Biology Grade 8

CHAPTER 3: DISORDERS OF THE IMMUNE SYSTEM

Activity 1: Deficiencies of the Immune System

INSTRUCTOR: SUHAIB AUDI

- Some deficiencies* of the immune system are congenital*.
- Their signs appear shortly after birth.
- Others are acquired, such as the Acquired ImmunoDeficiency Syndrome* (AIDS).

- How do immunodeficient children live?
- What is AIDS?
- What are its consequences?

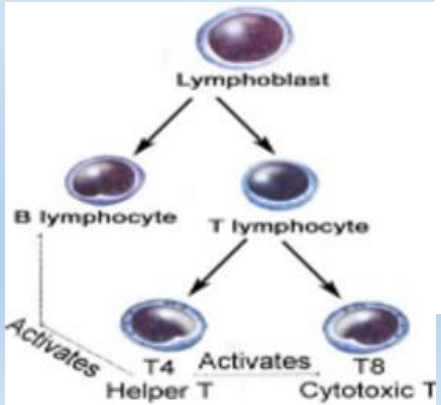
- Deficiency: defect or weakness.
- Congenital: present at birth.
- Syndrome: clinical signs of a disease.

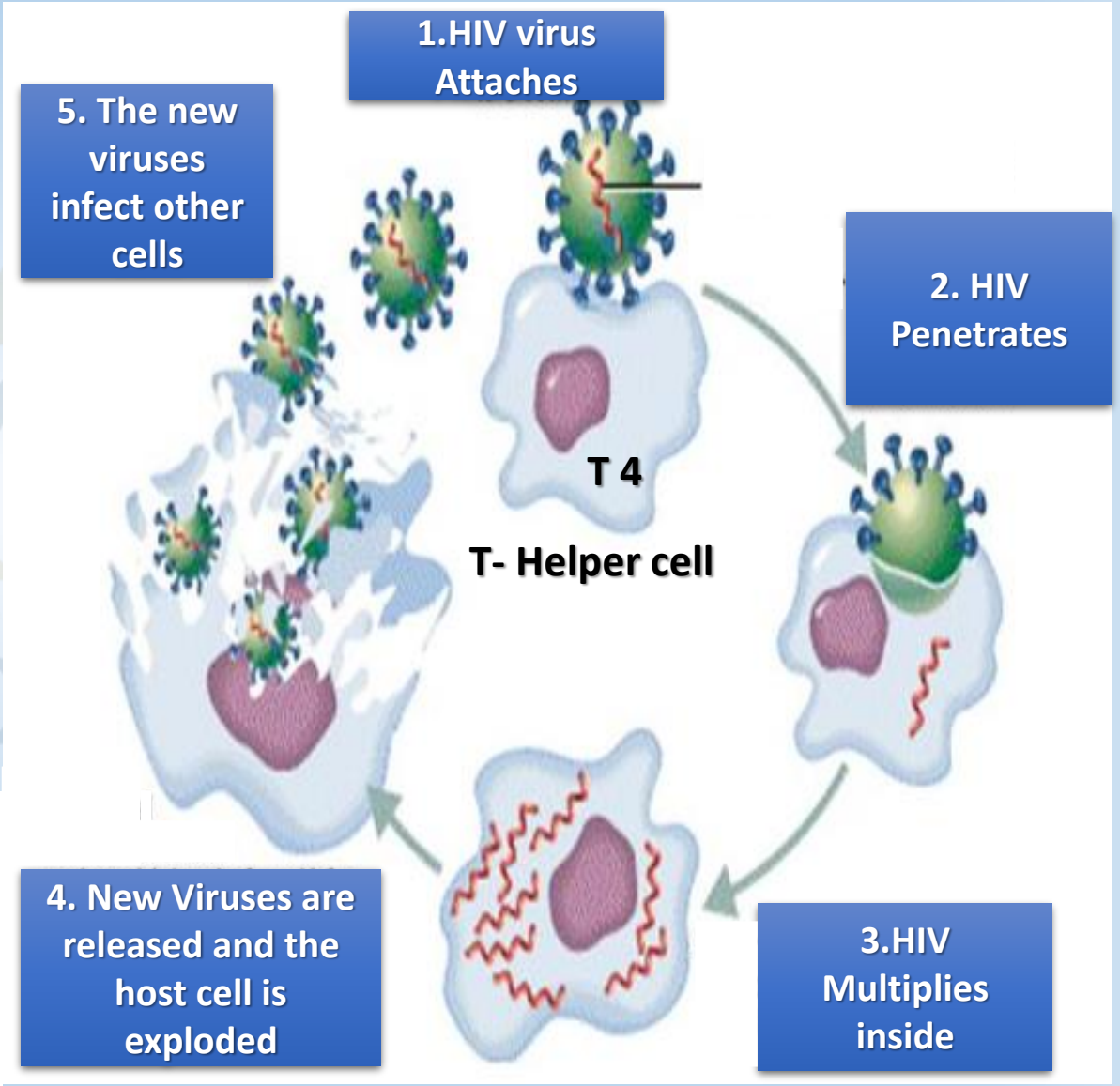
❖ Immunodeficient Babies:

