UNDERSTANDING HIV ANTIBODY RAPID CASSETTES: FAST AND EFFECTIVE HIV TESTING

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Outline

- Introduction to HIV
- HIV serological test

Objectives

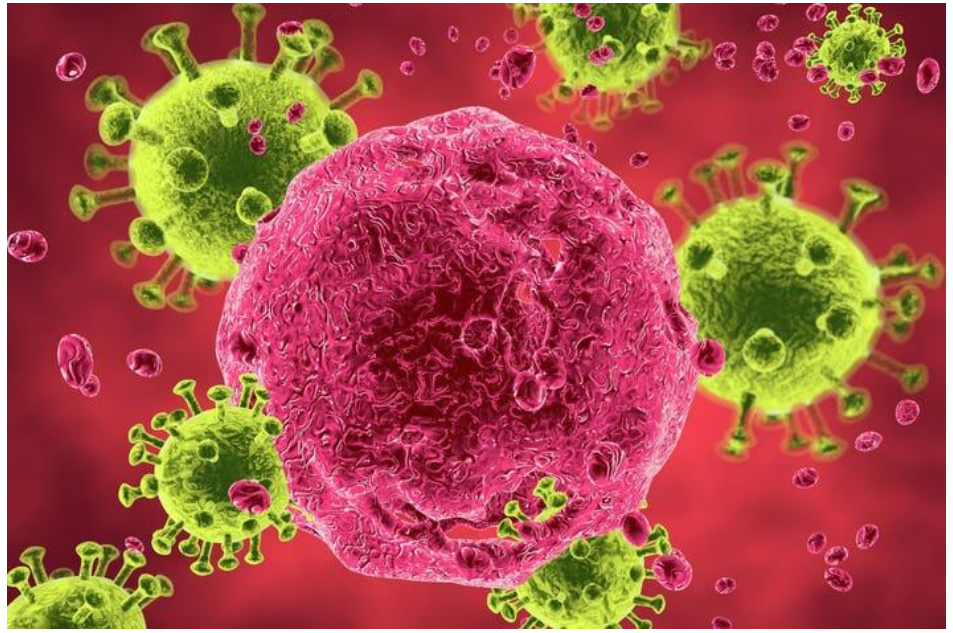
- Get knowledge about HIV properties
- Learn about HIV replication
- Get information about mode of HIV transmission
- Diagnosis of HIV and importance of diagnosis
- HIV Ab rapid cassette test

HIV

- **HIV, or Human Immunodeficiency Virus,** is a single-stranded, positive-sense RNA virus that belongs to the retrovirus family

- **HIV** attacks the body's immune system, particularly attacks CD4 cells (T cells), which help the immune system fight off infections.

