



Studybeesofficial

Where Minds Pollinate

Class 12
Biology 

Chapter 9

Notes

Follow Our Socials



studybeesofficial



studybeesofficialpak



studybeesofficialpak

IMMUNITY

Definition: The capacity to recognize the intrusion of any material foreign to the body and to mobilize cells and cell products to help remove the particular sort of foreign material with greater speed and effectiveness is called immunity

Immunology: Study of immunity and defense mechanism of the body is called as immunology

Antigen: It is a foreign substance, often a protein which stimulate the formation of a antibodies (Anti....antibody, gen.....Generating)

Antibodies: These are proteins which are specific i.e. cause the destruction of the antigens which stimulated their production. These are manufactured in B.lymphocytes, then secreted into the lymph and blood where they circulate freely.

IMMUNITY

Immune response: The body's response to foreign molecules such as the production of antibodies directed against a specific antigen is called as immune response

IMMUNITY

❖ Functions of immunity:

- Provide resistance against pathogens
- Destroy cancerous cells
- Scavenge dead cells

IMMUNITY

❑ **Thucydides:**

- He was Greek historian and observed the presence of immunity in human body about 2000 years ago.

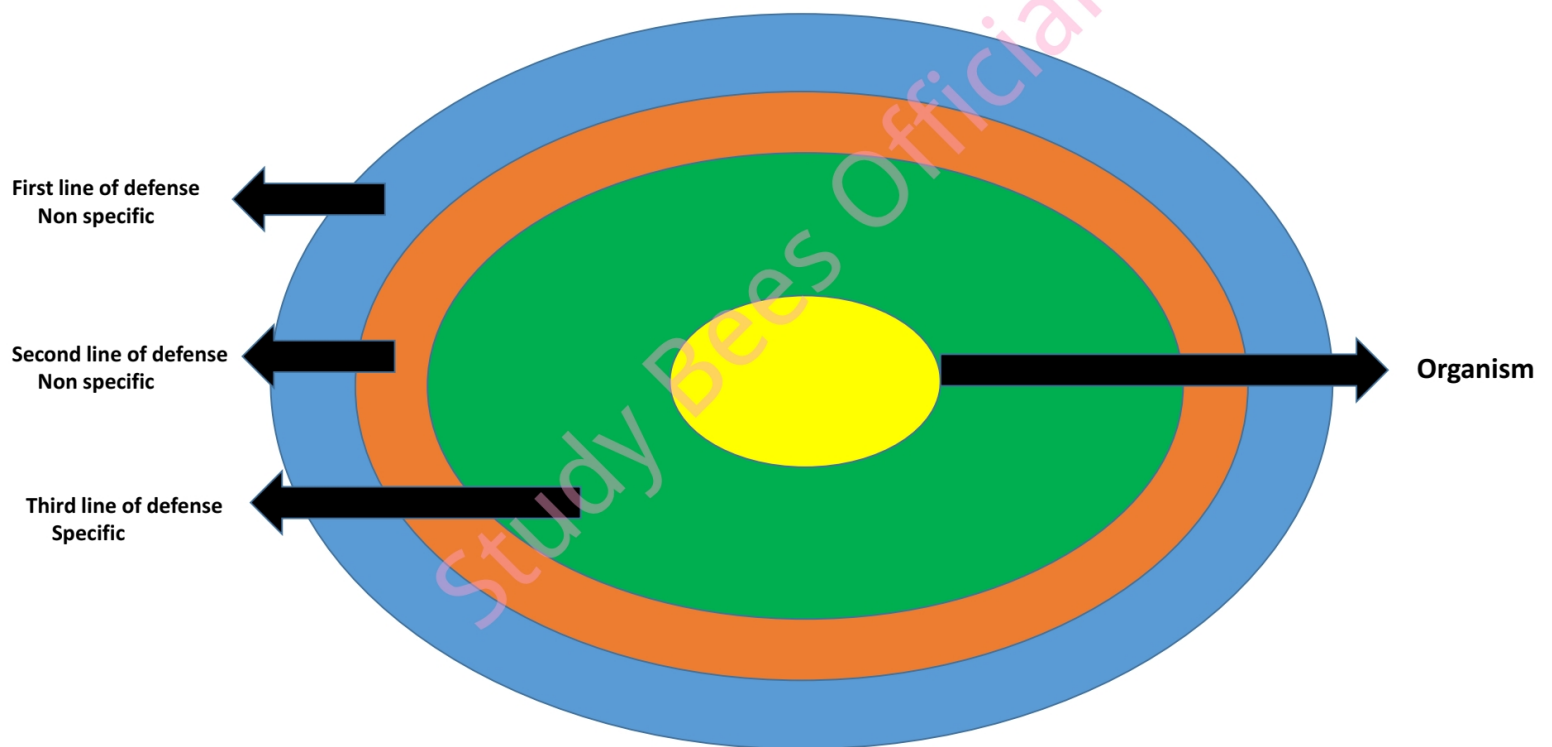
❑ **Edward Jenner:**

- He hypothesized that cow pox conferred protection against small pox

