

IMMUNOTHERAPY



WHAT YOU NEED TO KNOW

You or your loved one has been diagnosed with a type of blood cancer. One of the treatments your doctor may offer is called immunotherapy. What does it mean and how does it work?

This fact sheet will help you:

Learn about
your immune
system

Understand
immunotherapy
treatment

See how
it works

Your immune system

To learn about how immunotherapy treatment works, it helps to understand your immune system. The immune system is your body's primary defense against infection and cancer.

About your immune system

- Your immune system recognizes the difference between cells that naturally belong in your body and cells that are foreign and toxic (antigens).
- An antigen can be from the environment, like bacteria or a virus.
- An antigen can also be made inside your body, such as a cancer cell.
- Having a foreign cell in your body causes your immune system to identify, target, and eliminate the cell.
- The cells in your immune system that fight infection and disease are white blood cells, also called lymphocytes.
- There are three main types of lymphocytes:
 - **B lymphocytes** (B cells) recognize and target foreign cells
 - **T lymphocytes** (T cells) are the main cancer fighters; they recognize and target foreign cells, and kill invading and infected cells
 - **Natural killer** (NK) cells attack cancer cells and eliminate viruses

The goal of immunotherapy is to detect and attack cancer cells.

When your immune system is working well, lymphocytes travel through your body looking for and destroying anything that does not belong there.

What is immunotherapy?

Immunotherapy is a type of cancer treatment that improves your immune system's ability to detect and attack cancer cells. Doctors and researchers are learning to manage the immune system to destroy cancer cells. This approach is effective for certain blood cancers. Not all blood cancers can be treated with immunotherapy.

Cancer and the immune system

- Scientists think that the body recognizes and destroys many abnormal cells before they become cancer.
- Even a healthy immune system can't always prevent cancers from forming.
- Sometimes cancers can bypass the immune system and multiply: this is called immunoediting.
- Cells can go through genetic changes that allow them to avoid being detected and destroyed.
- Immunotherapy activates or reactivates the immune system to attack and destroy cancer cells that have not been detected.

The science of how immunotherapy works is still new.

How does it work?

Immunotherapy treatments work in different ways. Some boost your body's immune system. Others help train your immune system to attack specific cancer cells.

Here are four types of immunotherapy treatment for blood cancers that are being used or being studied:

Name of treatment	Description
Immune checkpoint inhibitors	This intravenous (IV) treatment allows T cells to stay active and to attack cancer cells.
Adoptive cell transfer	This treatment allows your own T cells to fight cancer. T cells are taken from your blood and treated in the lab to make them better at targeting and killing cancer cells. The one that has gone furthest in clinical development is chimeric antigen receptor (CAR) T-cell therapy.
Monoclonal antibodies	This IV treatment marks cancer cells so your immune system can better see and destroy them.
Therapeutic vaccines	Researchers are studying new vaccines to treat certain types of blood cancer. These vaccines train your immune system to recognize cancer cells and protect against them.

New immunotherapies are being researched and new drugs and treatments are being used in ongoing clinical trials. Talk to your doctor about whether or not you are eligible for clinical trials.

Immunotherapy side effects

Many immunotherapies involve substances that occur naturally in the body, but side effects can happen when your immune system is overactivated.

Even though most people can tolerate immunotherapy more easily than chemotherapy, it's important to watch for potential side effects. An overactive immune system can have a negative impact on some organs, including your liver, skin, lungs, kidneys, gastrointestinal tract, and endocrine organs. Speak to your doctor if you are having side effects.

Side effects can continue for weeks or months after treatment stops.

Common side effects

Some common side effects of immunotherapy treatment are:

- Fatigue, rash, diarrhea, stomach pain, nausea, vomiting, cough, shortness of breath, headache, confusion, and muscle weakness or pain from immune checkpoint inhibitor treatments
- Cytokine release syndrome, a serious side effect that includes fever, nausea, headache, rapid heartbeat, low blood pressure, and difficulty breathing from CAR T-cell treatment – the syndrome is usually mild, but can be life-threatening
- Neurologic toxicity (also known as CAR T-cell-related encephalopathy syndrome), a neurological problem that affects the brain, spinal, and other nerves from CAR T-cell treatment; symptoms can include problems remembering words, handwriting changes, difficulty speaking, hallucinations, being less alert, confusion, and changes in sleep patterns
- Fatigue, weakness, headaches, backaches, diarrhea, rash, dizziness, nausea, vomiting, fever, chills, muscle aches, and breathlessness caused by monoclonal antibodies treatment, including a possible allergic reaction

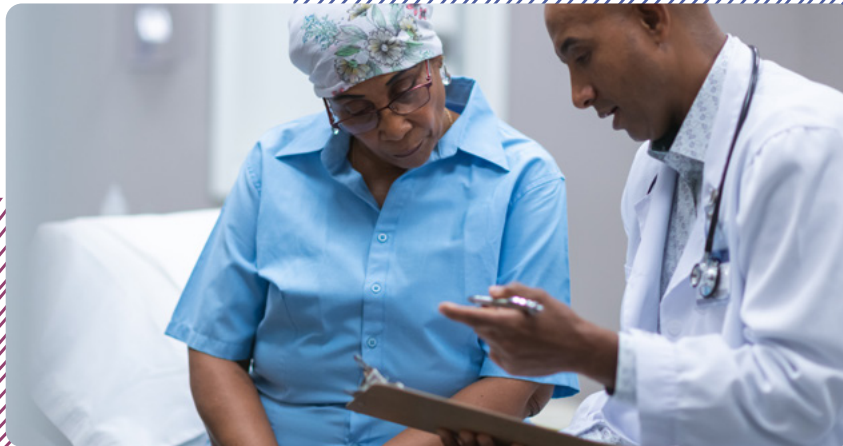
People who have immunotherapy usually tolerate it better than chemotherapy.

Questions to ask your healthcare team

Your healthcare team includes your doctor, nurse, and pharmacist. To make sure you receive the best care, be open and honest with them. Immunotherapy may not be available or may not be right for you. Talk to your doctor about whether it is a good option.

Here are some questions you may want to ask:

- Why are you recommending this type of treatment?
- What are the benefits and risks of this treatment?
- How does this treatment work for my cancer?
- How will this treatment be given? How often? For how long?
- How will you know if it's working?
- What side effects should I expect during and following my treatment?
- Will I need to make changes to my daily routine, work, or exercise habits?
- Do health insurance plans cover this treatment?
- Will other cancer treatments be needed? If so, will these therapies be given together or at different times?
- Are there any immunotherapy clinical trials that might be right for me?



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