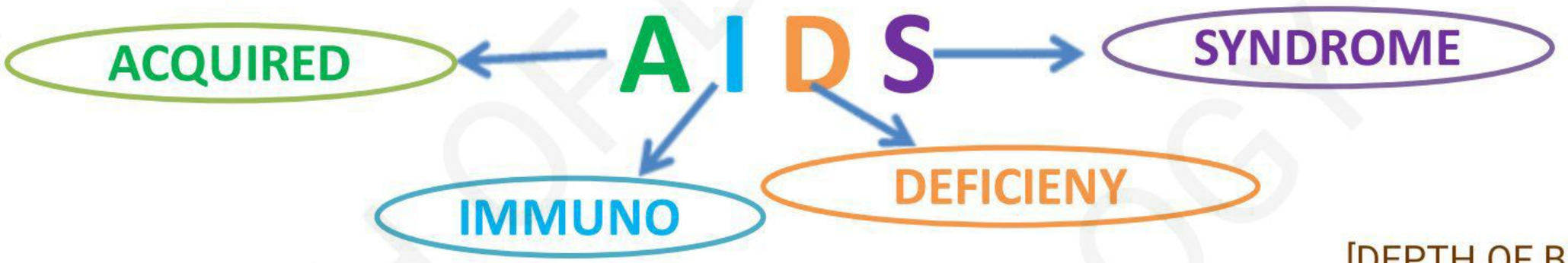


- [Group of cells]
- A virus that targets the immune system cell.
- Over the time immune system begins to fail so called ***immunodeficiency***; this increases the risk of infection & tumours
- This complication are referred as **A.I.D.S.**

2 distinct types of HIV

HIV-1	HIV-2
Most commonly associated with AIDS in the U.S. & the worldwide	More rare & typically in restricted area in western Africa [DEPTH OF BIOLOGY]

- So HIV referrs to HIV-1 because HIV-2 is rare.
- HIV targets CD4+ cells [meaning cell that have specific molecule called CD4 on their membrane] [DEPTH OF BIOLOGY]
- Macrophages, T-helper cells & dendritic cell are all involved in the immune response & all have CD4 cells
- Therefore they can be targeted by HIV

DEPTH OF BIOLOGY

- Generally CD4 molecule helps these cells attach to & communicate with other immune cells which is particularly important when the cells are launching attacks against foreign pathogen [DEPTH OF BIOLOGY]

- So CD4 is very important for our immune system [but also extremely important for HIV] [DEPTH OF BIOLOGY]
- HIV target & attach to CD4 molecule via a protein called gp120 found on its envelope

[DEPTH OF BIOLOGY]

- HIV again use gp120 to attach to another receptor , called co-receptor [DEPTH OF BIOLOGY]

- HIV need to bind to both CD4 molecule & a co-receptor to get inside the cell
- Most common co-receptor that HIV use is CXCRY co-receptor which is found mainly on T- cells.

OR

- CCR5 co- receptor which is found on T-cells, macrophages, monocytes & dendritic cells

These co-receptor are very important for HIV that some people with homogeneous genetic mutation in their CCR5 are actually having resistance / immunity to HIV

- **SO HIV CAN'T ATTACH & GET INTO THE CELL**

DEPTH OF BIOLOGY

- Without mutation once HIV binds to CD4 & either CXCRY or CCR5, it gains access to the cell [DEPTH OF BIOLOGY]
- HIV is SS (single stranded) +sense, enveloped RNA retrovirus.

[DEPTH OF BIOLOGY]

- It injects it's single strand of RNA into helper T-cell

RETRO- it needs to use an enzyme called REVERSE TRANSCRIPTASE to transcribe a complimentary d.s piece of ***PROVIRAL*** DNA

Can be integrated in host's DNA

[DEPTH OF BIOLOGY]

- So it enters the helper T-cells & pops itself into the cells DNA & ready to transcribe new virus.

NOW [DEPTH OF BIOLOGY]

When any infection occur in our body our immune cells translating new HIV virus which bud of from the cell membrane to infect more cells [DEPTH OF BIOLOGY]

HIV is notorious for making error when it replicates

During infection it can mutate to create slightly different strain of viruses [DEPTH OF BIOLOGY]

DEPTH OF BIOLOGY

- This virus are still considered HIV but behave slightly different from each other & target different cell in the host
- HIV typically spread by sexual contact [DEPTH OF BIOLOGY]

NOW if a person comes in contact with this virus through sexual contact at this early point [acute infection]

[DEPTH OF BIOLOGY]

The R-S strain of HIV which bind to CCR5 co-receptor & will get into macrophage, dendrite cells & T-cells

Usually dendritic cell hanging out in the epithelial or anucosal tissue where the virus enters the body, capture the virus & migrate to the lymph nodes, where a lot of immune cell live

[DEPTH OF BIOLOGY]