❑ **Three lines of defense against microbial attack**

- First line of defense
- Second line of defense
- Third line of defense

IMMUNITY



IMMUNITY

NON-SPECIFIC DEFENCES (INNATE IMMUNITY)

SPECIFIC DEFENCES (ADAPTIVE IMMUNITY)

First line of defense

- Skin
- Mucous membranes
- Secretions of skin and mucous membranes

Second line of defense

- Phagocytic leukocytes
- Antimicrobial proteins
- Inflammatory response
- Fever

Third line of defense

- Lymphocytes
- Antibodies
- Memory cells

IMMUNITY

FIRST LINE OF DEFENCE

Physical

- Skin
- Nasal hairs
- Eye lashes & Eye lids
- Mucous membranes
- Mucociliary clearance
- Urination

Chemical

Low pH

- Skin--- Ph. 5.5
- Gastric acid– pH. 1-3
- Vagina– pH. 4.4

Antimicrobial molecules

- Sebum
- Mucous
- Lysozyme
- Lacto peroxidase (saliva)
- Beta defensins (cornea)
- Pepsin

Biological

→ Microbiome
(Skin, Gut)

IMMUNITY

Skin:

❖ Epidermis (Epithelial cells)

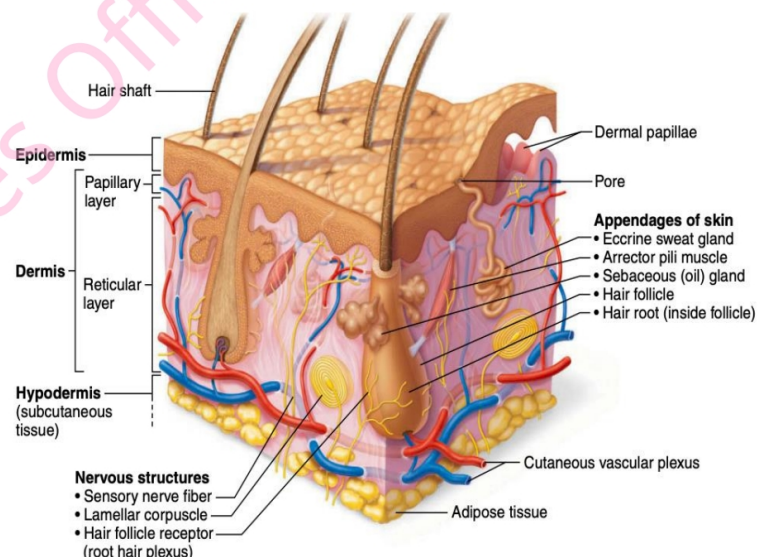
- Continuously shed
- Keratinocytes.....Keratin
- Melanocytes.....Skin color
- Langerhans cells....Immune system

❖ Dermis

- Thick layer
- Hair follicles
- Sweat glands.....Sweat (Lysozyme, salts)
- Sebaceous glandsSebum(Oil, acids)
- Nerves

❖ Hypodermis

- Fats storing region



IMMUNITY

SECOND LINE OF DEFENCE

Cells

- Monocytes & Macrophages
- Neutrophils
- Dendritic cells
- Natural killer cells
- Mast cells
- Eosinophils
- Basophils

