

AIDS

Microbiology III

History of HIV (AIDS)

- HIV is most identical to SIV, Chimpanzees were the source of HIV-1 virus.
- Researches concluded that 1st transmission of SIV to HIV in humans took place around 1920 in Kinshasa (central Africa).
- In 1968, earliest case of AIDS appears in Midwest.
- In 1970s start of epidemic in united states.
- In 1981 GRID was coined in general press.
- The CDC in search of a name and looking at the infected communities coined ‘the 4H disease’ seemed to single out Haitians, homosexuals , hemophiliacs and heroin users.

Discovery of HIV:

- In 1983, 2 separate research groups led by Robert Gallo and Luc Montagnier, independently declared that a novel retrovirus may have been infecting AIDS patients.
- Gallo's group called their isolated virus as HTLV-III.
- Montagnier's group called their isolated virus as LAV.
- As these 2 viruses turned out to be same, in 1986, LAV and HTLV-III were renamed HIV.

NOTE:

- HTLV – Human T-Lymphotropic Virus
- LAV – Lymphadenopathy Associated Virus

Epidemiology

- More in females.
- Occurs in all ethnic groups and all ages.
- Occurs in all geographical locations.
- AIDS is common cause of death in adults between the ages of 25-44.
- Worldwide more than 22 million people have died of AIDS since the epidemic was recognized in 1981.
- The epidemiology of HIV infection is quite different in children.

HIV and AIDS

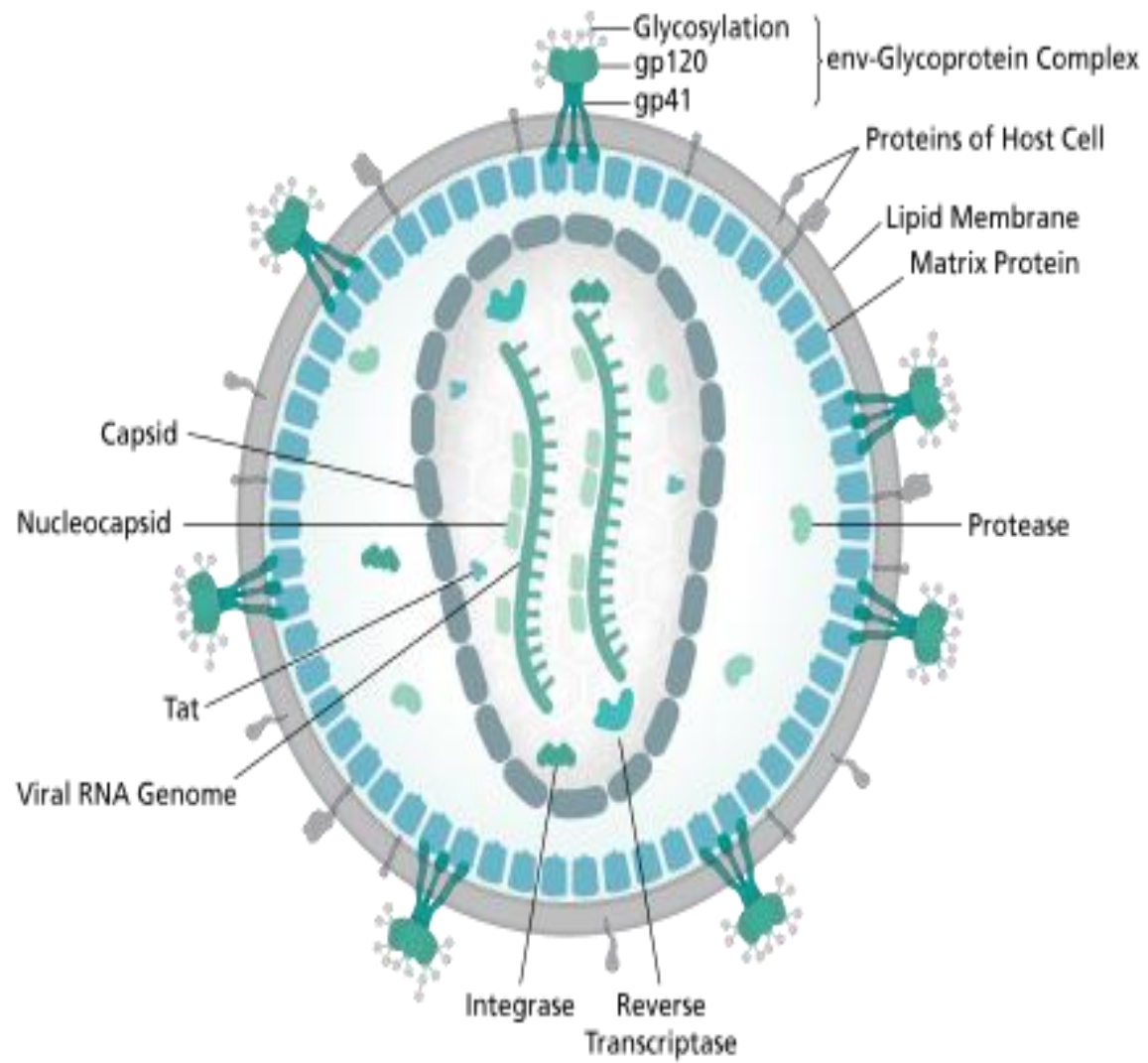
- HIV- **Human** (can live only in humans) **Immunodeficiency** (damages immune system of hosts) **Virus** (RNA).
- AIDS- **Acquired** (transmit from person to person) **Immune** (affects immune system) **Deficiency** (malfunctioning of body's immune system) **Syndrome** (group of signs and symptoms).
- HIV is a virus and AIDS is a disease.
- HIV develops into AIDS.
- AIDS is deficiency in body's defense mechanism or immune system.
- AIDS is acquired, not hereditary.

