11.1 Body Defence

1.

Immunity

The ability of the body to fight pathogens infection by producing antibodies .

Antigen

Protein found on the surface of a pathogen which stimulates the lymphocyte to produce antibody.

Antibody

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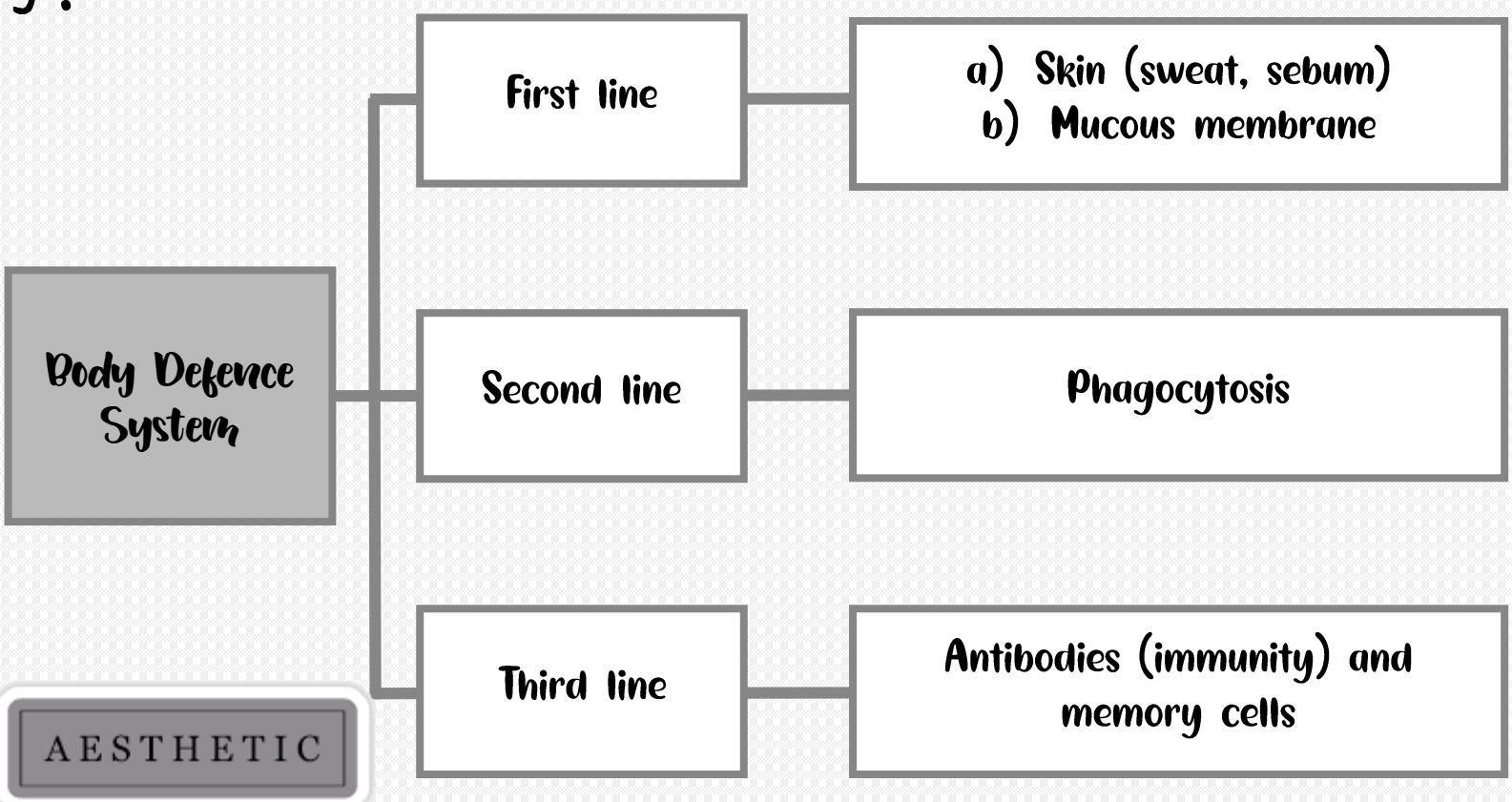
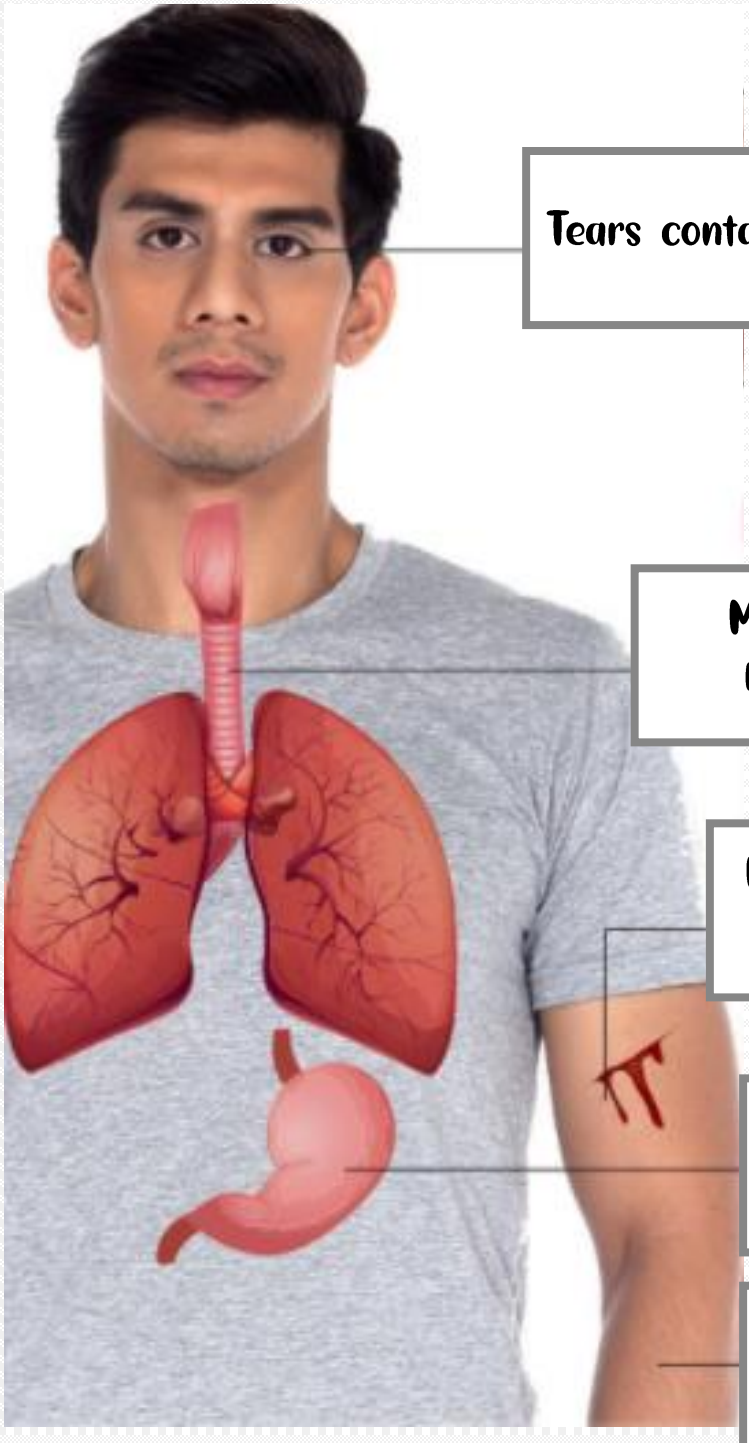
Specific protein produced by lymphocyte to destroy antigen.

