Committee on Oversight and Government Reform, Chairman Henry A. Waxman

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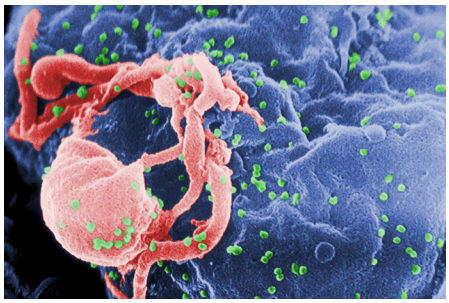
The Human Immunodeficiency Virus and AIDS

In 1983, scientists discovered the virus that causes AIDS: the Human Immunodeficiency Virus, or HIV. This edition of HIV/AIDS Today discusses how HIV affects the immune system and how untreated HIV infection progresses to AIDS.

HOW HIV ATTACKS THE IMMUNE SYSTEM

HIV enters the body in blood, semen, vaginal secretions, or breast milk. In the body, HIV primarily targets T cell lymphocytes, a type of white blood cell that is a key component of the body's immune system. The virus attaches itself to one type of T cell called a CD4 cell and enters through the cell membrane.[i]

Once inside the cell, the virus inserts its genes into the cell's DNA. It then directs the cell's own replication machinery to make multiple copies of the virus.[ii]



Scanning electron micrograph of HIV-1 budding from cultured lymphocyte.

CDC/ C. Goldsmith, P. Feorino, E. L. Palmer, W. R. McManus

Early stages of HIV infection can cause flu-like symptoms that last for a short period before subsiding. During this time the viral load, as well as the risk of transmission, is at its highest. After initial infection, HIV can remain in the body for months or years without causing any symptoms. However, without treatment, the amount of virus in the blood (the "viral load") usually starts to rise again and the concentration of CD4 cells begins to drop as the virus destroys its host cells.[iii]

THE PROGRESSION FROM HIV INFECTION TO AIDS

Clinical signs indicate whether a person with HIV infection has developed AIDS. One way to define AIDS is based on a patient's "CD4 count." The typical CD4 count for a healthy person is between 800 and 1200. The Centers for Disease Control and Prevention define AIDS to include people with HIV infection and a CD4 count below 200.[iv]

People with HIV are also diagnosed as having AIDS, regardless of CD4 count, if they develop one of a set of certain "opportunistic infections" that do not typically affect healthy people but commonly strike people whose immune systems have been compromised by HIV.[v] Most opportunistic infections involve viral or bacterial agents. People with AIDS, however may also develop rare cancers, such as Kaposi's sarcoma.[vi] Invasive cervical cancer is an AIDS-defining condition in women.

With antiretroviral treatment, people who at one point in time fit the definition for AIDS may shift out of it; therefore, clinical decision making today is based upon a fluid view of a person's viral, immune and health status.

ENDNOTES

[i] National Institutes of Health, National Institute of Allergy and Infections Diseases, *Determining How HIV Causes Disease* (online at http://www.niaid.nih.gov/final/aids/pathogen.htm).

[ii] *Id.*

[iii] National Institutes of Health, National Institute of Allergy and Infections Diseases, *How HIV Causes AIDS* (Nov. 19, 2004) (online at http://www.niaid.nih.gov/factsheets/howhiv.htm).

[iv] *Id.*

[v] Opportunistic infections may also affect other people with compromised immune systems, such as those with other immune disorders, transplant recipients or cancer chemotherapy patients.

[vi] National Institutes of Health, National Institute of Allergy and Infections Diseases, *HIV Infection and AIDS: an Overview* (March 2005) (online at http://www.niaid.nih.gov/factsheets/hivinf.htm).