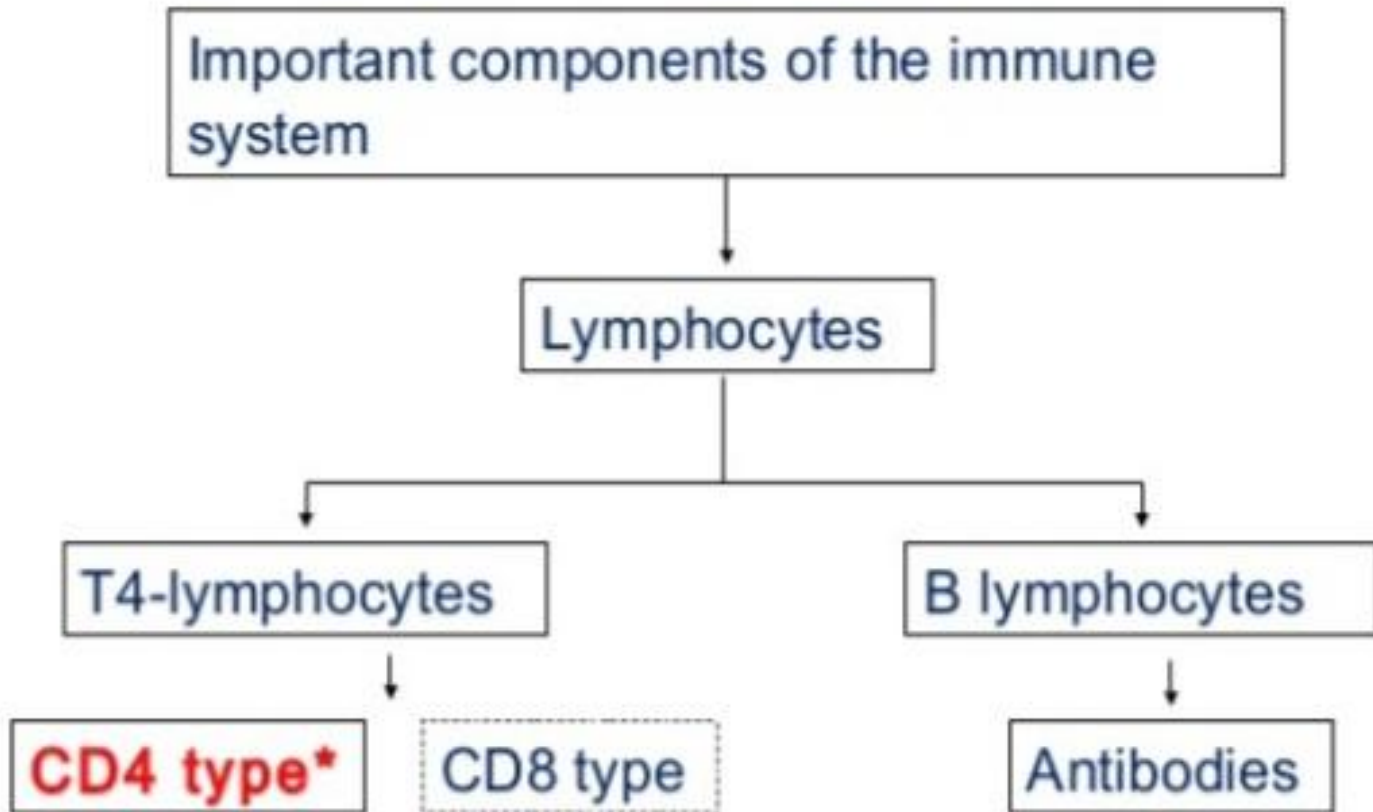
Etiology

- AIDS is caused by HIV, a human retro virus.
- Two types – HIV-1 and HIV-2 which are genetically different but has related forms.
- HIV-1 is most common type associated with AIDS in US, Europe and Central Africa.
- HIV-2 causes similar disease in west Africa and India .
- HIV-2 is transmitted less efficiently than HIV-1.

Structure

- Consists of a small RNA genome of 9300 base pairs.
- Diameter- 120nm, Spherical shaped.
- Contains nucleocapsid core surrounded by a lipid bilayer or envelop derived from host cell membrane.
- The lipid membrane is studded with the surface glycoprotein gp 120 and the transmembrane gp 41 protein.
- Consists of 3 enzymes:- Reverse transcriptase, integrase and protease.
- Consists of 3 structural genes:- gag, pol, env.





HIV uses CD4 cells for replication

Stages of HIV infection

Primary HIV infection:

- May be either asymptomatic or associated with acute retroviral syndrome.

Stage 1:

- HIV infection is asymptomatic with count of CD4+ greater than 500 micro litre.
- May include generalized lymph node enlargement.

Stage 2 :

- Mild symptoms which may include minor mucocutaneous manifestations and upper respiratory tract infections.
- CD4 count of less than 500 micro litre.

Stage 3 :

Advanced symptoms which may include:

- unexplained chronic diarrhea,
- severe bacterial infections including tuberculosis and
- CD4 count of less than 350, micro litre.

Stage 4 or AIDS:

