CHANDIGARH UNIVERSITY

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INSTITUTE-UNIVERSITY INSTITUTE OF ENGINEERING

ACADEMIC UNIT-II

Computer Science Engineering

Subject Name-Biology For Engineers

Subject Code- 20SZT148

HIV AND DIABETES

HIV AND DIABETES

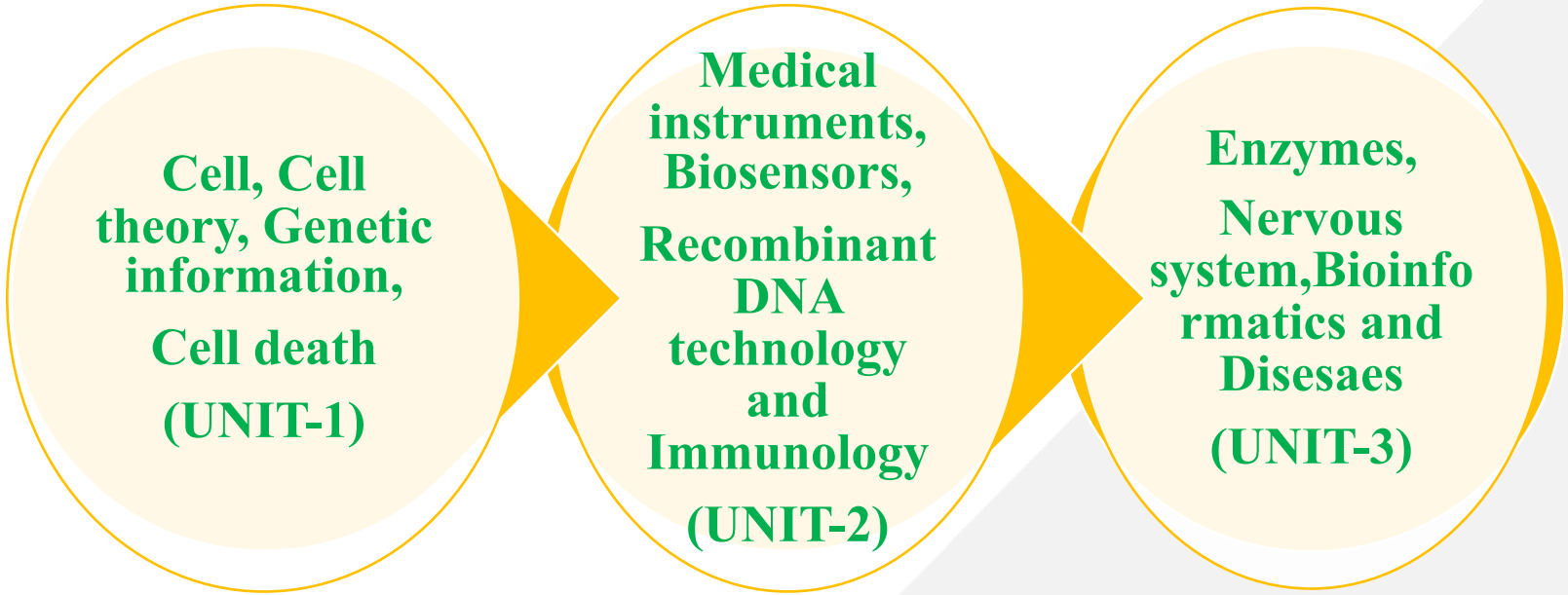
Course Outcome

CO Number	Title	Level
CO1	It gives an idea about the about the basic cell biology.	**Understanding**
CO2	It deals with the idea of uses of biology in engineering.	**Understanding**
CO3	It provide knowledge about the uses of softwares in biology field.	**Remembering**