Proteins

- Interferon
- Antimicrobial peptides
- Iron Binding Proteins
- Complement System
(30 types of proteins complex)

Other responses

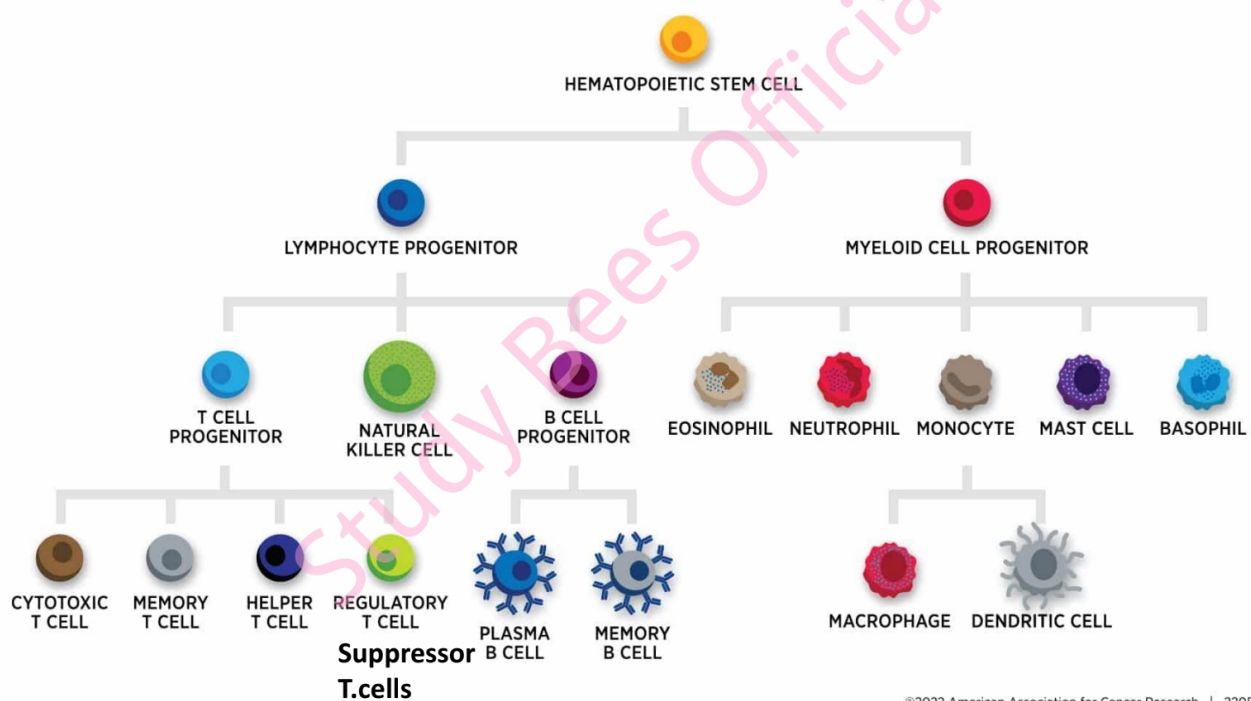
- Fever
- Inflammation

IMMUNITY

❑ Third line of defense: (immune system)

- ❖ Lymphocytes play major role
 - T. Lymphocytes (T.cells)
 - B. Lymphocytes (B.cells)
 - Both produced before birth in red bone marrow (origin)
 - T. Lymphocytes mature in thymus gland (lymph node)
 - B. Lymphocytes mature in bone marrow
 - After maturation, both dispersed in lymph, blood, body fluids, lymph nodes, tissue fluid and other body parts
 - Thymus gland becomes double in size from birth till puberty and after adolescence, its size reduced.

TYPES OF IMMUNE CELLS



B.