- Some children have congenital immunodeficiencies and contract serious and repeated infections.
- To avoid infections, they are placed immediately after birth in a sterile cabinet while waiting for a bone marrow graft that would sometimes save their life.

❖ AIDS

- When the Human Immunodeficiency Virus (HIV) enters the body, it gradually weakens and destroys the immune system over a few years.
- As a result, the body becomes Exposed to frequent opportunistic infections (This means the body is not strong enough to fight off infections), which cause a range of symptoms and health issues.
- This stage is known as Acquired Immune Deficiency Syndrome (AIDS), and it often leads to death.





1. Is this deficiency acquired or congenital?

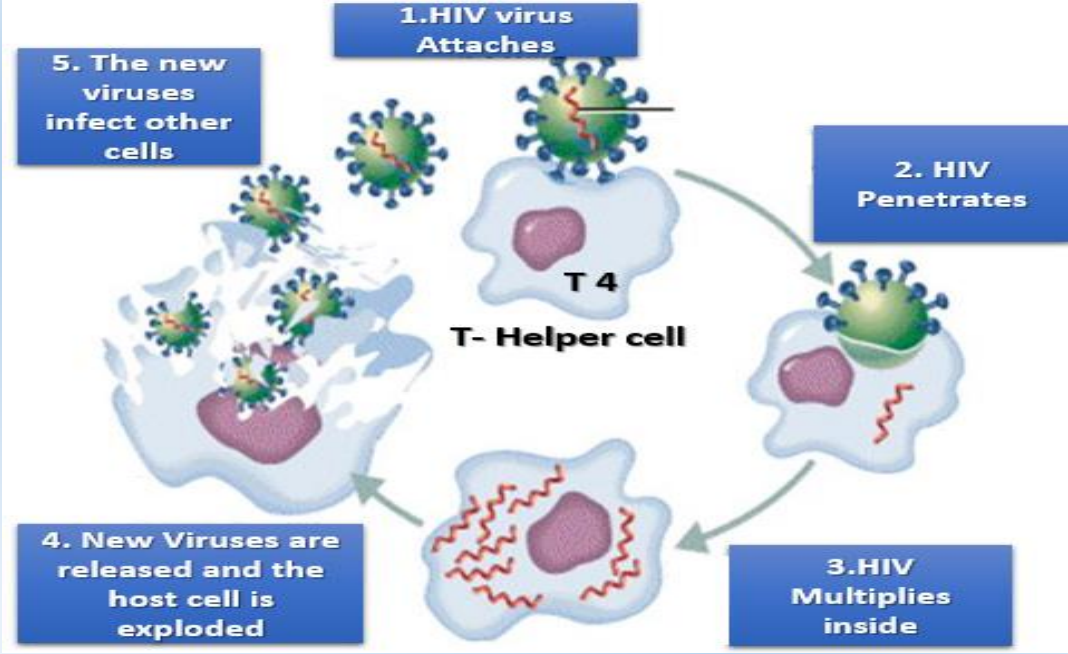
Acquired

2. Pick out the target host cell for HIV virus

T4 cells

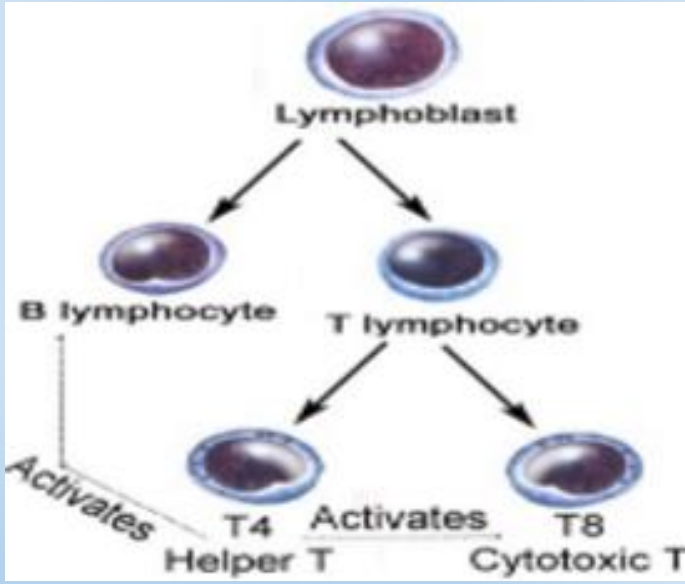
3. Pick out the fate of this cell

The cell explodes



4. "The whole immune system shuts down". Justify.

