

# Human Immunodeficiency Virus (HIV) Laboratory Testing

## Viral genotyping and phenotyping

When talking to your physician about all of the available antiretroviral drugs, you may wonder which drugs you should try first. There are tests that can help you and your physician make this decision.

An important consideration in selecting the right therapy is whether or not your HIV is resistant to any antiretroviral drugs. HIV resistance to a drug is determined by the presence or absence of certain patterns in viral genes. These patterns are called genotypes. Blood tests can determine the genotypes of your HIV, allowing physicians to predict whether your virus has resistance to one or more drugs. Another type of resistance test directly measures drug activity against your virus by exposing your HIV to different drugs in a laboratory. This test is called phenotyping. Phenotypic testing identifies drugs that have the potential to be effective against your virus. Based on these tests, you and your physician can learn which drugs are most likely to work, and then decide on the best medication for you.

## What is suppression management?

When your HIV medications are working well, HIV will not be detected or the virus numbers will be very low in a viral load test. This state is called viral suppression. If your doctor would like to adjust your medications when your virus levels are low, perhaps because you would like to simplify your regimen or minimize the side effects you may be having, this is called suppression management. Special suppression management laboratory tests are available to determine the right drugs for you.

## Where can I find more information?

You can get more information on HIV from the following sources:

### National Institutes of Health

Home page: [www.aidsinfo.nih.gov](http://www.aidsinfo.nih.gov)

Telephone: 800-448-0440

e-mail: [ContactUs@idsinfo.nih.gov](mailto:ContactUs@idsinfo.nih.gov)

### Centers for Disease Control and Prevention

Home page: [www.cdc.gov/hiv](http://www.cdc.gov/hiv)

Telephone: 800-CDC-INFO (800-232-4636)

### References

1. Branson BM, Handsfield HH, Lampe MA, et al. Centers for Disease Control and Prevention (CDC). Revised Recommendations for HIV testing in adults, adolescents, and pregnant women in health-care settings. *MMWR Recomm Rep.* 2006;55(RR-14):1-17.
2. Moyer VA. Screening for HIV: U.S. Preventive Services Task Force Recommendation Statement. *Ann Intern Med.* 2013;159(1):51-60.
3. Marrazzo JM, del Rio C, Holtgrave DR, et al. International Antiviral Society-USA Panel. HIV prevention in clinical care settings: 2014 recommendations of the International Antiviral Society-USA Panel. *JAMA.* 2014;312(4):390-409.
4. Branson BM, Owen SM, Wesolowski LG, et al. Centers for Disease Control and Prevention. Laboratory Testing for the Diagnosis of HIV Infection: Updated Recommendations. June 27, 2014.

**Note:** This material is provided for general information purposes only. It is not intended as a substitute for medical advice and/or consultation with a physician or technical expert.



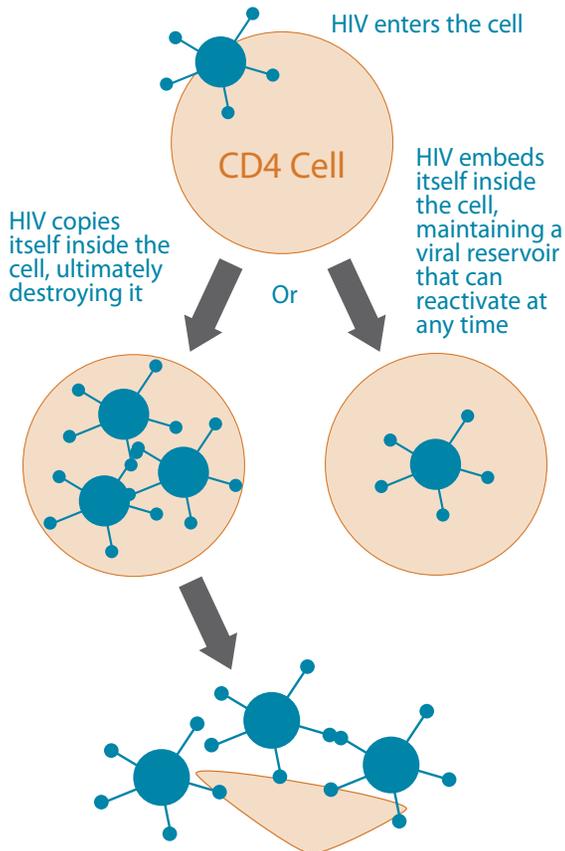
[www.LabCorp.com](http://www.LabCorp.com)



## What is HIV?

Human immunodeficiency virus (HIV) attacks the body's immune system, thereby lowering a person's ability to fight infections. HIV enters CD4 cells of the immune system, where it makes numerous copies of itself and ultimately destroys the cells. People with low numbers of CD4 cells have poor immune responses, and are therefore at significant risk for developing serious illnesses. If it is left untreated, HIV infection can progress to Acquired Immunodeficiency Syndrome (AIDS).

### HIV invades a CD4 cell



## Who should get tested for HIV?

HIV testing is recommended by the CDC and other organizations for all adults and adolescents.<sup>1-3</sup> People who are at high risk for HIV infection, including injection-drug users and men who have sex with men, should undergo testing on a yearly basis.<sup>1-3</sup> High-risk behaviors include having sex with people who inject drugs, exchanging sex for money or drugs, having sex with HIV-infected persons, or having unprotected sex with more than one person from the time either partner had an HIV test.<sup>1-3</sup> All pregnant woman should be tested for HIV.<sup>1,2</sup>

## How is HIV diagnosed?

In response to HIV infection, the body's immune system produces and releases antibodies into the bloodstream. Until recently, the primary way to detect an HIV infection was to test for the presence of these antibodies, followed by a confirmatory test called a Western blot. However, antibodies take up to 12 weeks to develop, which delays diagnosis. A newer, 4th generation test detects HIV approximately 15 to 20 days after infection – much sooner than previous testing methods.<sup>3,4</sup> This is accomplished by testing for the presence of antibodies as well as an HIV antigen, which is a fragment of HIV itself.<sup>3,4</sup>

## What is a viral load?

The number of copies of HIV in your blood can be measured using a blood test. The result of this measurement is called a viral load. This test is used to track HIV levels after therapy is initiated. By running this test regularly, you and your physician will know how well your HIV medications are working, and if there is any change in the activity of your virus. An increase in viral load means that the virus may have become resistant to the HIV medications that you are currently taking. By discovering the increase in viral load early, you and your physician can decide on a new HIV medication regimen.

## Keeping the virus in check

No cure for chronic HIV infection currently exists since HIV embeds itself into your host cells. However, early detection and treatment of HIV greatly reduces the risk for progression to AIDS.<sup>1,2</sup>

The use of HIV medicines to treat HIV infection is called antiretroviral therapy (ART).<sup>3</sup> Antiretroviral drugs have been shown to inhibit HIV replication very effectively. To check how well these drugs are controlling your HIV, you and your physician may want to know how much virus is in your system and whether the virus is changing.

## What is resistance testing?

HIV can adapt to its environment by developing changes in its genetic makeup. These changes are called mutations, and they enable HIV to evade drug therapies (ie, develop resistance).

At some point in its history, your virus may have mutated to a form that is resistant to some of the available antiretroviral drugs. It is important to identify any mutations in your HIV in order to select the appropriate drugs for your treatment.