Will be covered in this lecture

https://www.electronicshub.org/types-of-transducers/

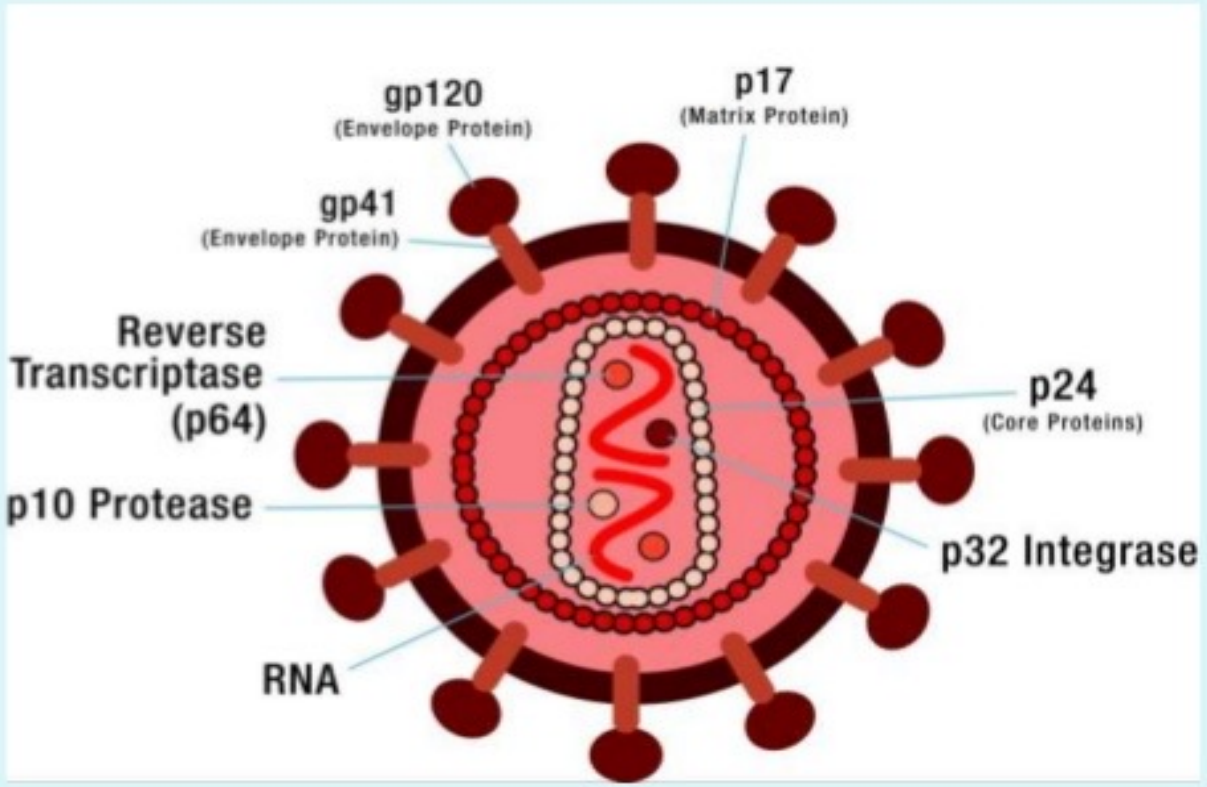
BIOLOGY FOR ENGINEERS



AIDS

- Acquired immuno deficiency syndrome
- Fatal illness
- Caused by a retrovirus HIV
- It breaks down the body's immune system, leaving the patient vulnerable to a host of life threatening opportunistic infections, neurological disorders or unusual malignancies.