When HIV destroys T4, No activation for T8 and B cells will take place then both humoral and cellular responses will shut down. Thus, the whole immune system shuts down.



5. Give the complete name for each of the following terms:

HIV: **H**uman **I**mmune deficiency **V**irus

AIDS: **A**cquired **I**mmune **D**eficiency **S**yndrome

6. Distinguish between HIV and AIDS

HIV is the virus that infects the human to cause a disease called AIDS.

❑ First Stage - 6 Months to 2 years: Infection phase

- HIV enters blood and hides rapidly inside T4, which will remains constant and protecting the body.
- At the same time, BL recognized it and started to produce anti- HIV

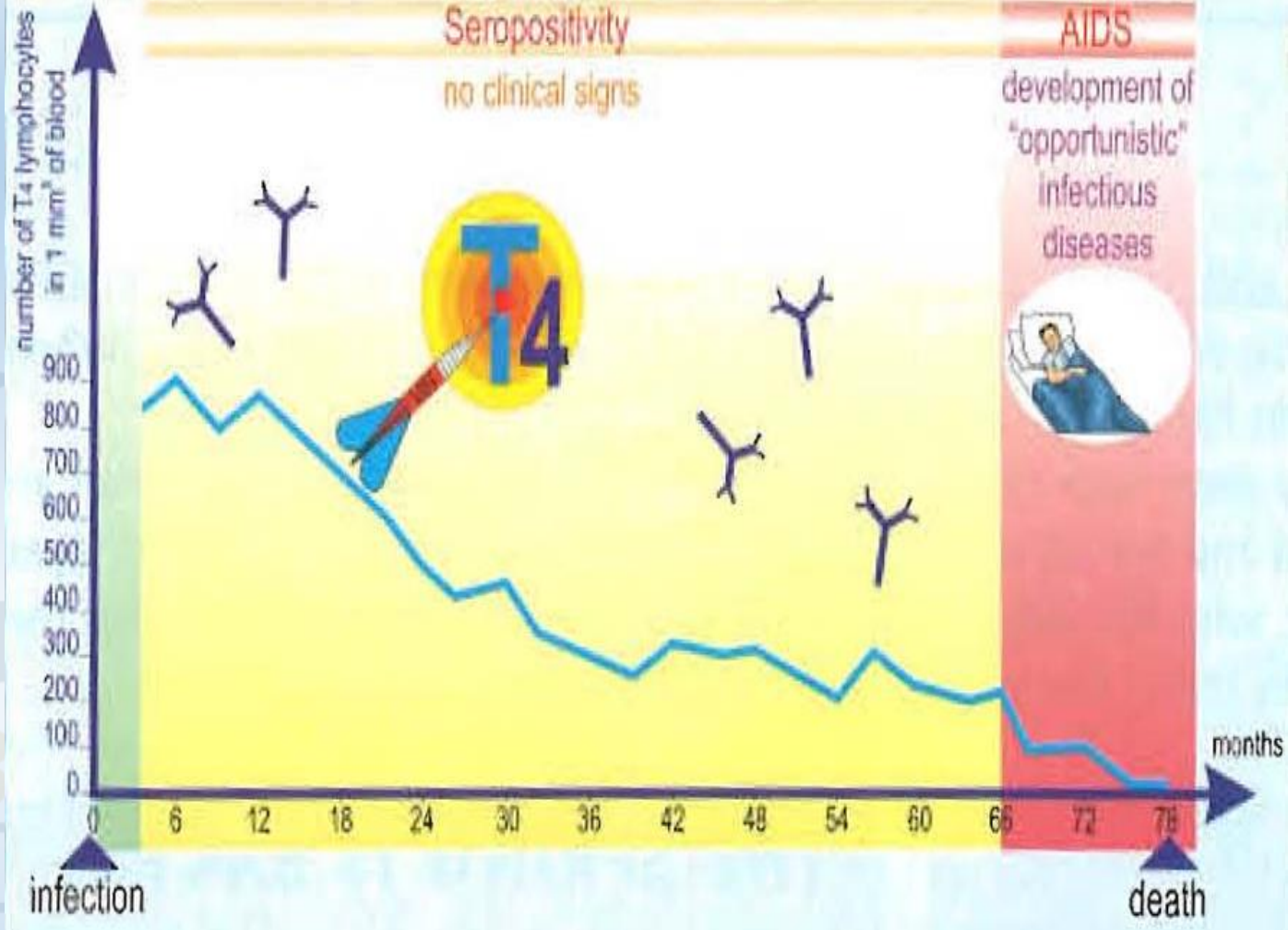
❑ Second Stage- Couple years: Seropositivity phase