**Plasma
B.cells**

Secrete anti-
Bodies into
Blood stream



**Memory
B.cells**

Long lived
Provide future
immunity

T



**Cytotoxic
T.cells**

Destroy cancer
Cells and body
Cells infected by
Foreign particles



**Helper
T.cells**

Activate B
And T cells



**Suppressor
T.cells**

Shut down
Immune
response



**Memory
T.cells**

Long lived
Provide future
immunity

Second defense line

1st line of defense failed

Pathogen entered in our inner environment
(Blood, cell cytoplasm, tissue)

2nd & 3rd line of defense will active

Monocytes

Entered in tissues where triggered by proteins
to mature into macrophages

Act as scavengers

Move to the infected cells

Attack the surrounding foreign particles

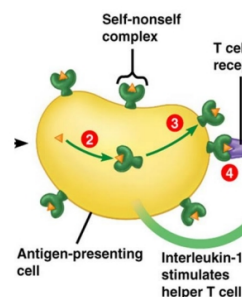
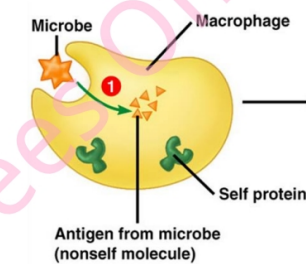
Phagocytosis

