Non-Hodgkin Lymphoma: Immunotherapy

What is immunotherapy?

Immunotherapy is a treatment that works with your immune system. It's also called biological therapy. Your immune system helps fight infections by killing germs. In the same way, it can also kill cancer cells.

Immunotherapy treatments can boost your natural immune system. Or they can be lab-made versions of normal immune system proteins that kill or slow the growth of lymphoma cells.

Types of immunotherapy used to treat non-Hodgkin lymphoma

The types used to treat non-Hodgkin lymphoma include:

- Monoclonal antibody therapy
- Immunomodulator therapy
- Immune checkpoint inhibitors
- CAR T-cell therapy

Monoclonal antibody therapy

Monoclonal antibodies are lab-made versions of immune system proteins. Each type of antibody attaches to a certain type of CD protein that is on the cancer cells. (CD stands for cluster of differentiation.) This helps the immune system find and kill the cancer cells. Because of this focused attack, there's less damage to healthy cells.

These medicines are most often given over several hours through an IV (intravenous line). This means they're put right into the blood through a vein. Some can also be given as a shot under the skin. Treatment is often done at a healthcare provider's office. Or it may be done at a treatment center.

The most common monoclonal antibody used to treat non-Hodgkin lymphoma is rituximab. This antibody attaches to a substance called CD20, which is found on B cells. It's often given with chemotherapy. There are other medicines that also attach to CD20.

Other monoclonal antibodies attach to different proteins on lymphoma cells to destroy them. Some of the proteins these medicines target include CD19, CD52, CD79b, and CD30. Your lymphoma cells are tested to see which CD proteins are on them. This helps find the monoclonal antibody treatment that's best for you.

Some monoclonal antibodies are attached to small radioactive particles. The antibodies then attach the radiation to the cancer cells. This kills the cancer cells. An example of this type of medicine is ibritumomab tiuxetan.

Other types of antibodies are attached to chemo medicines. The antibodies then attach the chemo right to the cancer cells. An example of this is brentuximab vedotin. It attaches the chemo to lymphoma cells with the CD30 protein.

Possible side effects

Side effects of these medicines are not the same as chemo side effects. They most often happen during or right after the treatment.

Side effects depend on the type of monoclonal antibody medicine you get and may include:

- Feeling tired

- Fever
- Chills
- Upset stomach (nausea)
- Headache
- Rash or hives with itching
- Swelling in the throat
- Chest tightness
- Diarrhea

Some people may have more severe reactions during treatment. This can lead to low blood pressure and trouble breathing. The risk of this tends to be higher with the first treatment. Because of this, medicines are often given before each treatment to help reduce the risk of bad reactions.

Some of these medicines can increase your risk of infection in the months after treatment. If you've had the hepatitis B virus in the past, the virus may flare up. A blood test for hepatitis B will be done before you start this treatment.

Some monoclonal antibodies can affect the bone marrow. This is more likely if they have radioactive molecules or chemo medicines attached to them. This can lead to low red and white blood cell counts and low platelet counts. Low red blood cell counts (anemia) can cause fatigue. Low white blood cell counts can raise your risk of infection. Low platelet counts can raise your risk of bleeding and bruising. Some monoclonal antibodies attached to chemotherapy can also affect nerve endings. This can cause tingling, numbness, or pain in the hands and feet (called peripheral neuropathy).

Immunomodulating therapy

Immunomodulating medicines work with your immune system to help slow down the growth of cancer cells. They may be used for some types of non-Hodgkin lymphoma if other treatments are no longer working. Lenalidomide is an example of this kind of medicine. It's taken every day as a pill.

Possible side effects

Side effects of these medicines can include:

- Low platelet counts, which raises your risk of bleeding
- Low white blood cell counts, which raises your risk of infection
- Nerve damage, which can cause pain in the hands or feet
- Blood clots
- Tiredness
- Constipation
- Birth defects if taken during pregnancy

Immune checkpoint inhibitors

The immune system uses certain proteins to know a cell is healthy and not attack it. These proteins are called checkpoints. Cancer cells sometimes use these checkpoints to keep the immune system from attacking them.

Medicines called immune checkpoint inhibitors block these checkpoints. Then the immune system can kill the cancer cells. Pembrolizumab is an immune checkpoint inhibitor that blocks the PD-1/PD-L1 checkpoint. It might

be used to treat certain B-cell lymphomas that start in the chest and don't respond to other treatments or come back after treatment. It's given as an IV infusion.

Possible side effects

Because these medicines block checkpoints, the immune system can attack your healthy cells as well as the cancer cells. This causes side effects such as:

- Skin problems, like rashes and itching
- Muscle and joint swelling and pain
- Diarrhea
- Low platelet counts, which increases the risk of bleeding
- Low white blood cell counts, which increases the risk of infection
- Low red blood cell counts, called anemia, which can cause fatigue, paleness, and shortness of breath
- Lung inflammation, called pneumonitis (rare)
- Heart problems (rare)

CAR T-cell therapy

For this treatment, a certain type of white blood cells (WBCs), called T cells, are removed from your blood. This is done during a process called apheresis. The rest of your blood goes right back into your body. Only the T cells are removed.

The genes of the T cells are then changed in a lab. They're made to have receptors called chimeric antigen receptors (CARs) on their surface. CARs make the T cells target and kill your lymphoma cells. The CAR T cells are then grown and multiplied in a lab. You're given chemotherapy, and then the CAR T cells are put back into your blood. They stay in your body for many months and find and kill lymphoma cells. This helps keep the lymphoma from coming back.

This might be an option if other lymphoma treatments aren't working. CAR T-cell treatment takes many weeks. It's only done in treatment centers with special training for this kind of cancer therapy.

Possible side effects

This treatment can cause things like:

- Nausea
- Headache
- Fever
- Tiredness
- Breathing problems
- Low blood pressure
- Infection
- Swelling

It can also cause very serious side effects, like heart problems, bleeding, or blood clots. It may lead to nerve damage. This can cause seizures, confusion, twitching, and hallucinations. Other organs that can be affected include the bone marrow, lungs, liver, spleen, and kidneys.

Working with your healthcare provider

Talk with your healthcare providers about what you should expect immunotherapy to be like and the side effects you should watch for. Be sure you know when to call them. For instance, if your blood counts drop, it can make you more likely to get infections. You may be told to check your temperature and stay away from people who are sick. You may need to call if you have a fever or chills. Make sure you know what number to call with problems or questions. Ask how to get help after hours and on weekends and holidays.