- Severe symptoms which include:
- toxoplasmosis of brain
- candidiasis of the oesophagus, trachea, bronchi or lungs and Kaposi's sarcoma.
- A CD4 count of less than 200 micro litre.

Signs and Symptoms

- Fever
- Headache
- Weight loss
- Rashes
- Lymphadenopathy
- Neurological symptoms
- Fatigue, malaise
- Pharyngitis

Modes of transmission

- Open cuts, mucous membranes.
- Sexual contact: from a patient to healthy person.
- Parenteral:
 - Blood/ blood products
 - Unsterilized injections
 - Donated organs
- Vertical transmission: from mother to baby.
- Through body fluids.

Diagnosis

- Enzyme- linked immunosorbent assay/ Enzyme immune assay (ELISA/EIA).
- Radio immunoprecipitation assay/ indirect fluorescent antibody assay (RIP/IFA).
- Polymerase chain reaction (PCR).
- Western blot confirmatory test.
- Urine test.
- Orasure (collecting secretions' between cheek and gum and evaluating them for HIV antibodies.

Treatment

- HIV medicines cant cure HIV, but they help HIV patients live longer, healthier lives.
 - People with HIV take HIV medicines to prevent HIV from advancing to AIDS.
 - Reduce risk for HIV transmission.
 - Protease inhibitors; Indinavir, Ritonavir.
 - **HAART: Highly affective anti retroviral therapy-** patients must contain 200-350 CD4 cells/mm³
 - HAART combines 2 types of antiviral drugs:
 - Reverse transcriptase inhibitors (RTI'S).
 - Non nucleoside RTI's (NNRTI'S).
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