- HIV can lead to the disease **AIDS (Acquired Immunodeficiency Syndrome).**



HIV

Family *Retroviridae*

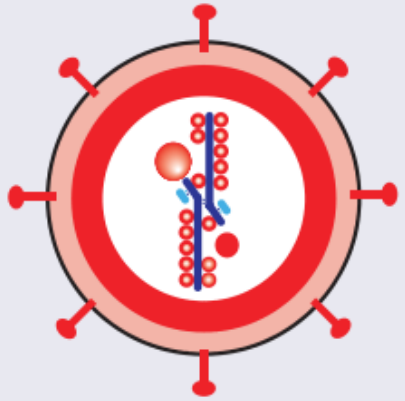
retro (Latin) = backwards

Hosts: mammals
birds
other vertebrate animals

Diseases: immunodeficiency diseases
leukaemias
solid tumours

Virion

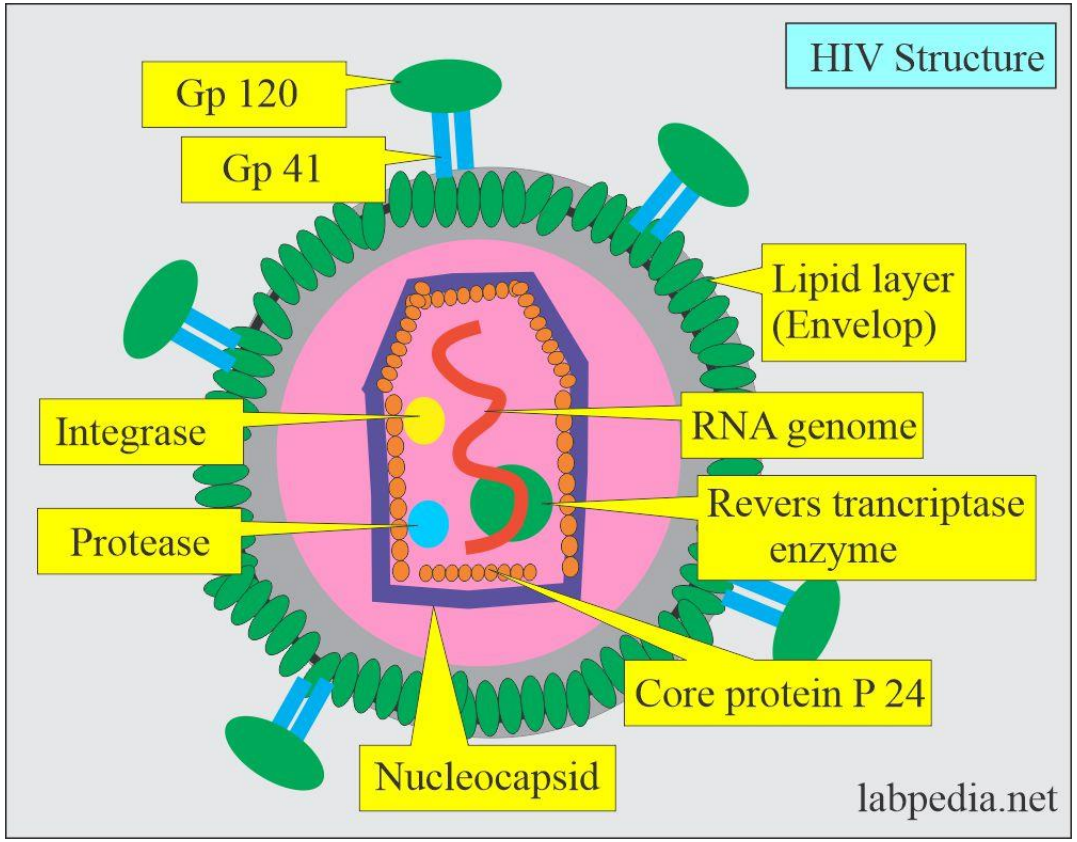
- Enveloped
- 80–110 nm diameter
- Genome: single-stranded RNA
  plus polarity
  9–10 kb
- Contains reverse transcriptase



HIV properties

HIV is a complex and unique virus with several notable properties

1. **Retrovirus:** HIV is a member of the retrovirus family, which means it contains genetic material in the form of RNA rather than DNA.
2. **Enveloped Virus:** HIV is enveloped by a lipid (fatty) membrane that is derived from the host cell membrane. This envelope allows the virus to enter and exit host cells more easily.
3. **Reverse transcriptase:** It uses an enzyme called reverse transcriptase to convert its RNA into DNA once inside a host cell.

