

# HIV-AIDS

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January 17, 2017

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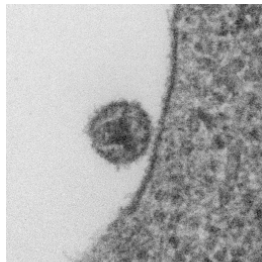
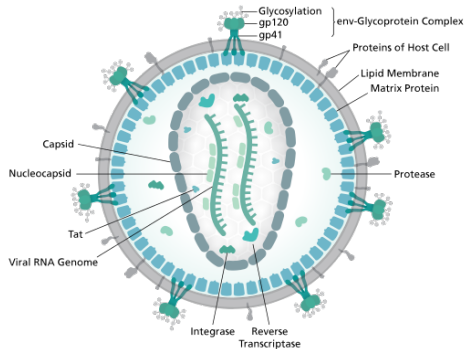
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# Introduction

- **HIV-AIDS** : Acquired Immunodeficiency Syndrome (AIDS) caused by Human Immunodeficiency Virus (HIV).
- First described in 1981.
- HIV originated from cross species infection by simian viruses in Africa.

## Human Immunodeficiency Virus (HIV)

- HIV is a **retrovirus**.
- Member of the genus *Lentivirus*.
- Two distinct types, HIV-1 and HIV-2, with more than 50% sequence divergence.
- HIV-1 has 3 subtypes; HIV-2 has 5 subtypes.



•  $P_{\text{W,sp}} = 18.20 \text{ W} \cdot \text{s}^{-1} \cdot \text{A}^{-1}$   
 $2e, H_2O_2$   
 •  $P_{\text{W}} = 1.0 \text{ mW}$  (max. output)  
 Fuel cell stage:  $322.300 \text{ Cx} \cdot \text{W}^{-1} \cdot \text{C} \cdot \text{In}$   
 $\rightarrow 1.5 \text{ V} \cdot \text{s}^{-1} \cdot \text{C} \cdot \text{In}^{-1}$   
 TEM Method: Temperature

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# Symptoms

## **Nonspecific symptoms during acute HIV infection**

fatigue, rash, headache, nausea and night sweats.

## **Prodromal stage**

chronic diarrhoea, fatigue, malaise, weight loss, fever, shortness of breath, hairy leukoplakia and lymphadenopathy.

## **AIDS**

Additional opportunistic infections s.a tuberculosis, hepatitis C, Candida infections etc. eventually leading to death.

# Pathogenesis

Typical course of untreated HIV spans about 10 years.

- 1** Primary Infection.
- 2** Dissemination to lymphoid organs.
- 3** Clinical latency.
- 4** Elevated HIV expression.
- 5** Clinical disease.
- 6** Death due to secondary, usually opportunistic infections.

# Pathogenesis

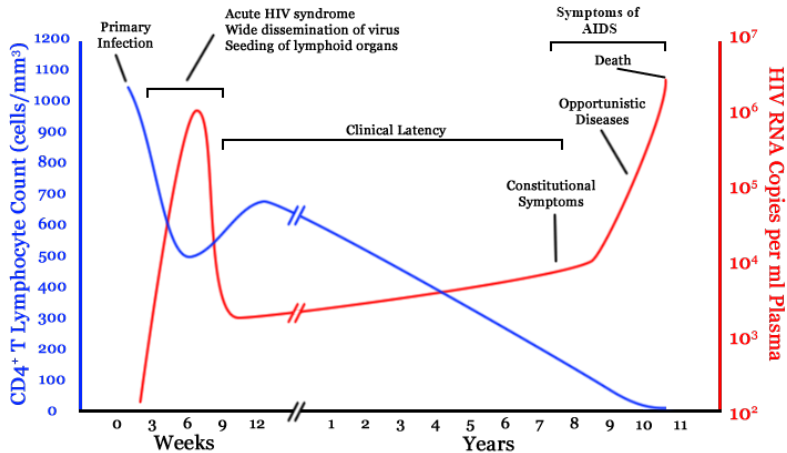
## Primary infection

- Mucosal infection leads to viremia in 4 to 11 days.
- Viremia is detectable for 8-12 weeks, and virus spreads to lymphoid organs.
- Number of CD4 T-cells drops significantly.

## Immune response

- Immune response kicks in between 1 week to 3 months of infection.
- Plasma viremia drops while CD4 cell numbers rebound.
- HIV infected cells persist in lymph nodes.

# HIV Time Course



# Diagnosis

## Isolation of virus

- Cultured from lymphocytes in peripheral blood.
- Higher titres of virus in blood cells and plasma observed in AIDS.

## Serological diagnosis

- Enzyme linked Immunoassay (EIA)
- Agglutination assay
- Immunodot assay

## Detection of viral nucleic acid or antigens

- RT-PCR
- DNA PCR
- bDNA assay



# Transmission

**High titers of HIV are found in blood and semen.**

## **Transmitted through:**

- Unprotected sexual contact (homosexual or heterosexual).
- Mother to babies.
  - 1. *in utero*    2. during birth    3. breast feeding
- Re-use of contaminated needles
  - + Bad medical practice    + Intravenous drug use
- Transfusion/transplantation of infected blood or tissue.
- Sharing of personal implements such as razors or toothbrushes.

## **Not transmitted through:**

common exposures s.a. coughing, sneezing, sharing meals, casual touch *etc.*

# Treatment

## Antiviral drugs

- Reverse transcriptase inhibitors
- Viral protease inhibitors
- Fusion inhibitors
- Integrase inhibitors

## HAART : Highly Active Anti Retroviral Therapy

Treatment with a combination of antiretroviral drugs.

## HIV infection is now a chronic, treatable disease.

Treatment has to continued for life.

# Secondary Infections

Bacterial	Fungal	Protozoa	Viral
<i>Mycobacterium tuberculosis</i> <i>Salmonella</i> sp.  <i>Listeria monocytogenes</i>	<i>Candida albicans</i>  <i>Cryptococcus neoformans</i> <i>Pneumocystis jiroveci</i>	<i>Cryptosporidium</i>  <i>Toxoplasma gondii</i>	Hepatitis B  Herpes simplex  Hepatitis C

# Prophylaxis

## No HIV vaccine available

- No vaccine candidates have proven effective.
- High mutation rate of HIV leads to very high antigenic variability.
- Lack of suitable animal models.

## HIV-AIDS prevention

- Use a condom during sexual intercourse.
- Never share unsterile needles or syringes.
- Never share personal instruments such as toothbrushes and razors.
- HIV positive women should avoid getting pregnant.
- HIV positive women should avoid breast feeding of infants.