2 . The importance of the body defence mechanism is to prevent the entry of pathogen into the human body to avoid diseases.

3 .



First Line of Defence



Tears contain lysozymes to destroy bacteria.

Mucus contains lysozymes to destroy bacteria in the respiratory system.

Blood clotting mechanism becomes active if injuries or wounds occur.

Hydrochloric acid in the stomach kills bacteria.

Skin (epidermis)

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Second Line of Defence

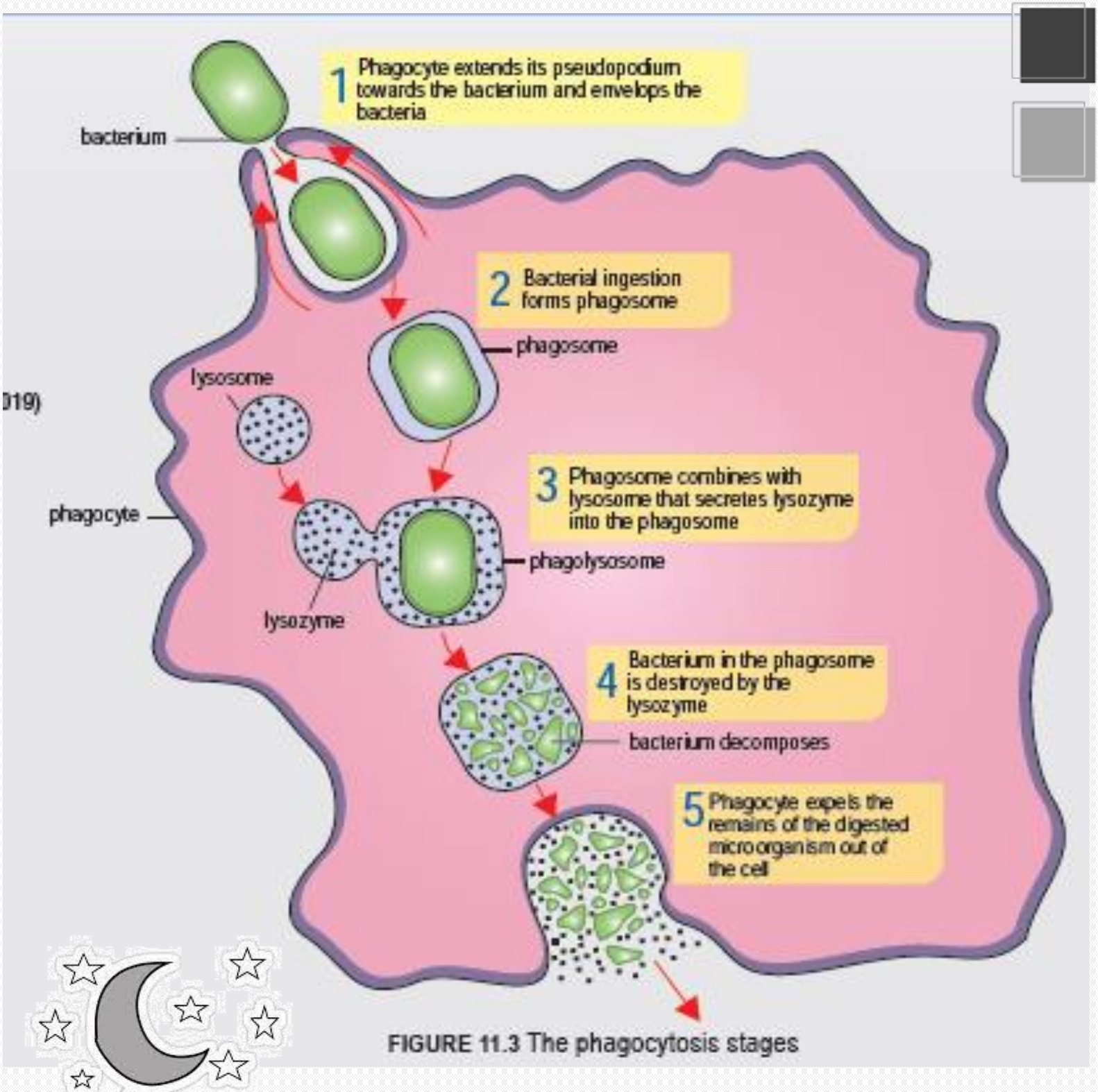

FIGURE 11.3 The phagocytosis stages

Third Line of Defence

Immune response is a very specific defence mechanism.

IMMUNITY	Body resistance against a specific pathogen which causes a specific disease.
IMMUNISATION	The process of acquiring immunity.
ANTIGEN	Specific molecules (proteins) on the outer surface of a pathogen.
ANTIBODY	A specific protein produced by lymphocyte that binds to a specific antigen
LYMPHOCYTE	The lymphocyte cell produces antibodies . T cell lymphocyte attacks the infected cells and also stimulates the B cell lymphocyte to produce memory cells .

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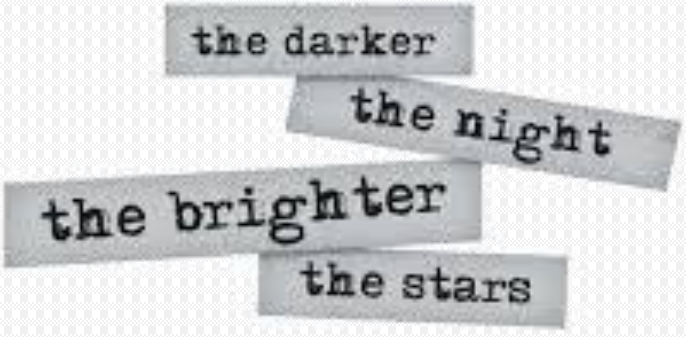
charcoal grey.



