

## Immune Reconstitution

Submitted on May 3, 2024



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## What Is Immune Reconstitution?

HIV can damage your [immune system](#) and lower your body's natural ability to fight infections. Immune reconstitution or restoration refers to:

- Improving the body's immune function
- Repairing the damage done by HIV

Researchers are studying many different methods of immune reconstitution. However, the US Food and Drug Administration (FDA) has not approved any immune-based therapies for HIV. The good news is that newer HIV drugs are more effective and less toxic than the old drugs. Although HIV drugs cannot cure HIV, they can help you stay healthy by preventing the virus from reproducing (making copies of itself) and doing more damage to your immune system.

## How Does HIV Damage the Immune System?

HIV attacks immune system cells called [CD4 cells \(T cells\)](#). HIV enters these cells and turns them into virus factories that produce thousands of copies of HIV. [Viral load](#) is the amount of HIV (number of copies) in your bloodstream. The higher the amount of HIV, the greater the chances of your immune system being damaged.

As the virus reproduces, it damages or kills CD4 cells. There are different types of CD4 cells that help your body fight off infections. Over time, the virus lowers both the number and type of CD4 cells. As the immune system loses CD4 cells, your body is less able to fight off infection. Serious, even deadly, infections can develop. These are called [opportunistic infections \(OIs\)](#) because they take advantage of the body's weakened defenses.

## Using HIV Drugs to Restore Immune Function

HIV drugs work by stopping HIV from making copies of itself. When HIV cannot reproduce, it cannot infect new cells in your body and your viral load remains low. This allows your body's immune system to repair itself instead of constantly fighting off HIV.

The sooner someone who is living with HIV starts taking HIV drugs, the less damaged their immune system will be and the sooner that system can return to its healthy, germ-fighting state. Research studies have shown that starting treatment earlier, even when someone feels fine and has plenty of CD4 cells, can prevent unseen damage to the immune system and slow the development of disease. As a result, all major public health organizations in the US and globally now recommend treatment for all people living with HIV, no matter their CD4 count. For more information on this topic, please see our fact sheets on [Starting HIV Treatment](#) and [Considerations Before Starting HIV Treatment](#).

## Monitoring the Health of the Immune System

The lower your viral load, the less active HIV is and the more likely you are to have a healthy immune system.

One way to find out if your immune system is damaged is to have a [CD4 cell count](#) done. This is a routine blood test. If you have fewer than 200 CD4 cells you are at greater risk for opportunistic infections, and your healthcare provider will probably recommend that you get medications that prevent certain OIs.

An increase in the number of CD4 cells is one sign that your immune system is getting stronger. At first, the new CD4 cells are probably copies of existing types of CD4 cells. If some types of CD4 cells were lost, they may not come back right away. This could leave some gaps in the body's immune defenses. However, if HIV stays under control for a few years, the immune system may make new types of CD4 cells that can fill in these gaps and more completely restore immune function.

A [viral load](#) test tells you how active HIV is in your body. When compared over time, viral load test

results show if the amount of HIV in your bloodstream is higher or lower than it was before. The lower your viral load, the less active HIV is and the more likely you are to have a healthy immune system.

When a combination of HIV drugs (your drug regimen) is working, the viral load usually goes down within weeks of starting the drugs, ideally to undetectable within several months. One goal of HIV treatment is to keep viral loads as low as possible for as long as possible.

## Immune Reconstitution Inflammatory Syndrome (IRIS)

Although an increase in CD4 cells and a decrease in viral load are usually good signs, certain types of infections may flare up or HIV-related symptoms may get worse in some people. This is referred to as immune reconstitution inflammatory syndrome (IRIS).

IRIS can also worsen some other conditions, especially autoimmune problems.

IRIS happens when your immune system acts so strongly and so quickly that it causes a strong inflammation, which actually makes your symptoms worse. For most, these symptoms include fever, swollen lymph glands, and rash, and they go away in a few weeks. For others, the symptoms are more severe, and they should tell their healthcare provider.

The symptoms often depend on the germs already in your body when the immune system begins its strong, inflammatory response. You may or may not know that you have these infections. They may only be diagnosed when related symptoms occur because of the new and improved immune response. The following infections often flare up: *Mycobacterium avium* complex (MAC), cytomegalovirus (CMV), [herpes simplex virus](#) (HSV), hepatitis [B](#) and [C](#), [tuberculosis](#) (TB), herpes zoster (or shingles), Kaposi sarcoma (KS), and PCP (pneumocystis [pneumonia](#)). IRIS can also worsen some other conditions, especially autoimmune problems like Graves' disease, lupus, or rheumatoid arthritis. It is important to share any new symptoms with your healthcare provider.

IRIS usually occurs in the first six weeks of treatment. It can occur in anyone starting HIV drugs for the first time, starting HIV drugs after being off them for a while, or switching to new HIV drugs. Most cases of IRIS occur in people who have very low CD4 counts and high viral loads when they begin or switch HIV drugs, but IRIS can occur at any CD4 count. It also tends to occur more often in people whose CD4 count rises quickly and/or viral load drops quickly after they start HIV treatment. You can prevent IRIS, if you begin taking HIV drugs as soon as you are diagnosed with HIV.

Although the outlook for most people living with HIV who have IRIS is good, the syndrome has been associated with some serious illnesses. Discuss IRIS with your healthcare provider before you [start](#) or switch HIV drugs.

## Taking Care of Yourself

For people living with HIV, the best way to improve and support your immune system's health is to take HIV drugs on schedule ([adherence](#) is key!), [eat well](#), be [physically active](#), do what you can to [manage the stress](#) in your life, and get the [support](#) and care you need to stay healthy.

## Additional Resources

Select the links below for additional material related to immune reconstitution.

- [Immune Reconstitution Inflammatory Syndrome \(IRIS\) in AIDS \(Khan Academy, video\)](#)
- [Immune Reconstitution Inflammatory Syndrome \(IRIS\) \(International Association o...](#)
- [Immune Reconstitution Inflammatory Syndrome \(IRIS\) \(aidsmap\)](#)



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