CD4 Cell Count

WHAT ARE CD4 CELLS?

CD4 cells are white blood cells that play an important role in the immune system. The CD4 cell count gives an indication of the health of the immune system, which is the body's natural defense system against pathogens, infections, and illnesses. CD4 cells are also called T-cells, T-lymphocytes, or helper cells.

There are two main types of T-cells:

- **T-4 cells** (CD4) are "helper" cells that lead the attack against infections.
- **T-8 cells** (CD8) are "suppressor" cells that end the immune response. CD8 cells can also be killer cells that kill cancer cells and cells infected with a virus.

WHY ARE CD4 CELLS IMPORTANT IN HIV?

HIV most often infects CD4 cells. The genetic code of the virus becomes part of the cells. When CD4 cells multiply to fight an infection, they make more copies of HIV.

Your CD4 cell count is the number of blood cells in a cubic millimeter of blood (a very small blood sample). It is not a count of all the CD4 cells in your body. A higher number indicates a stronger immune system.

- The CD4 cell count of a person who does not have HIV is usually between 500-1,500 cells/mm^3.
- People with HIV who have a CD4 cell count over 500 cells/mm^3 are usually in pretty good health.
- People with HIV who have a CD4 cell count below 200 cells/mm^3 are at high risk of developing serious illnesses called opportunistic infections (OIs). HIV antiretroviral therapy (ART) is recommended for all people with HIV, and it is especially important for people with low CD4 counts.

If you have HIV and are not on ART, your CD4 count will fall over time. The lower the CD4 cell count, the greater the damage to the immune system and the greater the risk of illness. When you take ART, your CD4 count should gradually increase.

There are millions of different families of CD4 cells. Each family is designed to fight a specific type of germ. When HIV reduces the number of CD4 cells, some of these families can be wiped out. You can lose the ability to fight off the particular germs those families were designed for. If this happens, you might develop an OI.

WHAT IS A CD4 CELL COUNT?

To obtain a CD4 cell count, a small sample of blood is taken and it is tested to count several types of cells. CD4 cells are not counted directly. Instead, the laboratory makes a calculation based on total white blood cells and the proportion of cells that are CD4. Therefore, the CD4 count is not exact.

Current treatment guidelines state that a CD4 cell count is particularly useful before initiation of ART. The CD4 cell count provides information on the overall immune function of a person with HIV. The measurement is critical in establishing thresholds for the initiation and discontinuation of OI prevention and in assessing the urgency to initiate ART.

The management of people with HIV has changed substantially with the availability of newer, more potent, and less toxic antiretroviral medications (ARVs). In the U.S., ART is now recommended for all people with HIV regardless of their viral load or CD4 count. In the past, it was recommended to generally monitor both CD4 cell count and viral load concurrently. However, because most people with HIV in care now receive ART, the rationale for frequent CD4 monitoring is weaker.

WHAT FACTORS INFLUENCE A CD4 CELL COUNT?

Infections can have a large impact on CD4 cell counts. When your body fights an infection, the number of white blood cells (lymphocytes) goes up and CD4 counts go up too. Vaccinations can cause the same effects. It's best to wait a couple of weeks after you recover from an infection or get a vaccination before you get a CD4 test.

MONITORING CD4 CELL COUNTS BEFORE INITIATION OF ART

In the past, CD4 cell counts were used to guide decisions about when to start HIV treatment. However, we now know that all people with HIV benefit from ART and that it is better to start ART sooner rather than later. When you are on ART, your viral load is a more important indicator of your health and of the effectiveness of your treatment than your CD4 cell count.

Monitoring of your CD4 cell count is still important soon after diagnosis with HIV, before beginning ART, and for as long as your

CD4 count is low. It provides important information about disease progression and the immune system.

MONITORING CD4 CELL COUNTS WHILE ON ART

Once you are on ART, and your viral load starts to fall, your CD4 cell count is likely to increase gradually. The rate at which this happens can vary a lot between individuals.

During your first months on ART, your CD4 count will continue to be monitored regularly. After a while, your healthcare provider may suggest checking your CD4 cell count less often. If you have an undetectable viral load and CD4 cell count over 300 cells/mm^3 for at least 2 years, your healthcare provider may suggest monitoring your CD4 cell count once a year. If you have an undetectable viral load and CD4 cell count over 500 cells/mm^3 for at least 2 years, your healthcare provider may feel that CD4 cell counts are not needed at all.

However, if your viral load increases, or you have HIV-related symptoms, then your CD4 cell count would be monitored again.

THE BOTTOM LINE

The CD4 cell count is the most important laboratory indicator of immune function in people with HIV. It is also the strongest predictor of subsequent disease progression and survival according to findings from clinical trials and cohort studies.

ART is now recommended for all people with HIV. In people who remain untreated for any reason, CD4 counts should be monitored every 3-6 months to assess the urgency of ART initiation and the need for OI prophylaxis. A repeat CD4 count 3 months after ART initiation will provide information regarding the magnitude of immune system recovery. If you are on ART and successfully maintain viral suppression and CD4 levels greater than 500 cells/mm^3 for at least 2 years, you may not need to get CD4 cell counts anymore.

MORE INFORMATION

HIV.gov: Laboratory Testing Guidelines

Lab Tests Online: CD4 Count

MedlinePlus: CD4 Lymphocyte Count

Reviewed June 2025