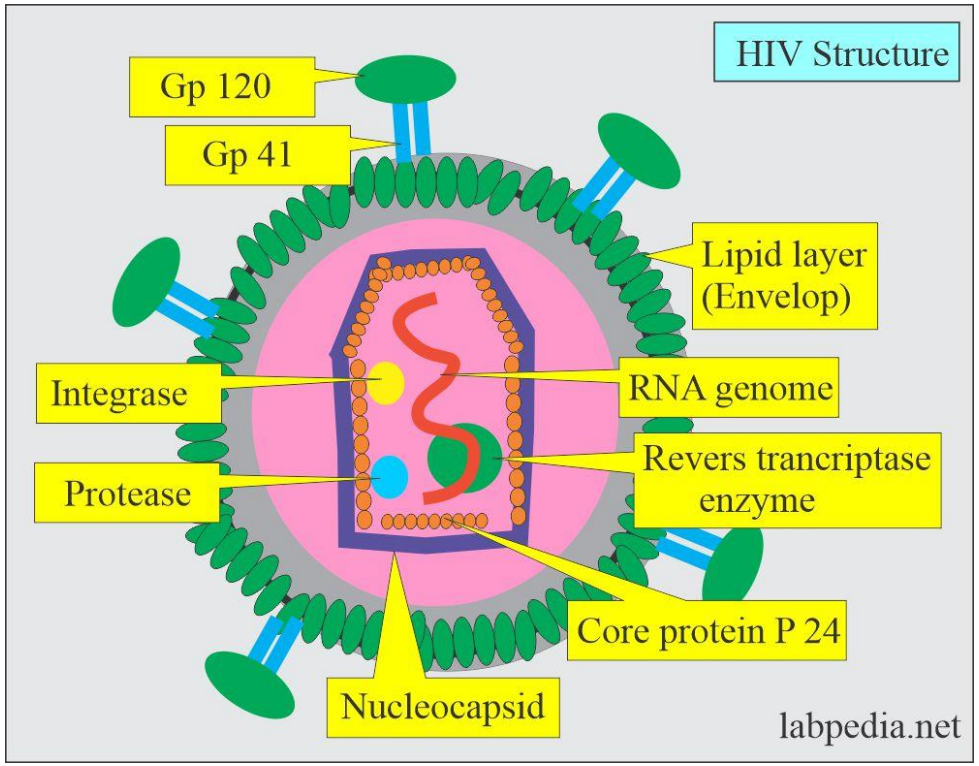


Continue with HIV properties

4. Integration: Once HIV's RNA is reverse transcribed into DNA, it integrates its genetic material into the host cell's DNA. This allows the virus to be replicated along with the host cell's DNA

5. Genetic Variability: HIV has a high mutation rate, leading to genetic diversity within and between HIV strains. This genetic variability makes it challenging to develop a single, universal vaccine or treatment for all HIV infections

6. Latency: HIV can establish a latent or dormant state within host cells, making it difficult to eradicate. During latency, the virus does not actively replicate, but it can reactivate at a later time.



Replication of HIV

HIV replicates through a complex process involving several steps. The main steps in the replication of HIV are as follows:

1. Attachment
2. Entry
3. Uncoating
4. Reverse transcription
5. Integration
6. Transcription
7. Translation
8. Assembly
9. Budding

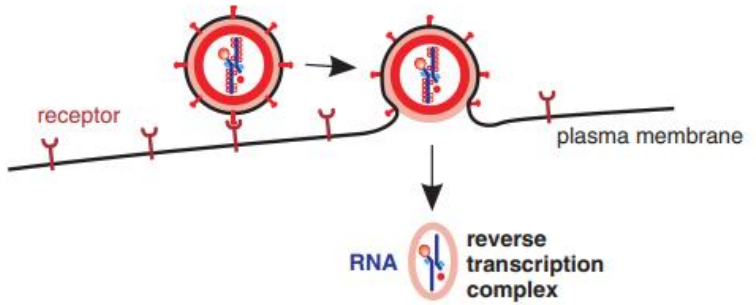


Figure 16.2 *Retrovirus attachment and entry.* Fusion of the virion membrane with the plasma membrane of the cell releases the virion contents, which undergo modification to form a reverse transcription complex.

