



## HIV INFORMATION

### The Challenge Of AIDS

#### The Origins of HIV/AIDS

AIDS (Acquired Immune Deficiency Syndrome), the disease caused by HIV (Human Immunodeficiency Virus), was first identified and named in 1982 after a rise in similar opportunistic infections is noticed in gay men in the United States. In the decades since its discovery, scientists have attempted to establish the origins of AIDS and the process through which it became a global pandemic. Presently, the most scientifically supported and widely accepted hypothesis seems to be that HIV/AIDS is a mutation of Simian Immunodeficiency Virus and that the most common strain was first established in humans in the Democratic Republic of Congo. Though the earliest blood sample to have tested positive for HIV was taken in 1959, mutations in the virus suggest that it likely was established in humans between 1884 and 1924. The movement and migration of people across large distances, socio-economic instability, intravenous drug use and multiple partner sexual activity has enabled the virus to spread rapidly worldwide.

#### HIV Is A Retrovirus

HIV, as a retrovirus undergoes an unusual biological process in which the genetic material, in the form of single-stranded RNA, can be converted to double-stranded DNA and then replicated in a host cell's DNA. In nature DNA usually makes RNA. An enzyme called reverse transcriptase enables the virus to perform this reverse action. A number of anti-HIV drugs are targeted at this enzyme in an effort to inhibit the process. Zidovudine (AZT), lamivudine (3TC) and stavudine (d4T) are examples.

More recently a new group of drugs has become available to target the protease reaction in the replication process of the virus. These 'protease inhibitors', such as indinavir and ritonavir have added a new dimension to anti-retroviral therapy.

The virus has a circular shape. Its core RNA genetic material is covered by an envelope that has many, small, glycoprotein projections on its surface. These projections have an attraction to certain target cells, with so-called CD4 receptor sites.

#### These CD4 receptors are present on various types of blood cells including:

- Lymphocytes, such as CD4 (helper) T lymphocytes
- Macrophages
- Monocytes
- Tissue cells (such as dendritic cells present in the genital tract and ano- rectal region)
- Certain brain cells (glial cells)

After binding to the CD4 receptor, the viral genetic material enters the host's cell (e.g. a CD4

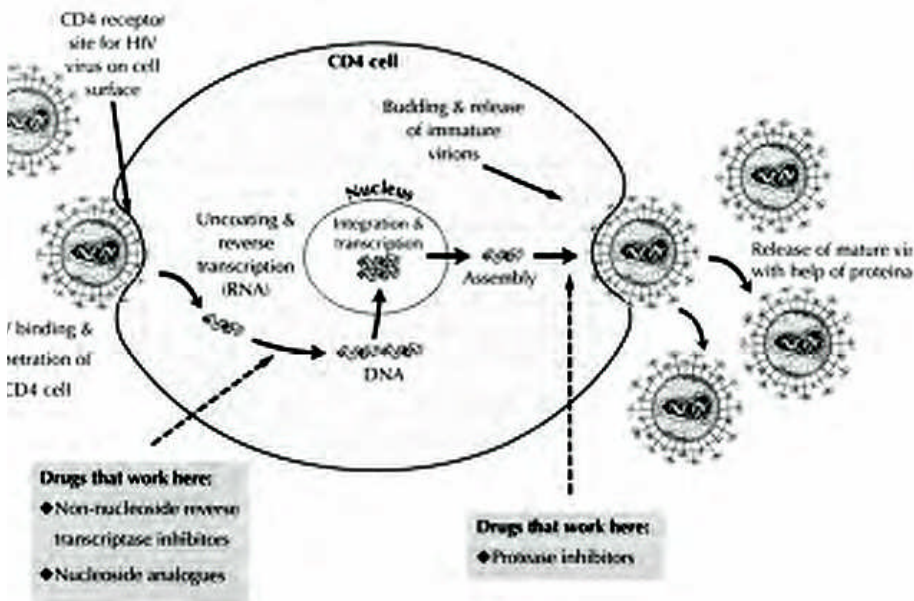




# HIV INFORMATION

cell). With the reverse transcriptase reaction, as described above, the virus's DNA copy becomes incorporated into the host cell. Later, when new virus particles are made, they bud off from the host cell, enter the blood stream and infect more cells. In this process, the host cells (such as the CD4 T lymphocytes) are damaged and destroyed.

## Life Cycle of HIV and site of action of anti-retroviral drugs



**Note:** The size of the virus has been artificially enlarged in this illustration. Relative to the size of the cell, it would be approximately the size of a full stop.