- HIV explodes T4, which will decrease in number but still protect at low efficiency because of that, there are no clinical signs.
- HIV spreads in blood searching for other host T4.
- Anti-HIV still trying to catch HIV.

➢ Seropositive: Presence of Anti-HIV in the blood.

❑ Third Stage - Last years of patient's life: AIDS phase

- T4 is very low.
- No activation of B or T8 so both cellular and humoral immune responses shut down.
- Leading to repeated opportunistic infections which cause clinical signs (syndromes)
- This phase ends by death.



❖ Possible Therapy of AIDS (HIV infection):

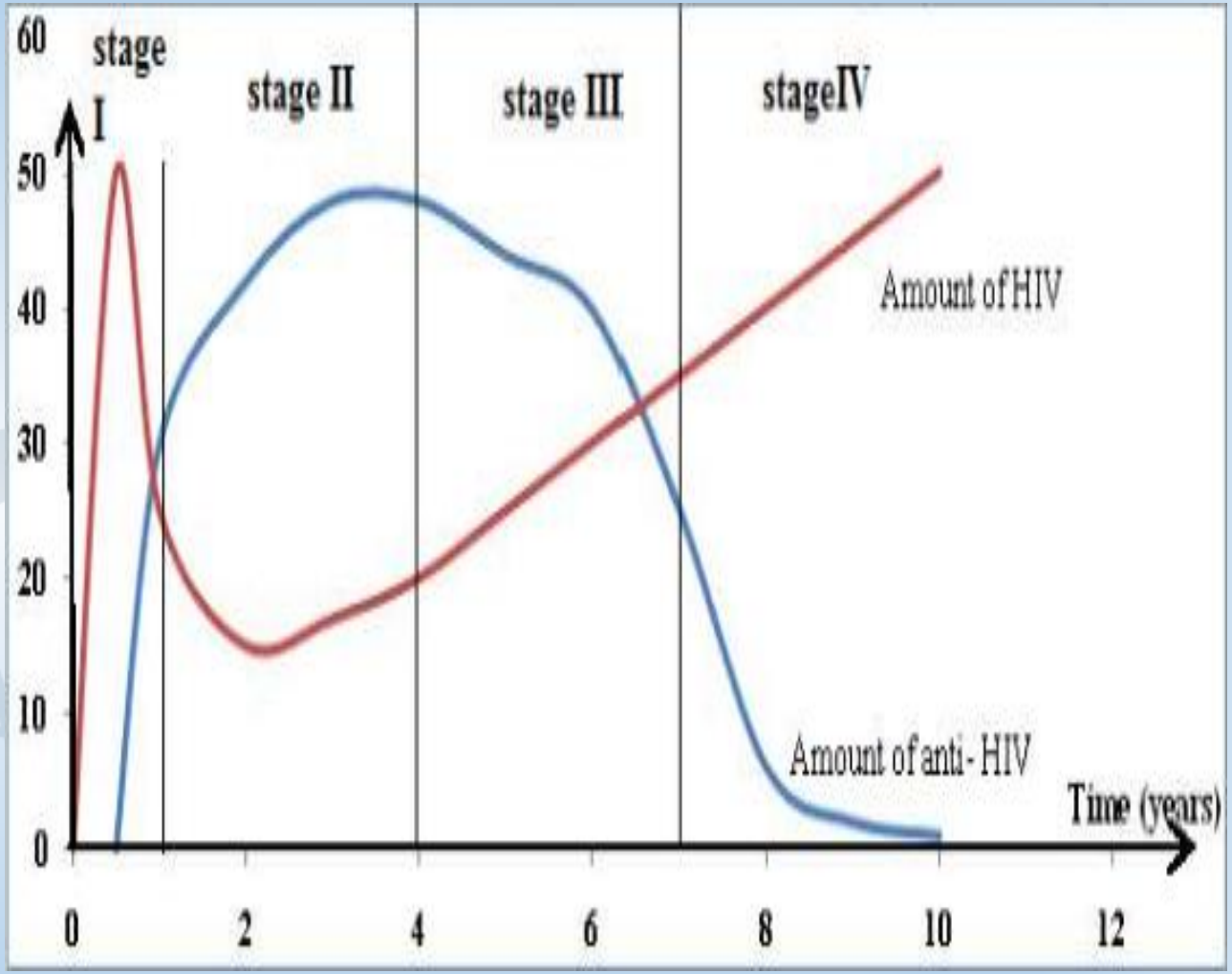
- **Antiretroviral therapy (ART):** Combines 3 or more drugs to stop HIV from multiplying and reduce viral load.
- **Goal of treatment:** To keep the virus undetectable and help the immune system recover.
- **Status of therapy:** There is **no complete cure** yet, but **ART is very effective** and allows patients to live nearly normal lives.