11.2 Actions of Antibodies

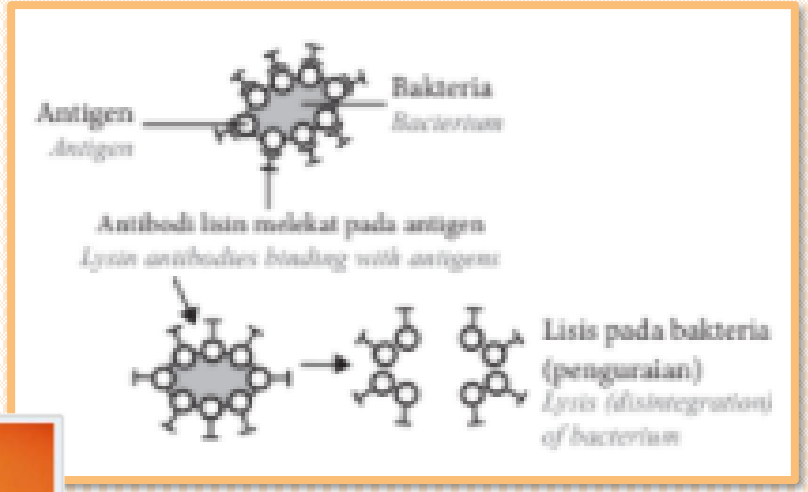
MECHANISMS USED BY ANTIBODIES TO DESTROY ANTIGENS

Opsonination

Opsonins are antibodies that bind with antigens to act as markers so that phagocytes can recognise the antigens and destroy them.

Decomposition

Lysin are antibodies that bind to the antigens and cause the antigens to rupture or disintegrate

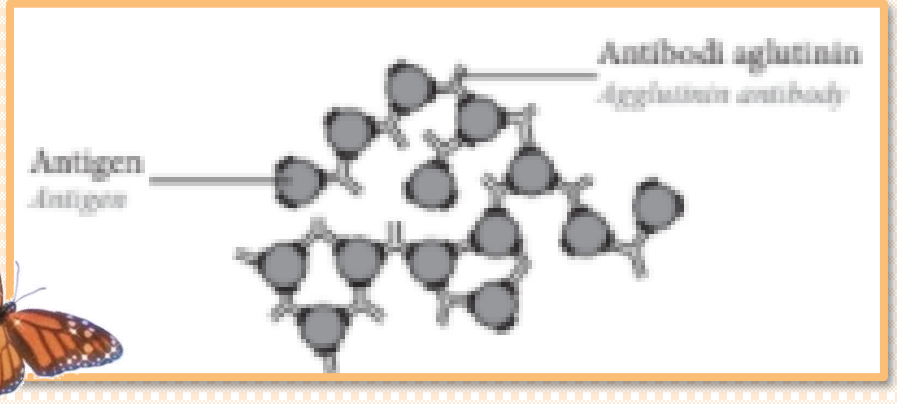


Precipitation

Antibodies act with soluble antigens to form an insoluble complex (precipitate) that easily destroyed by phagocyte cells.

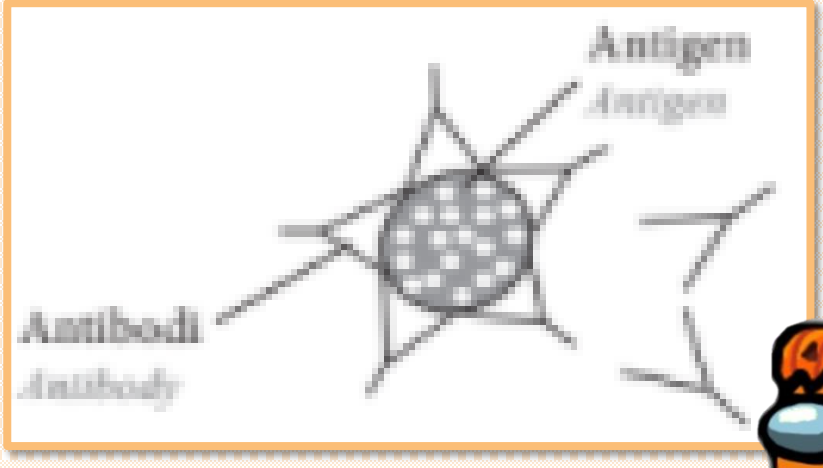
Agglutination

Agglutinin antibodies can clump pathogens together. The clumping makes the pathogens easy targets for phagocytes to capture and destroy.



Neutralisation

An antibody can neutralise the toxins produced by bacteria by binding to the toxin. This prevents the toxin from attaching to the cells and causing damage.