Structure of HIV



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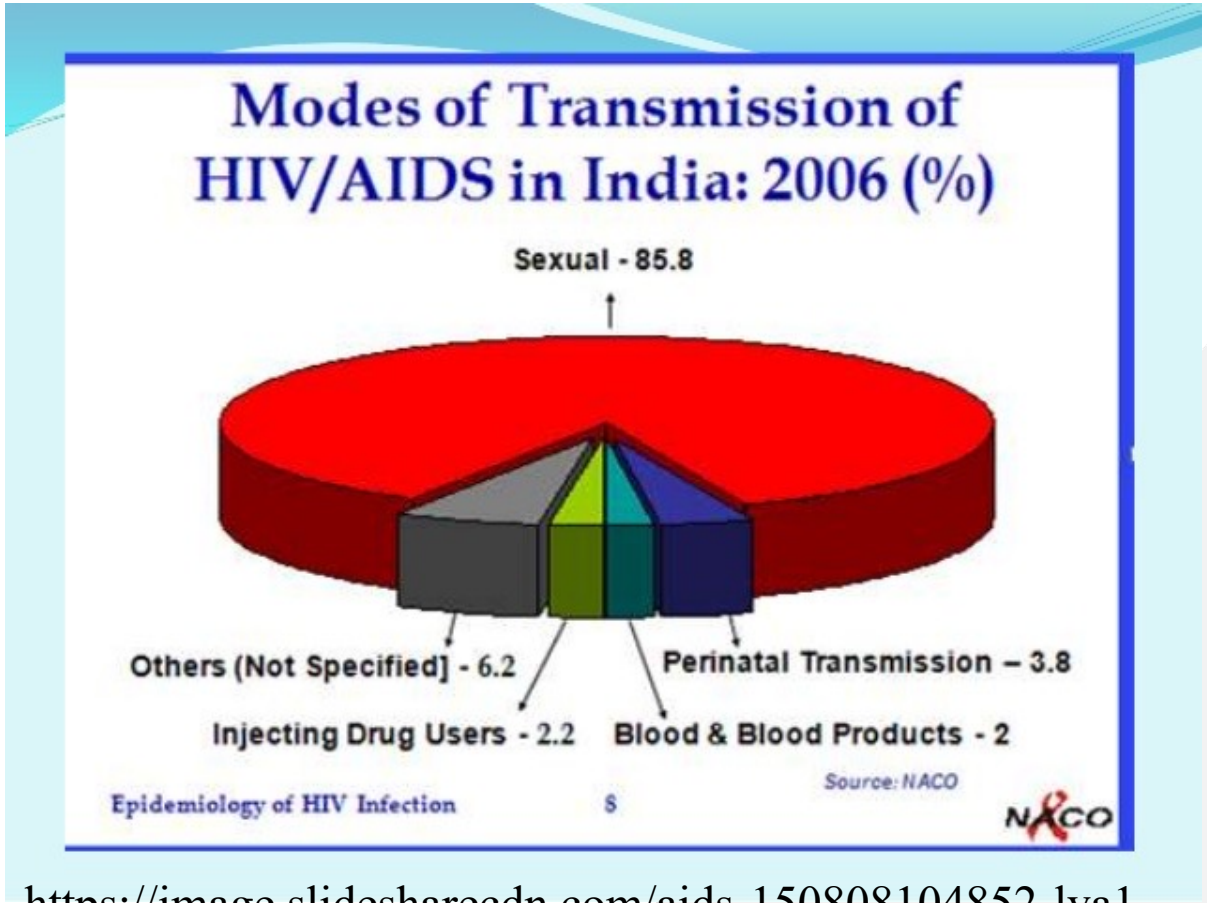
AIDS

- Epidemiology
- Males>females
- Occurs in all ages and ethnic groups
- All areas of the country are affected
- AIDS is now the second leading cause of death for all men aged 25-44 years