Exercise 1: Acquired Immunodeficiency Syndrome

The human immunodeficiency virus (HIV), which causes acquired immunodeficiency syndrome (AIDS), principally attacks TH cells.

As a result, the body's immunity is greatly weakened. Infection with HIV does not necessarily mean that a person has AIDS. Some people who have HIV infection may not develop any of the clinical illnesses that define the full-blown disease of AIDS for ten years or more.

Doctors prefer to use the term AIDS for cases where a person has reached the final, life-threatening stage of HIV infection.
The document shows how the amount of anti-HIV changes at different stages of the infection.



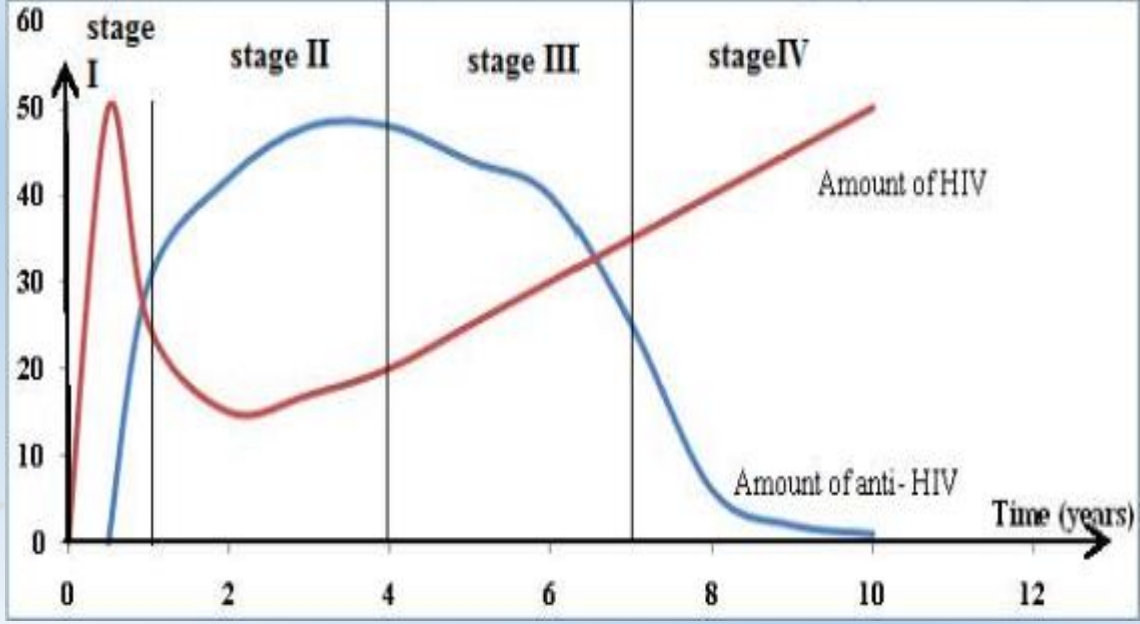
1. By referring to the above text:

1.1.Name the cause of AIDS

The human immunodeficiency virus (HIV).

1.2. Indicate the target cells of this disease.

T_H cells



2. Which stage can be called AIDS stage? Justify your answer.

Stage IV. Since the number of antibodies had decreased, so the immune system is weakened.

3. Based on your acquired knowledge, give two methods for HIV transmission.

Transfusion of contaminated blood, sharing contaminated needles.

4- By referring to the above document, explain how the immunity changes during the stages of HIV infection.

In stages I and II the amount of anti-HIV increases so the immunity increases and the body fights against HIV. But in the stages III and IV the amount of anti-HIV decreases so the immunity decreases and the immune system is weakened and is not able to attack against HIV.