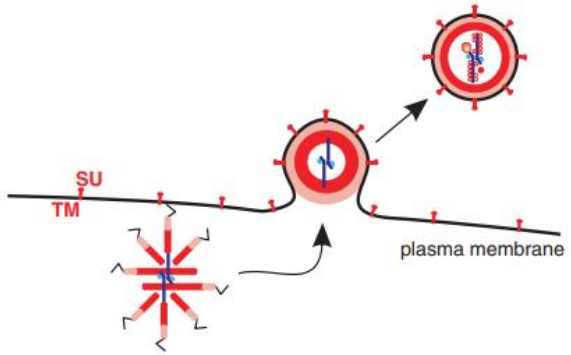


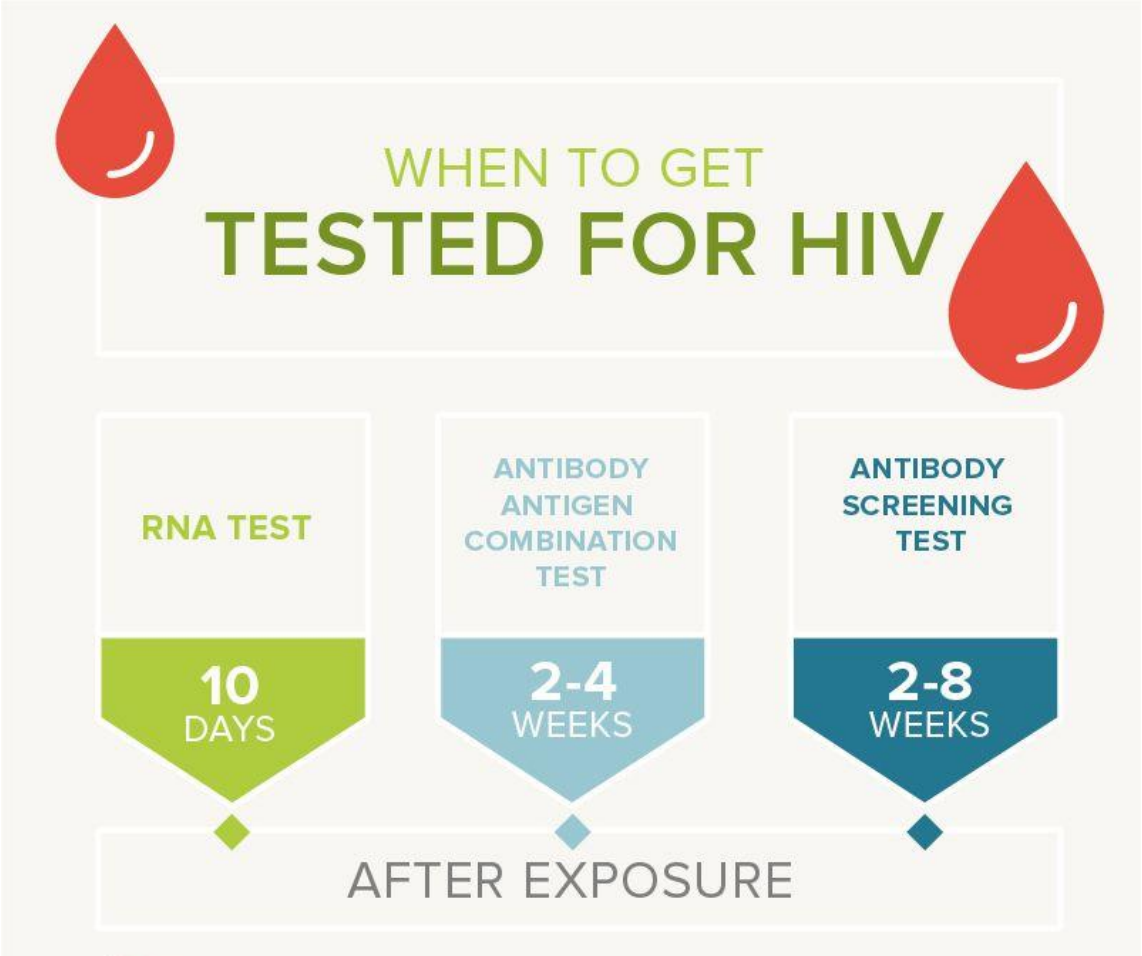
Figure 16.10 *Retrovirus assembly – late stages.* The envelope is acquired by budding from the plasma membrane. During and after budding Gag and Gag–Pol are cleaved to form the virion proteins.

Modes of transmission

The most common modes of HIV transmission include:

1. Unprotected sexual contact
2. Sharing needles or syringes
3. Mother to child transmission
4. Blood transfusions
5. Occupational exposure

HIV test time



Importance of HIV testing

HIV testing is of paramount importance for several reasons:

1. Early diagnosis and treatment
2. Prevention of transmission
3. Improved health outcomes

HIV diagnosis

HIV diagnosis involves various methods and tests to detect the presence of the virus or its antibodies in the body.

1. HIV antibody testing
2. HIV antigen testing
3. Nucleic acid testing

HIV antibody testing

HIV antibody testing is a common method for diagnosing HIV infection. It detects the presence of antibodies produced by the immune system in response to the HIV virus.

There are several types of HIV antibody tests, including:

1. Enzyme Immunoassay (EIA/ELISA)
2. Western Blot
3. Rapid antibody tests

Advantages of HIV Ab Rapid Cassettes

1. Speed and efficiency
2. Convenience and accessibility

Treatment of HIV

Modern treatment approaches for HIV focus on controlling

1. The virus
2. Managing symptoms
3. Preserving the individual's immune system.

Here are the key components of HIV treatment:

1. Antiretroviral therapy
2. Adherence
3. Monitoring
4. Preventive medications

Practical part - HIV Ab Rapid test

- Blood collection
- Centrifuge blood to make serum after clotting or use whole blood
- Run HIV Ab Rapid test

References (in APA style)

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