

HIV

MODES OF TRANSMISSION

- **Sexual Contact:**
 - Responsible for **~80%** of global infections.
 - Includes vaginal, anal, and oral sex.
- **Parenteral Exposure:**
 - **Needle-sharing** (IV drug use).
 - **Needlestick injuries** (occupational exposure).
 - **Blood transfusions** (rare in screened blood).
 - Exposure of **mucous membranes** to infected blood.
- **Vertical (Mother-to-Child):**
 - During **childbirth** or **breastfeeding**.

HIV LIFE CYCLE

1. **Binding:**
 - HIV **gp120 glycoprotein** binds to **CD4 receptor** on host cells (T helper cells, macrophages, dendritic cells).
2. **Fusion:**
 - Viral envelope fuses with host cell membrane (**requires coreceptor CCR5/CXCR4**).
 - Capsid enters the cell.
3. **Reverse Transcription:**
 - Viral **RNA** → **DNA** by **reverse transcriptase**.
4. **Integration:**
 - Viral DNA integrates into host DNA using **integrase**.
5. **Transcription & Translation:**
 - Host cell machinery produces viral RNA/proteins.
6. **Assembly:**
 - New viral particles assemble at cell surface.
7. **Budding:**
 - Immature virus buds out of host cell.
8. **Maturation:**
 - **Protease** cleaves viral proteins → **mature, infectious HIV**.

🔑 **Key Enzymes:** Reverse transcriptase, Integrase, Protease.

🔑 **Key Receptors:** CD4 + CCR5/CXCR4.

CLINICAL FEATURES

A. Acute HIV Infection (Primary/Retroviral Syndrome)

- **Timing:** 2–4 weeks post-exposure.
- **Symptoms:**
 - Flu-like illness: **Fever**, fatigue, headache, myalgia/arthralgia.
 - **Sore throat, night sweats, rash** (maculopapular).
 - **Lymphadenopathy** (swollen lymph nodes).
 - GI: Nausea, diarrhea, weight loss.
 - Often **asymptomatic**

B. Chronic HIV Infection (Clinical Latency)

- **Timing:** Months to **years** after acute phase.
- **Symptoms:**
 - **Asymptomatic** in most patients. or few symptoms

C. AIDS (Advanced HIV)

- **Diagnostic Criteria:**
 - **CD4 count < 200 cells/μL** or
 - **AIDS-defining condition** (opportunistic infection/malignancy).

AIDS-Defining Conditions:

- **Opportunistic Infections**+ nonopportunistic :

Pneumocystis pneumonia, Mycobacterial, coccidioidomycosis

Malignancies: Kaposi's sarcoma, non-Hodgkin lymphoma, cervical carcinoma.

- **Reactive latent infections** : TB, HSV , shingles

- **#1 cause of death:** Opportunistic infections (not HIV itself).
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