Infected body cell

1. Inflammation

2. Histamine production

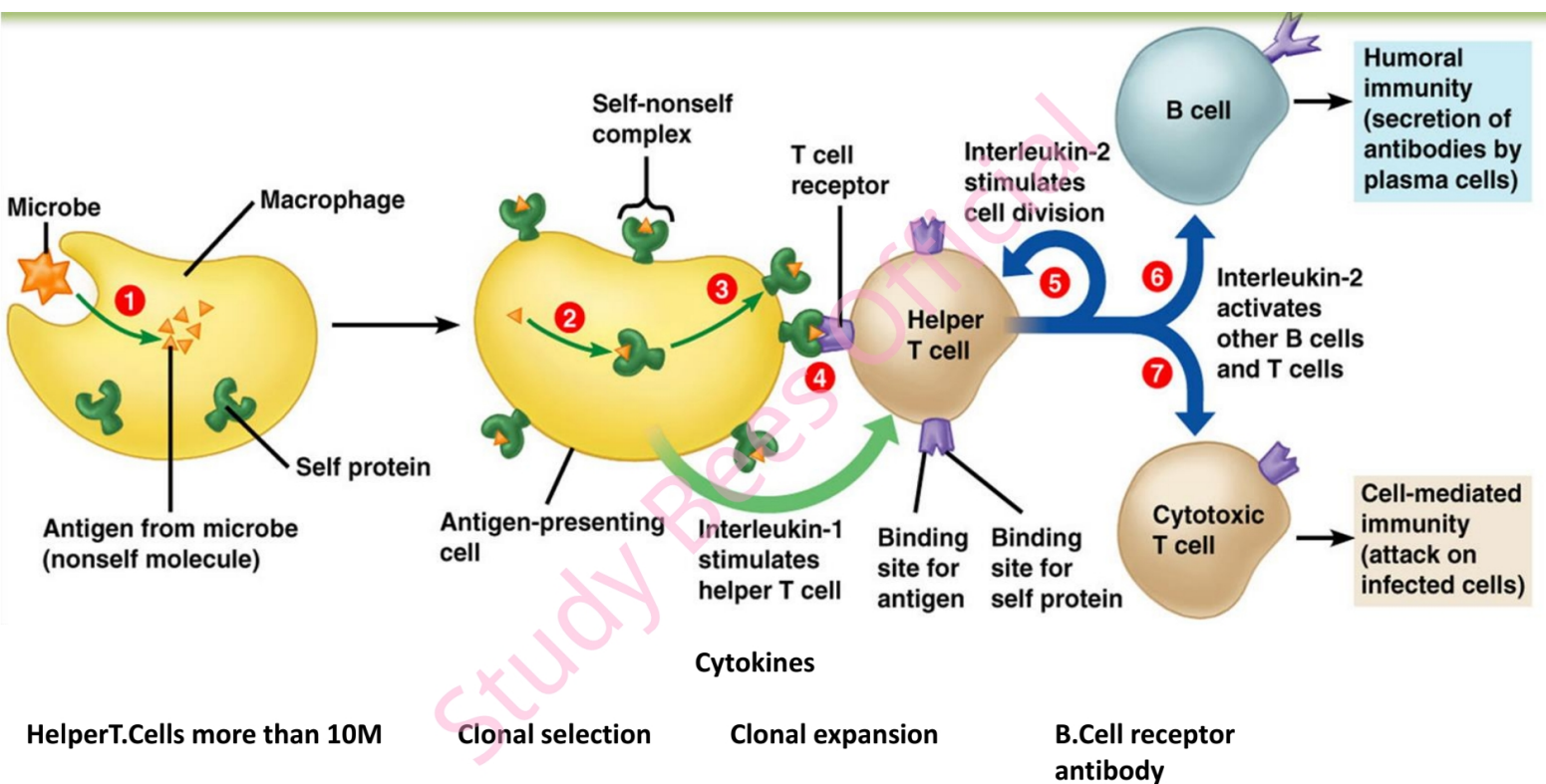
Site of infection



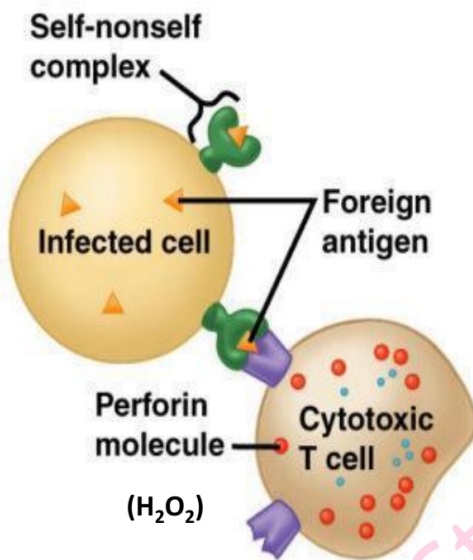
- Some cause inflammation
- Some raise body temp.
- Some activate specific immune response
- Some activate more monocytes

Protein secretion
100 diff. types

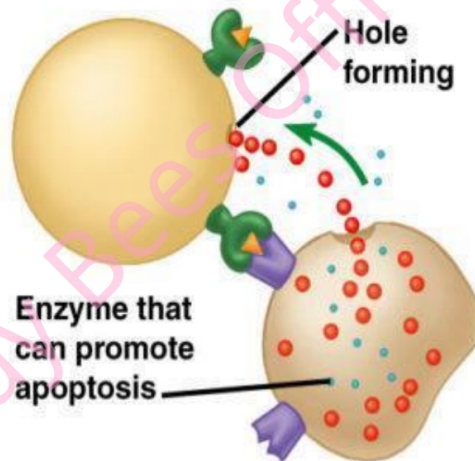
Major histocompatibility
complex (MHC)



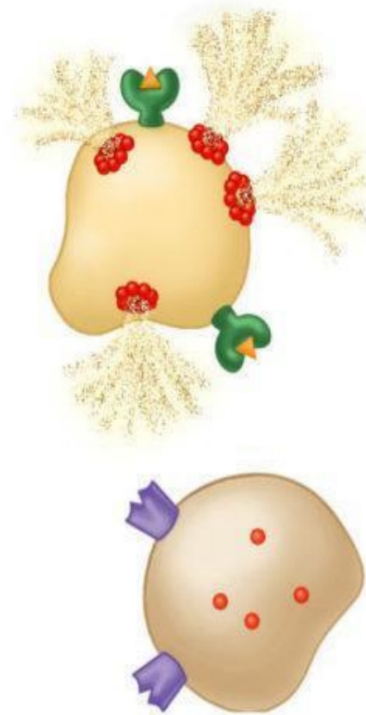
- 1** Cytotoxic T cell binds to infected cell