AIDS



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AIDS

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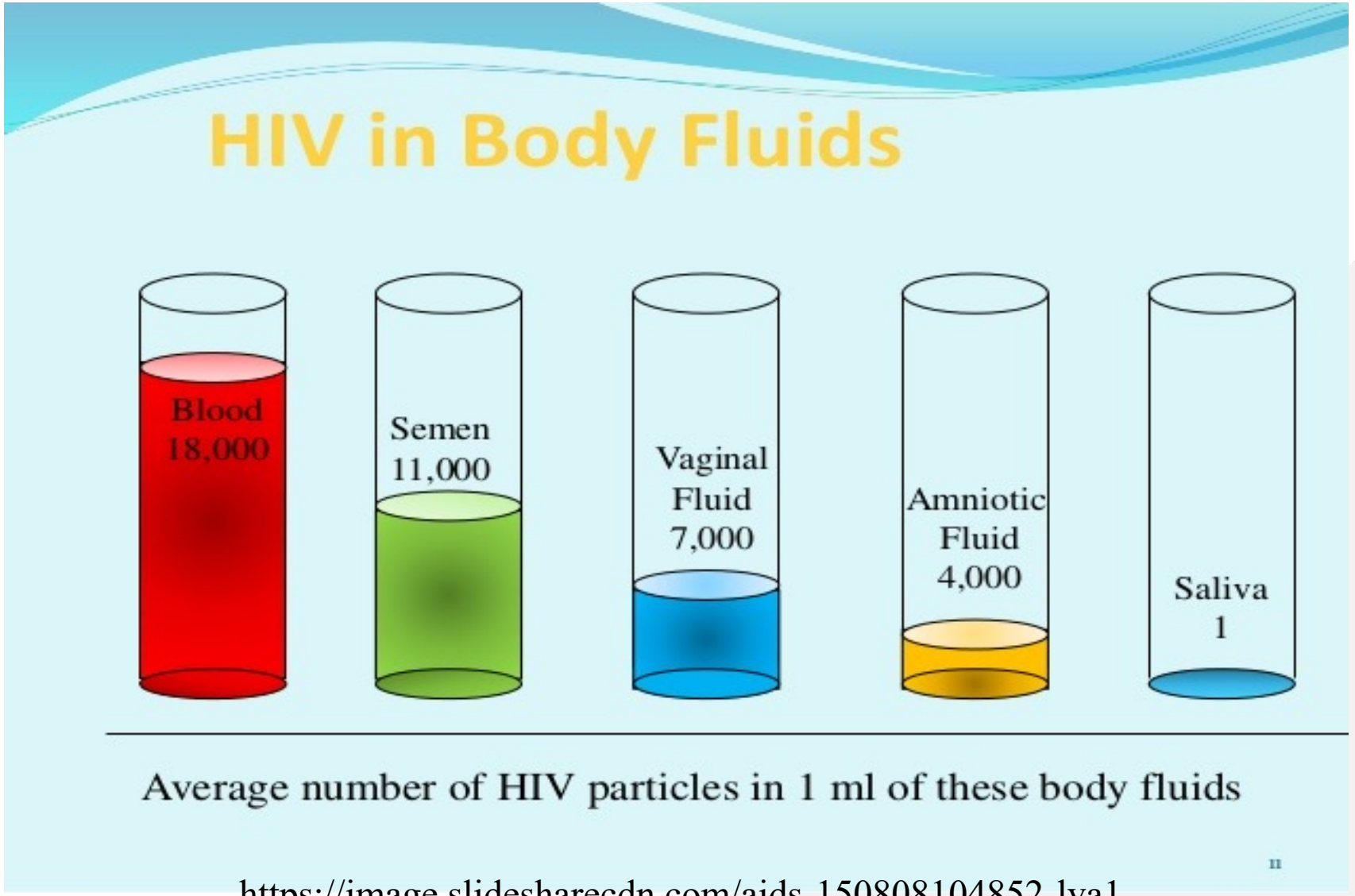
HIV- Agent

- It is a RNA virus
- Which replicates in actively dividing T4 lymphocytes.
- Unique ability to destroy T4 Helper cells
- Reservoir- Once a person gets infected virus remains in his body lifelong. And the person is a symptomless carrier for years before the symptoms actually appear.

AIDS

- Source – The virus is found in great concentrations in blood, CSF and semen.
- Lower concentrations have been found in tears, saliva, breast milk, urine, cervical and vaginal secretions.
- Also isolated from brain tissue, lymph nodes, bone marrow cells and skin.
- However only blood and semen are known to transmit the virus.



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HIV

- · Host
- Age- Most cases are among sexually active people aged between age 20- 49 years.
- High risk groups- Male homosexuals, hetero sexual partners, i.v. drug abusers, blood transfusion recipients, haemophiliacs and patients having STDs.

HIV

- HIV Transmission
  - HIV enters the bloodstream through:
  - Open Cuts Breaks in the skin
  - Mucous membranes
  - Direct injection

HIV

- · Routes of Transmission of HIV
- Sexual Contact: Male-to-male Male-to-female or vice versa
- Female-to-female
- Blood Exposure: Injecting drug use/needle sharing Occupational exposure Transfusion of blood products
- Perinatal: Transmission from mother to baby Breastfeeding

HIV

- · Routes of Transmission of HIV
- Occupational Transmission Health care worker/ hospital staff Laboratory workers