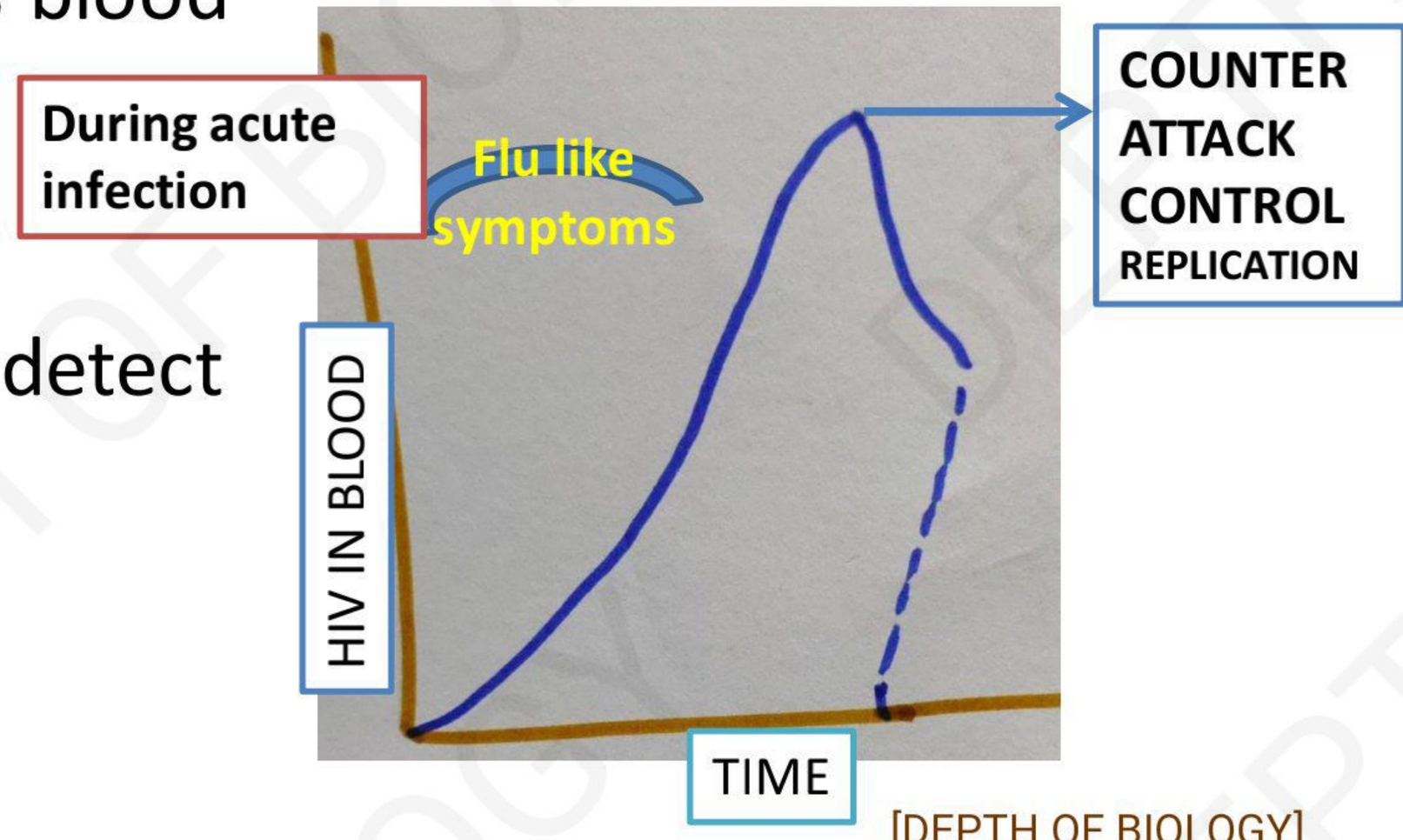
- It infect the helper T-cell, macrophages & more dendritic cell

- Leads to big spike in HIV replication & the amount of virus found in the patients blood

- The amount of virus

In blood is low but still detect

By 12 weeks



DEPTH OF BIOLOGY

- At which point patient enters the chronic or clinically latent phase which can last between 2-10 years

[DEPTH OF BIOLOGY]

Number of T-cell

- In CHRONIC PHASE

-viruses increase

-T cells decreases (1.2 billion/day)

[DEPTH OF BIOLOGY]

In this condition some other infection like tuberculosis become More common & severe

When the body's T-cells drop low enough between about 200-500 cells/ mm^3 , patient start experiencing symptoms like- swollen lymph nodes, Lymphadenopathy

- Hairy leukopakia (white patch on tongue)
- Oral candidiasis [yeast infection in mouth]

If < 200 cells/ mm^3

The immune system becomes severly compromise

HIV leads to AIDS

At this point people experiences things like fatigue, weight loss, diarrhea & HIV count in blood might increase significantly

DEPTH OF BIOLOGY

AIDS defining condition- [DEPTH OF BIOLOGY]

1. Recurred bacterial pneumonia
2. Pneumocystis pneumonia
3. Fungi infections (candidiasis of oesophagus)
4. Tumour (kaposi sarcoma)- skin lesions
5. Primary lymphoma [DEPTH OF BIOLOGY]

TRANSMISSION [DEPTH OF BIOLOGY]

1. Male to male (U.S.)
2. Male to female or female to male

75%

3. Intravenous drug abuse
4. Mother to child via placenta
5. Via breast milk [DEPTH OF BIOLOGY]
6. Blood transfusion

DIAGNOSIS

1. ***<u>ANTIBODY TEST-</u>*** look antibodies which make against HIV [DEPTH OF BIOLOGY]
2. ***<u>ANTIGEN-ANTIBODY TEST-</u>*** look virus directly
3. ***<u>RNA/ DNA TEST-</u>*** here we detect for viral RNA or copies of viral RNA in DNA [DEPTH OF BIOLOGY]

2 is recommended first 1 & 3 are confirmatory test

DEPTH OF BIOLOGY

TREATMENT- NO CURE

-***Antiretrovial therapy (ART)***: → Combination of medicine known as HIV regimen

It slows down HIV replication [DEPTH OF BIOLOGY]

& give a chance to immune system to recover & help fight other infections

[DEPTH OF BIOLOGY]

DEPTH OF BIOLOGY