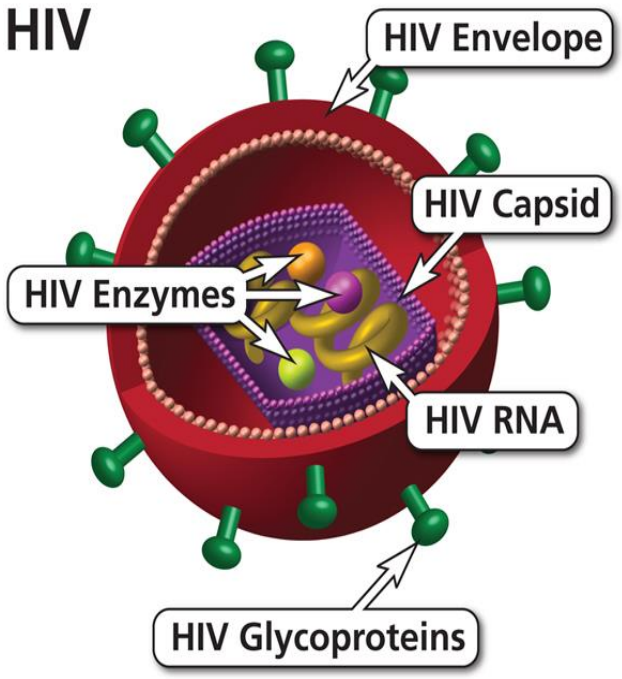
# *Human Immunodeficiency Virus (HIV)*

The virus that causes AIDS, which is the most advanced stage of HIV infection. HIV is a retrovirus that occurs as two types: HIV-1 and HIV-2. Both types are transmitted through direct contact with HIV-infected body fluids, such as blood, semen, and vaginal fluids, or from a mother who has HIV to her child during pregnancy, labor and delivery, or breastfeeding (through breast milk).




| | |
|---|---|
| Order: | ***Ortervirales*** |
| Family: | *Retroviridae* |
| Subfamily: | *Orthoretrovirinae* |
| Genus: | *Lentivirus*<br>• ***Human immunodeficiency virus 1***<br>• ***Human immunodeficiency virus 2*** |

HIV infects vital cells in the human immune system, such as helper T cells (specifically $CD4^+$ T cells), macrophages, and dendritic cells.HIV infection leads to low levels of $CD4^+$ T cells through a number of mechanisms, including pyroptosis of abortively infected T cells, apoptosis of uninfected bystander cells, direct viral killing of infected cells, and killing of infected $CD4^+$ T cells by $CD8^+$ cytotoxic lymphocytes that recognize infected cells. When $CD4^+$ T cell numbers decline below a critical level, cell-mediated immunity is lost, and the body becomes progressively more susceptible to opportunistic infections, leading to the development of AIDS.

| pecies | Virulence | Infectivity | Prevalence | Inferred origin |
|---|---|---|---|---|
| HIV-1 | High | High | Global | Common chimpanzee |
| HIV-2 | Lower | Low | West Africa | Sooty mangabey |

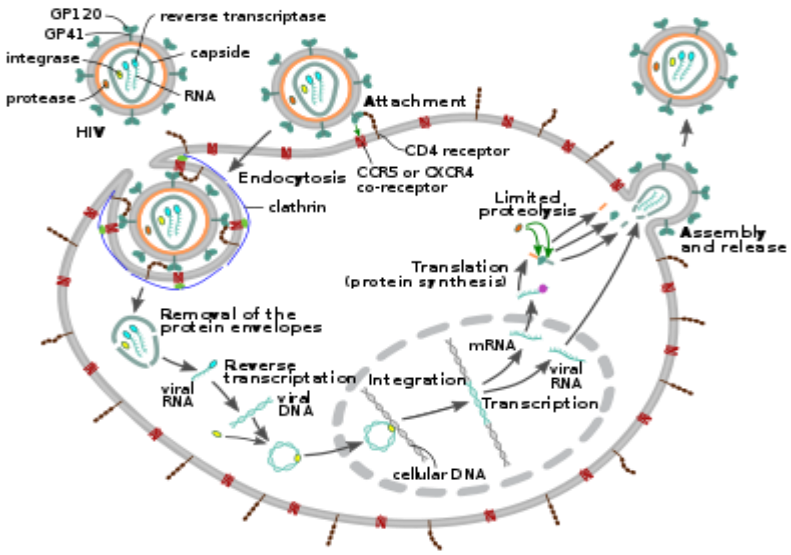
## *Structure :*

1. It is roughly spherical

2. It is composed of two copies of positive-sense single-stranded RNA that codes for the virus's

3. Surrounded by the viral envelope, that is composed of the lipid bilayer taken from the membrane of a human host cell when the newly formed virus particle buds from the cell.

4. The HIV virion enters macrophages and $CD4^+$ T cells by the adsorption of glycoproteins on its surface to receptors on the target cell followed by fusion of the viral envelope with the target cell membrane and the release of the HIV capsid into the cell.




Replication cycle of HIV

HIV-1 appears to have originated in southern Cameroon through the evolution of SIVcpz, a simian immunodeficiency virus (SIV) that infects wild chimpanzees (HIV-1 descends from the SIVcpz endemic in the chimpanzee subspecies *Pan troglodytes troglodytes*). The closest relative of HIV-2 is SIVsmm, a virus of the sooty mangabey (*Cercocebus atys atys*), an Old World monkey living in littoral West Africa (from southern Senegal to western Côte d'Ivoire).New World monkeys such as the owl monkey are resistant to HIV-1 infection, possibly because of a genomic fusion of two viral resistance genes.