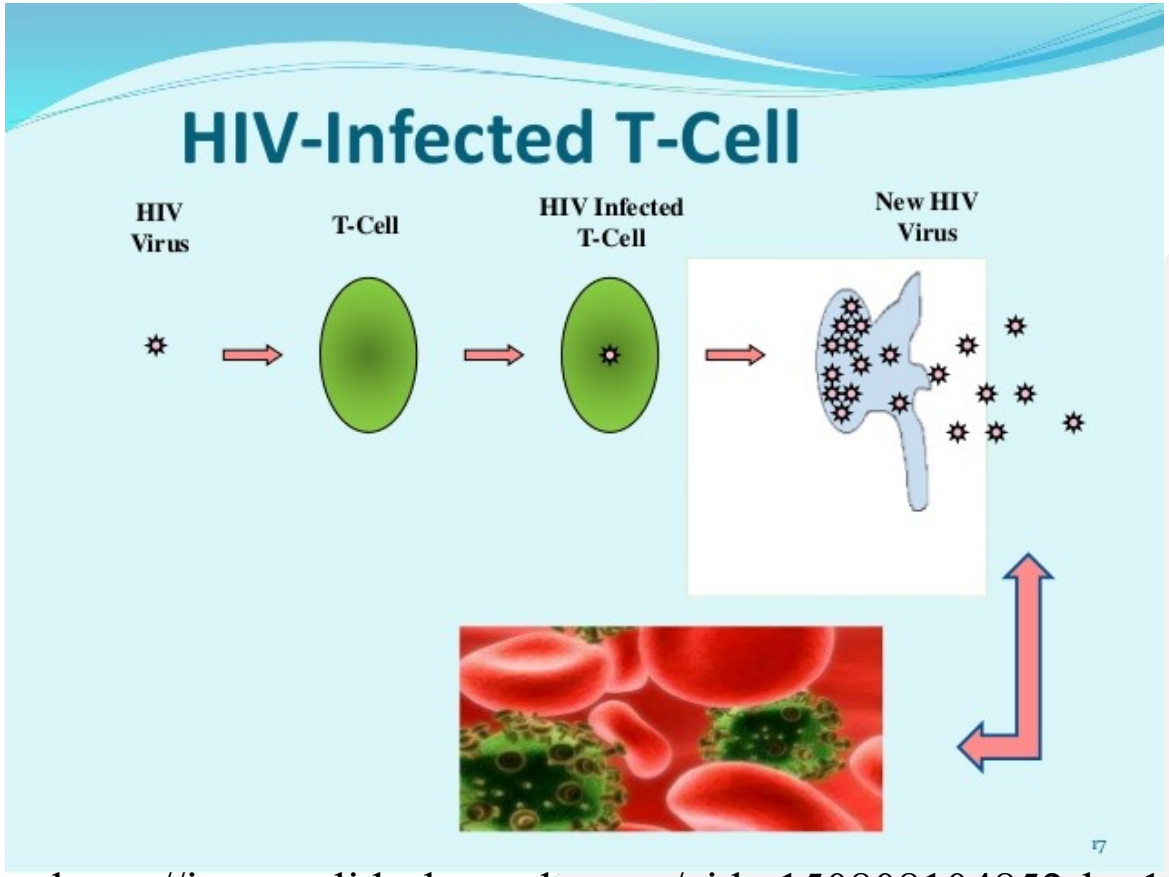
  Other routes Organ transplantation Artificial insemination Needle-prick

HIV

Incubation Period

- The incubation period is from HIV infection till development of AIDS.
- It is from a few months to 10 years or even more.
- However it is estimated that 75% of people infected with HIV will develop AIDS at the end of 10 years.

HIV



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HIV

Clinical Manifestations

I] Initial Infection

II] Asymptomatic Carrier State

III] AIDS-related Complex(ARC)