11.3 TYPES OF IMMUNITY

LONG-LASTING

NOT LONG-LASTING

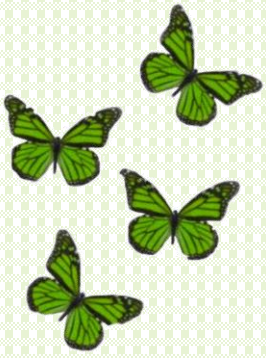
IMMUNITY

Active (Produced by the body)

- Natural (Without injection)
- Artificial (With injection)

Passive (Outside source)

- Natural (Without injection)
- Artificial (With injection)



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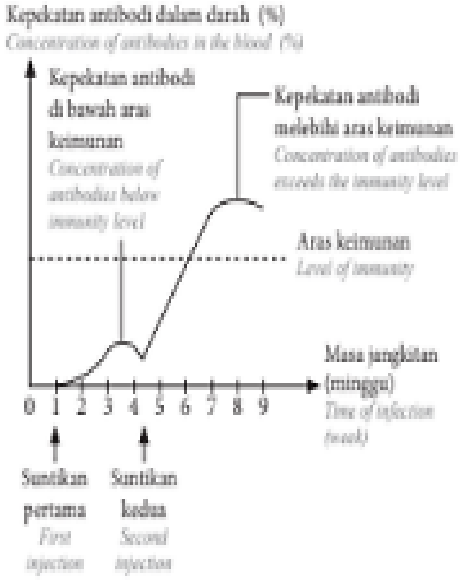
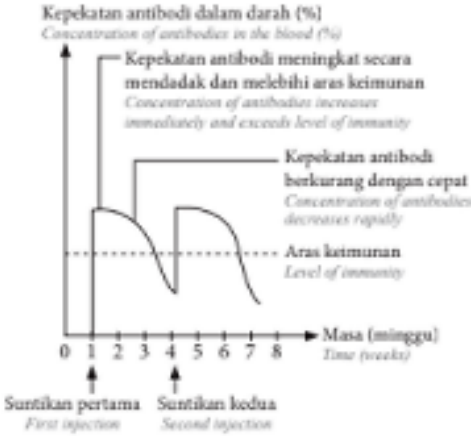
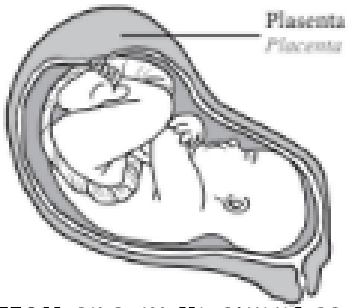
TYPES OF IMMUNITY

ACTIVE IMMUNITY	NATURAL (RECOVERY FROM DISEASE)	ARTIFICIAL (VACCINATION)
Graph		
example	Chicken pox	Hepatitis B, mumps, rubella, Tuberculosis
Method of acquisition 	A person gets infected for the first time. | Lymphocytes produce antibodies and remain in memory . | Recovery from disease . | The person gets infected by the same disease . | Memory identifies the same disease and produce antibodies much faster and in greater amount.	A person is injected with vaccine for the first time. | Lymphocytes identify the pathogen for the first time and produce antibodies slowly | Second vaccination . | Memory identifies the same pathogen and produce antibodies much faster and in greater amount.

PASSIVE IMMUNITY	NATURAL (BY PLACENTA AND BREAST MILK)	ARTIFICIAL (ANTISERUM INJECTION)
Graph		
example	Mild infections in newborns	Rabies, snake bites, tetanus
Method of acquisition 	a) Antibodies via placenta  b) Mother's milk supplies antibodies to the newborn baby.	A person gets infected and is unable to produce their own antibodies because the body is too weak. | Antibodies are injected directly into the body to fight the disease. | Antibodies continue to decrease | Antibodies injections are given from time to time until the person is able to resist the infection.

DIFFERENCES

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ACTIVE IMMUNITY

- Lymphocytes are stimulated to produce antibodies
- The action is slow
- The immunity is permanent for a long period of time

PASSIVE IMMUNITY

- Antibodies are received from another person or an animal
- The action is fast
- The immunity is temporary

11.4 HEALTH ISSUES RELATED TO HUMAN IMMUNITY

1 Acquired Immunodeficiency Syndrome (AIDS)

- HIV destroys lymphocytes and weakens a person's immunity. The person infected has low resistance towards diseases which may lead to death due to other infections.
- HIV can be transmitted through body fluids such as blood and the use of syringe contaminated by HIV blood. The virus can also be transferred to fetus through placenta.

2 Systemic Lupus Erythematosus (SLE)

- A disease in which a patient's immune system produces antibodies that attack healthy body cells. This causes damage to the skin, joint, liver, brain and other organs of the SLE patients. Among the symptoms a rash on the cheeks and nose called a "butterfly rash", joint pain and severe fatigue.

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