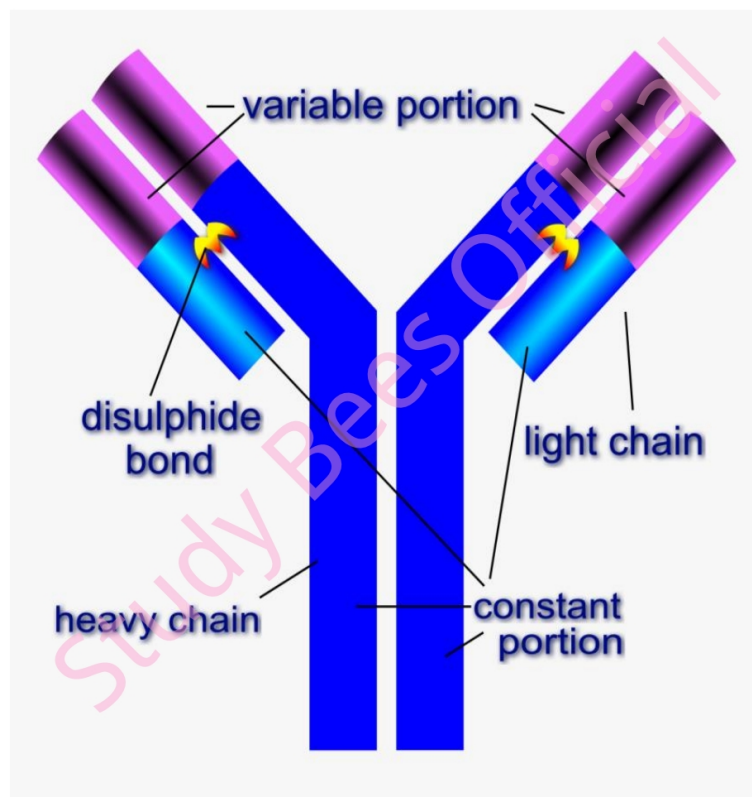


- 2** Perforin makes holes in infected cell's membrane and enzyme enters



- 3** Infected cell is destroyed

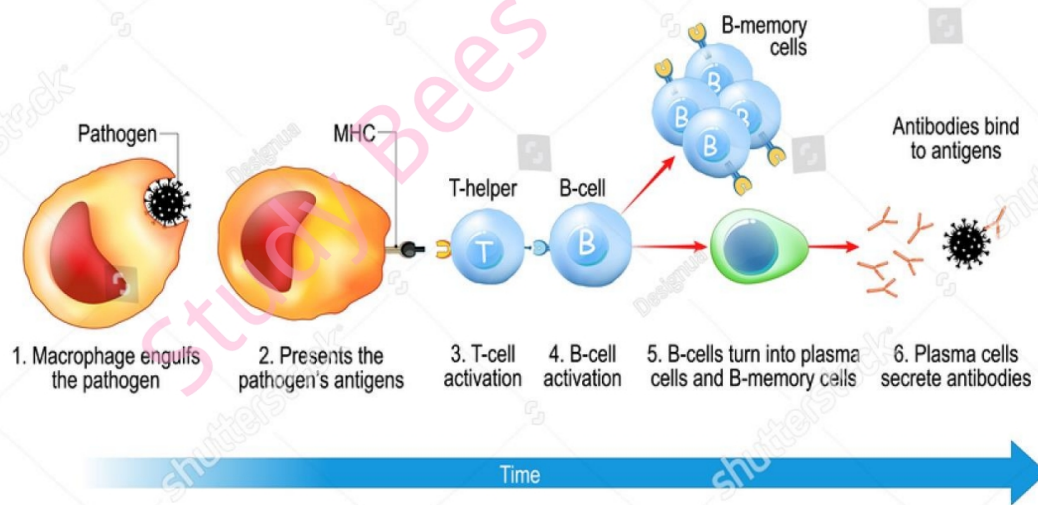


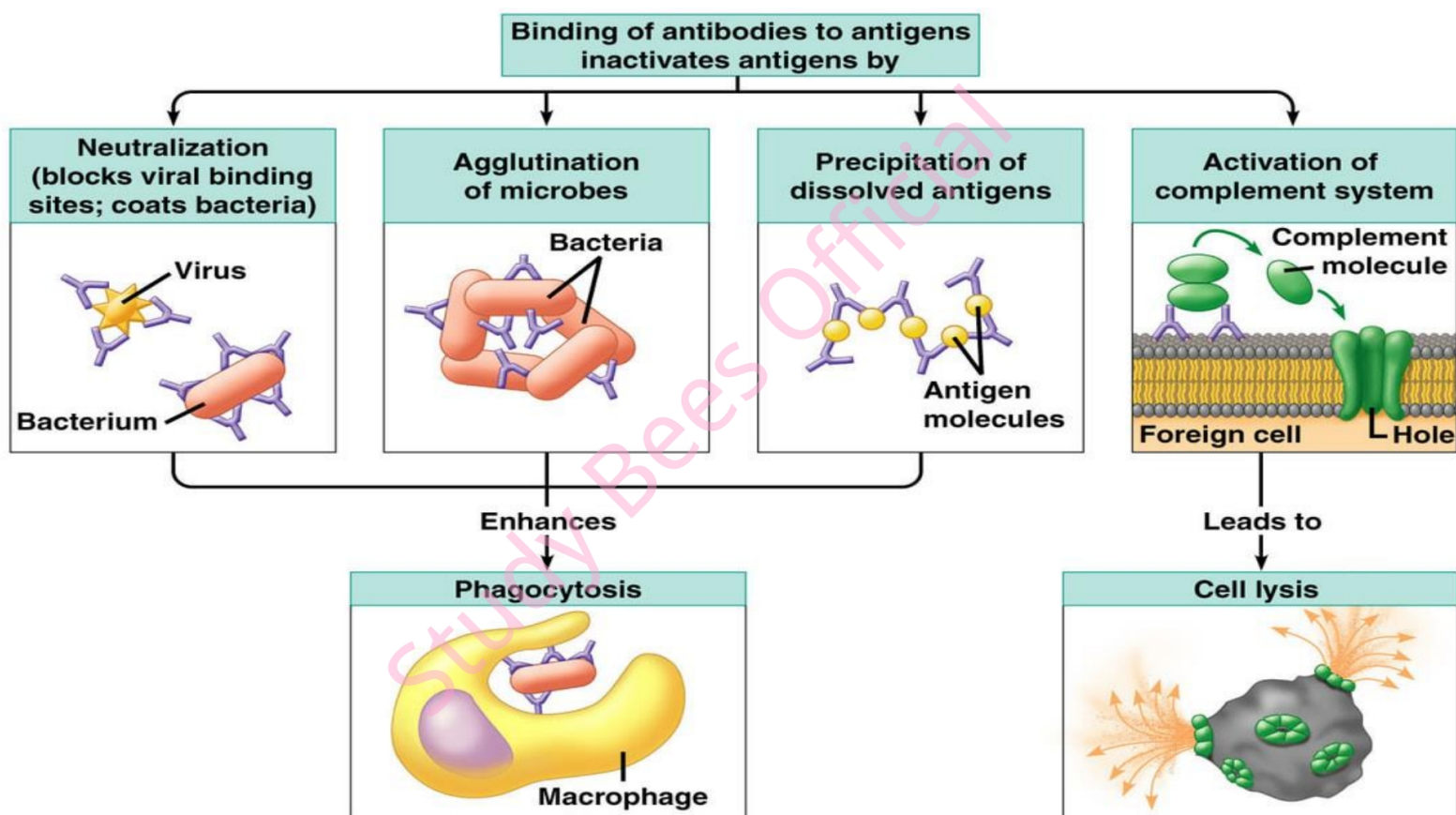


IMMUNITY

Immune response

humoral immunity





IMMUNITY

Adaptive/Acquired immunity

➤ Two types

☐ Naturally acquired immunity

- Naturally acquired active immunity
- Naturally acquired passive immunity

☐ Artificially acquired immunity

- Artificially acquired active immunity
- Artificially acquired passive immunity

IMMUNITY

Adaptive/Acquired immunity

☐ Naturally acquired immunity

- **Naturally acquired active immunity**

- Antigens enter the body naturally
- Body induces antibodies and specialized lymphocytes

- **Naturally acquired passive immunity**

- Antibodies pass from mother to fetus via placenta or to infant via the mother's milk

IMMUNITY

Adaptive/Acquired immunity

☐ Artificially acquired immunity

- Artificially acquired active immunity

- Antigens are introduced in vaccine
- Body induces antibodies and specialized lymphocytes

- Artificially acquired passive immunity

- Preformed antibodies in immune serum are introduced by injection