IV] AIDS

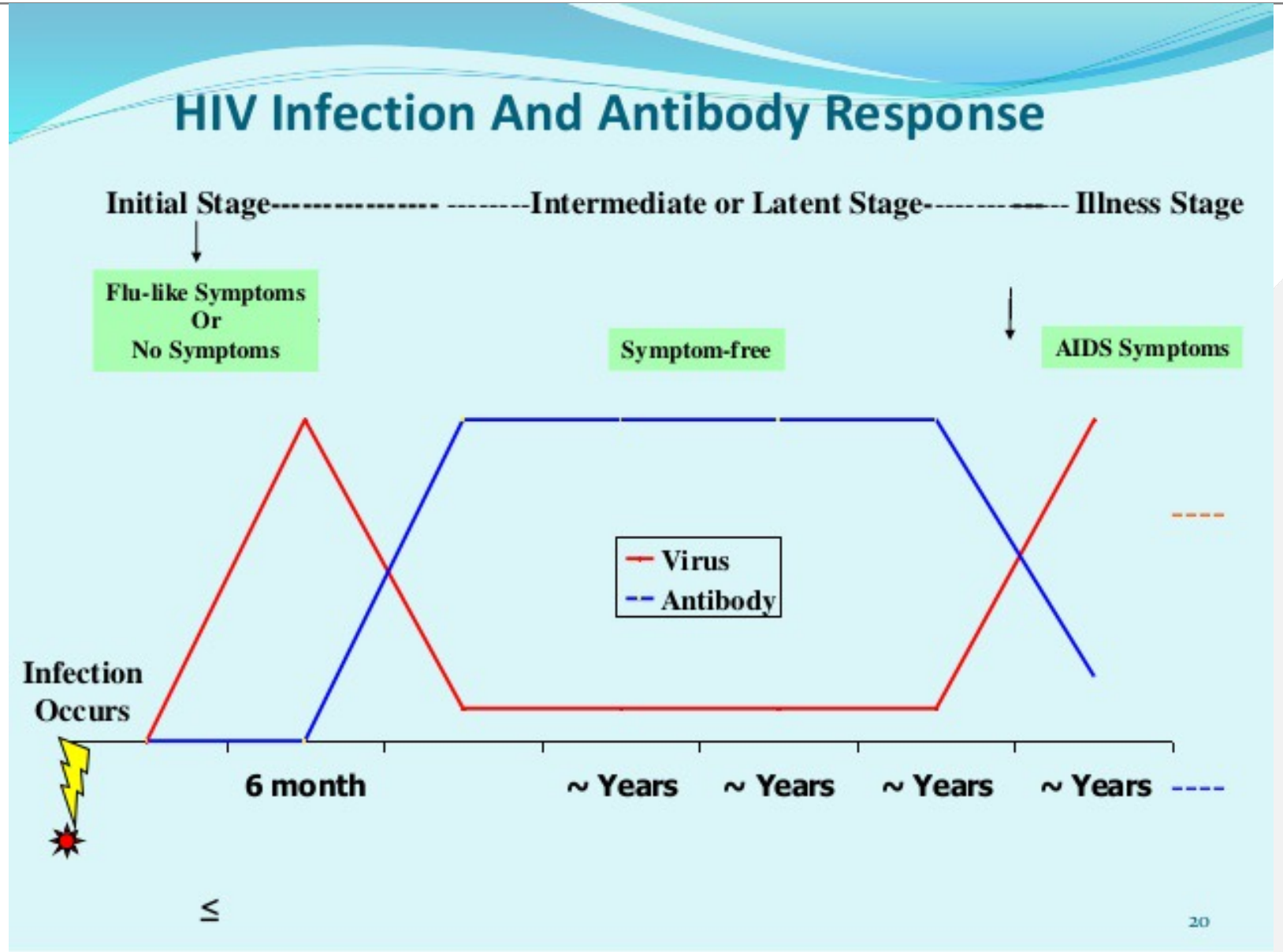
HIV

Initial Infection

- Except for a generally mild illness of fever, sore throat and rash, which about 70% of the people experience a few weeks after the initial infection; Most HIV – infected people have no symptoms for the first five years.

- However they can infect others, Once, infected the people a infected for life.

