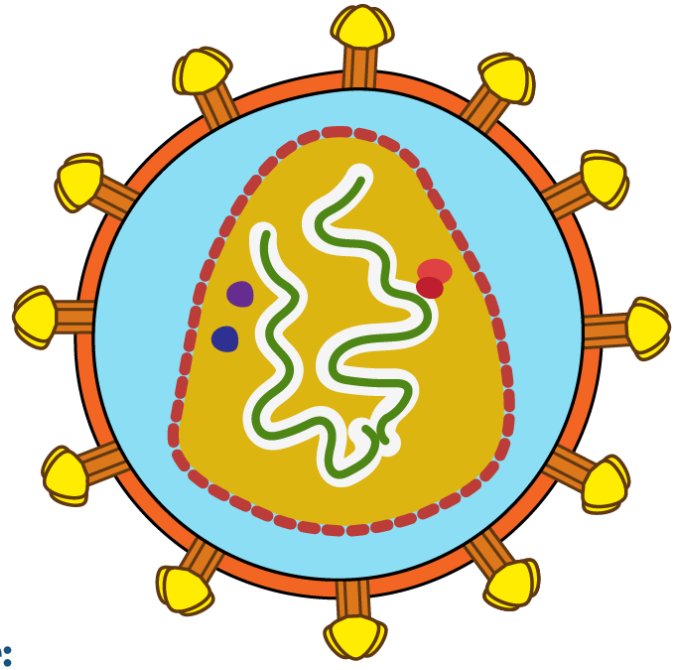

Name:

Human Immunodeficiency Virus (HIV)

Family:

Retroviridae

Class:

Group IV (+)ssRNA-RT
Enveloped

Genome:

9750 bases, 16 proteins

Mode of transmission:

Bodily fluids, sexual transmission, iv drug abuse, blood transfusion maternal transmission

Biology & Disease

The Human Immunodeficiency Virus (HIV) targets white blood cells of the immune system such as T-cells and Macrophages. The viral spike binds to target cell surface protein CD4. Binding to CD4 allows the virus to bind a second receptor – a chemokine receptor, followed by membrane fusion and entry of the viral core into the host cell cytoplasm. The viral RNA is then reverse transcribed into a dsDNA "provirus" which enters the nucleus and integrates into the host cell chromosome. The viral genome is transcribed by cellular RNA polymerase to produce copies of (+) RNA genomes which are packaged and released as enveloped viruses. HIV infection of CD4+ T-cells leads to their depletion causing a gradual decline in the potency of the immune system and eventual full blown Acquired Immunodeficiency Syndrome - AIDS.

As HIV infected individuals become more immuno-deficient they are more susceptible to opportunistic infectious diseases and various cancers. Without proper treatment, the expected life expectancy of infected individuals is 8-11 years.

Today a spectrum of anti-AIDS medications exist which specifically target the viral reverse transcriptase and the viral protease. Combinations of these drugs, the "cocktail", have proven extremely effective in prolonging life and markedly improving the quality of life of those HIV infected individuals for which these treatments are available.

Due to the extremely high mutation rate of reverse transcriptase and the fact that the virus integrates into the host chromosome, thus far - no effective AIDS vaccine has been developed.