.

Research has shown that CAR-T cells can remain in the body and continue to work. So, unlike many other blood cancer drugs, CAR-T therapy is designed to be a one-time treatment.

Who can have CAR-T therapy?

CAR-T therapy is still limited to a small number of people.

In the UK, CAR-T therapy has been approved to treat:

- children and adults up to the age of 25 with B-cell acute lymphoblastic leukaemia (ALL), whose first treatment has not worked
- adults with types of non-Hodgkin lymphoma called diffuse large B-cell lymphoma (DLBCL) or primary mediastinal large B-cell lymphoma (PMBCL), whose lymphoma has continued to grow after at least two treatments.

There are currently two types of CAR-T therapy used in the UK made by two different companies. They're called Kymriah (tisagenlecleucel) and Yescarta (axicabtagene ciloleucel).

Can everyone with these conditions get CAR-T therapy?

Unfortunately not. Right now, CAR-T therapy is only a treatment option for certain blood cancers that haven't responded to other standard treatments. There is also a high risk of side effects, so the person must have a certain level of fitness at the time of treatment.

If you're eligible for CAR-T therapy

If you think you may be eligible for CAR-T therapy and want to find out more, speak to your healthcare team.

If you are eligible, your doctor will refer you to both a local and a national CAR-T panel. The panel prioritises people eligible for CAR-T based on their fitness and severity of the cancer.

How safe is CAR-T therapy?

The CAR-T treatments approved for use in the UK have been through rigorous trials to make sure they're as safe as possible for eligible patients. However, CAR-T therapy is still a new treatment and we're learning with each clinical trial how to make it more effective.

As with all cancer treatments, there are benefits and risks. As CAR-T is a new treatment, we don't yet know if there are any longer-term risks.

What are the possible side effects of CAR-T therapy?

CAR-T therapy is still new and can cause some serious side effects. This is why the treatment is only done in specialist hospitals that have an expert team to manage these if they do occur.

Cytokine release syndrome (CRS)

One of the more common side effects of CAR-T therapy (can occur in more than 1 in 10 people) is cytokine release syndrome (CRS). CRS is triggered when CAR-T cells release a substance called cytokine. This results in a type of immune reaction in the body similar to a severe infection and causes flu-like symptoms. It can usually be treated within a few days.

Sometimes, CRS can become severe and dangerous, causing symptoms such as a high fever, fast heart rate, low blood pressure or difficulty breathing.

Neurological side effects

CAR-T therapy can also cause problems such as altered or decreased consciousness, delirium, confusion, agitation, seizures, difficulty speaking or understanding and loss of balance. Usually these symptoms get better on their own or respond to steroids.

How effective is CAR-T therapy?

The CAR-T treatments being used in the UK have been shown to be better at getting people into remission than existing treatments. However, the evidence is still limited to the trials that have been done with specific groups of patients. We don't know how well CAR-T works in large numbers of people, and we don't know how well it works in many types and stages of blood cancer.

Because CAR-T is a new treatment, we also don't know what the longer-term impact is, in terms of response, survival and side effects.

What CAR-T trials are currently happening in the UK?

In addition to the CAR-T treatments explained here, which are now being used on the NHS, there are other CAR-T treatments still being researched in clinical trials. They're looking at how to use CAR-T therapy to treat leukaemias, lymphomas and myeloma.

To search for clinical trials, visit **www.bepartofresearch.nih.ac.uk** and search 'CAR-T'.

If you want to know more about clinical trials you may be eligible for, speak to your healthcare team.

About this fact sheet

We have produced this fact sheet in collaboration with expert medical professionals and people affected by blood cancer. Thank you to Professor Karl Peggs, Scientific Director of the National Institute for Health Research (NIHR) Blood and Transplant Research Unit in Stem Cells and Immunotherapies, and Medical and Scientific Director of the Sir Naim Dangoor Centre for Cellular Immunotherapy at UCLH .

Our fact sheets contain general information. Always listen to the advice of your specialist about your individual condition because every person is different.

A list of references used in this fact sheet is available on request.
Please email information@bloodcancer.org.uk

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