- Antibody Response usually takes 2-12 weeks to appear in the blood stream. This period is called ‘the window period’. (Tests- Negative)



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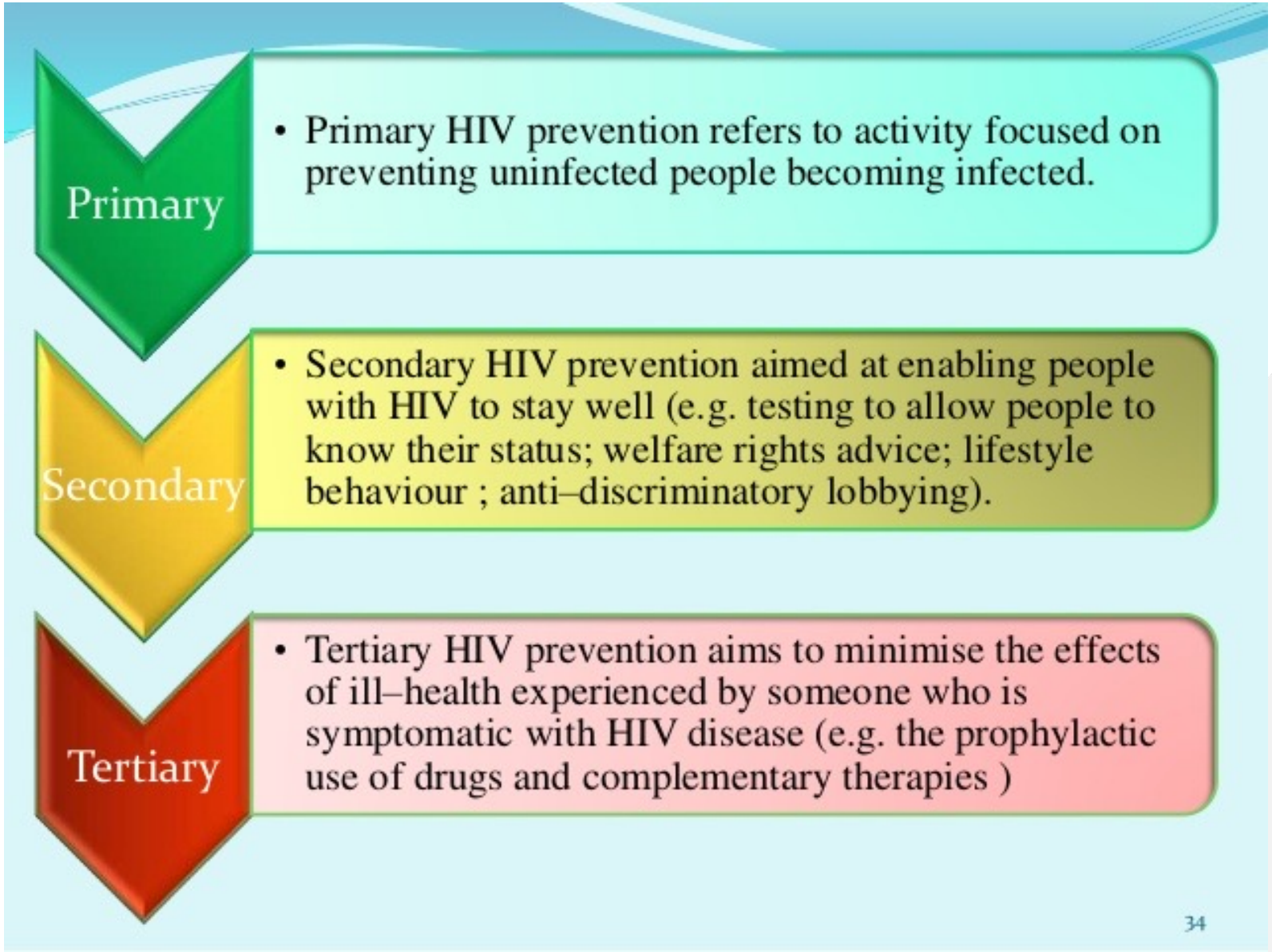

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Diagnosis of HIV

- HIV antibody test – using different antigen &/ or with different principle of the test
- Viral antigen test - used for screening blood donors in USA
- Detection of viral nucleic acid in blood.
- Determining the CD_4 counts to assess the disease progression.

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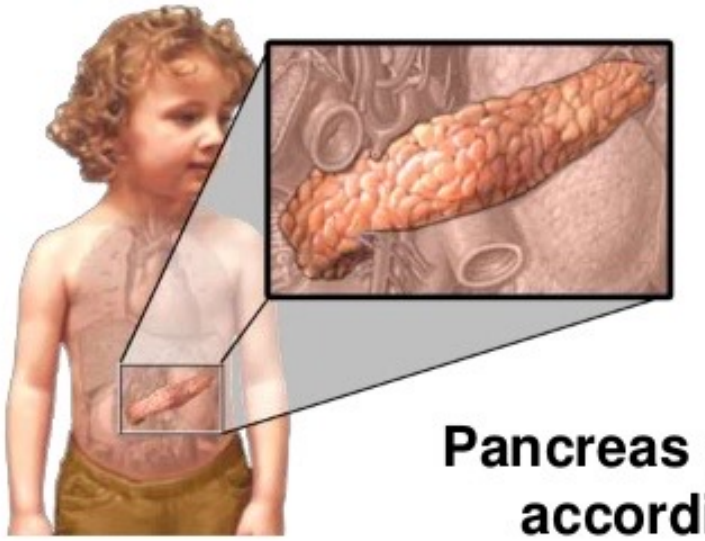
DIABETES

Diabetes describes a group of metabolic diseases in which the person has high blood glucose (blood sugar), either because insulin production is inadequate, or because the body's cells do not respond properly to insulin, or both.

INSULIN PRODUCTION



Pancreas produce insulin according to the blood glucose level

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DIABETES

- What happens if there is a problem with the production of insulin?
  - Glucose in blood is not able to go into the cells.
  - The cells can't meet energy needs and energy is tried to be provided from 'fat' and protein'.
  - Using 'fat' as the energy source results the increasing of keton in the body.

DIABETES

- With the usage of protein as energy source,the patient feels themselves tired and sluggish.
- If blood glucose is to high,It is tried to be thrown away by kidneys so the patients begin to urinate so often.
- As a result, the patients feel thirsty and start to drink a lot.

- On the other hand,despite eating so often and a lot,the patients lose weight.

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DIABETES

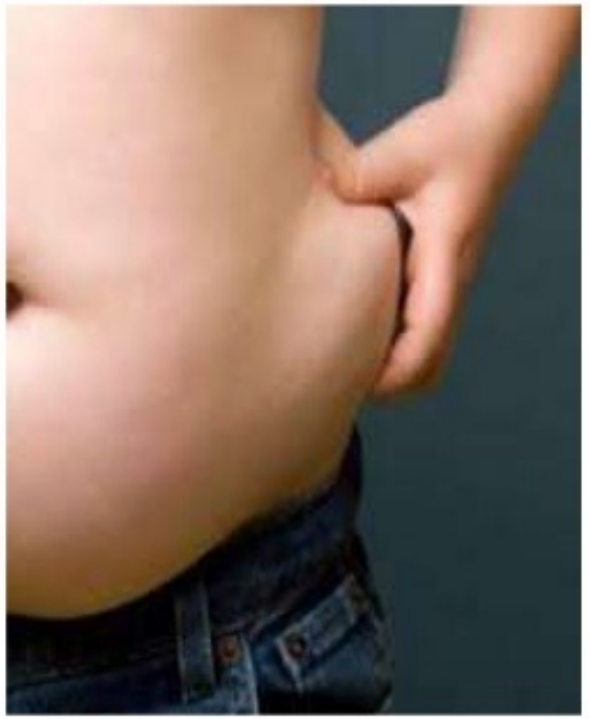
THE TYPES OF DIABETES

- While type 1 and type 2 are the most common form of diabetes, there are others that you may hear about.Impaired Glucose Metabolism or Pre-diabetes

- There are two pre-diabetes conditions:Impaired glucose tolerance (IGT) is where blood glucose levels are higher than normal but not high enough to be classified as diabetes

- Impaired fasting glucose (IFG) is where blood glucose levels are escalated in the fasting state but not high enough to be classified as diabetes.

- **Teyp 1 Diabetes:**Type 1 diabetes is usually diagnosed in children and young adults. Only 10% of people with diabetes have this form of the disease.
- In type 1 diabetes, the body does not produce insulin.



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- Patients with **type 1 diabetes** will need to take insulin injections for the rest of their life. They must also ensure proper blood-glucose levels by carrying out regular blood tests and following a special diet.

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CONCLUSION

Till now we have discuss:

- HIV
- Cause of HIV
- Diagonosis of HIV
- diabetes
- Cause of diabetes
- Types of diabetes.

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THANK YOU

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