



IMMUNITY AGAINST PARASITES

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WHAT IS IMMUNITY

- **Immunity** (Synonyms with resistance)

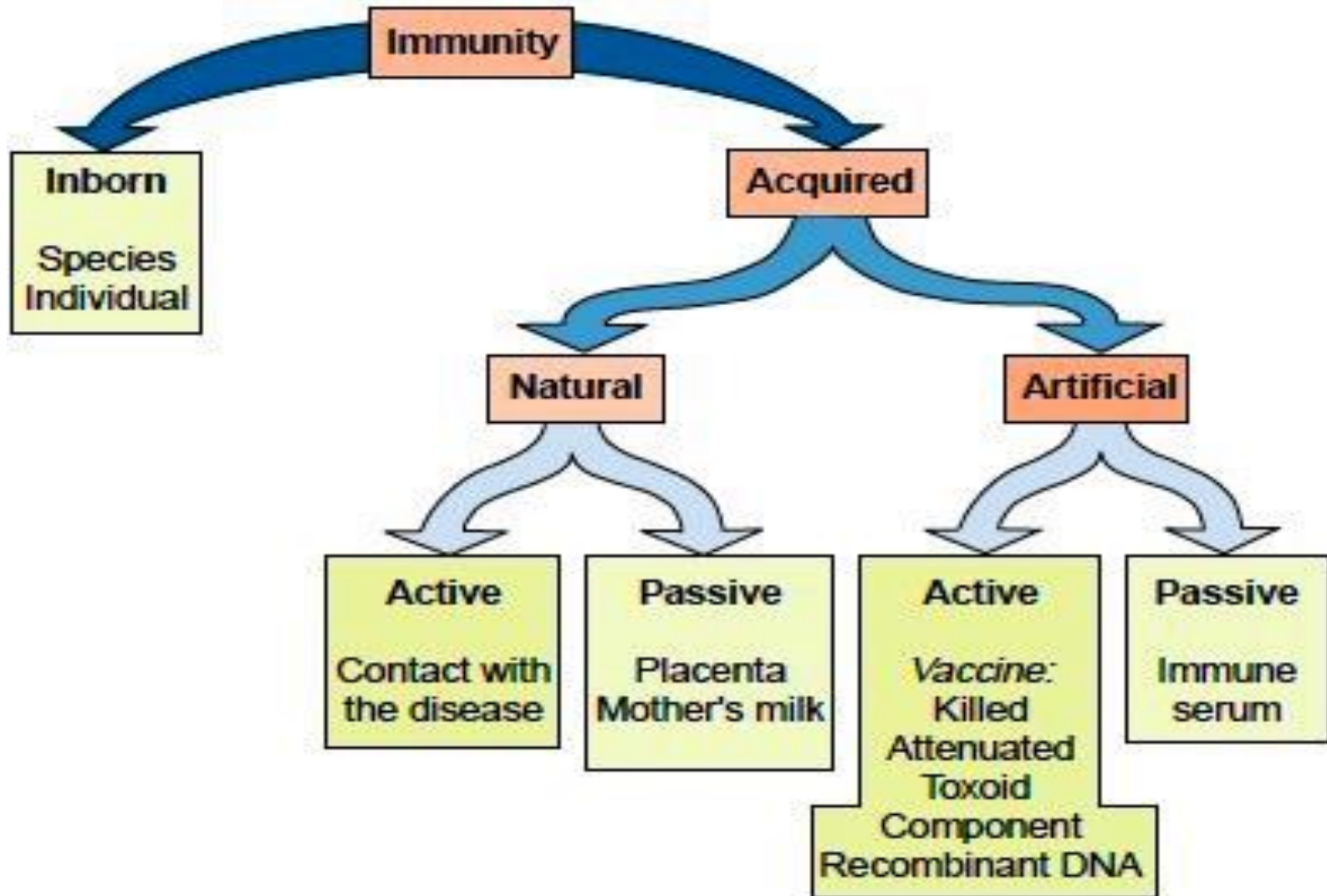
Is the capability of multicellular organisms to resist harmful microorganisms from entering it.

- **Immune System**

the organs and processes of the body that provide resistance to infection and toxins. Organs include the thymus, bone marrow, and lymph nodes.



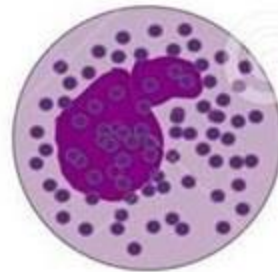
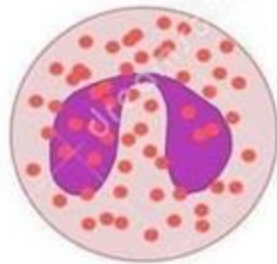
TYPES OF IMMUNITY



COMPONENTS OF IMMUNE SYSTEM

1. White blood cell

- Neutrophil (bacteria and phagocytes)
- Basophil (allergies)
- Eosinophils (Parasites)
- Lymphocytes (Viruses)
- Monocytes (Phagocytes during inflammation)



neutrophil

eosinophil

basophil

monocyte

lymphocyte

2. Antibodies

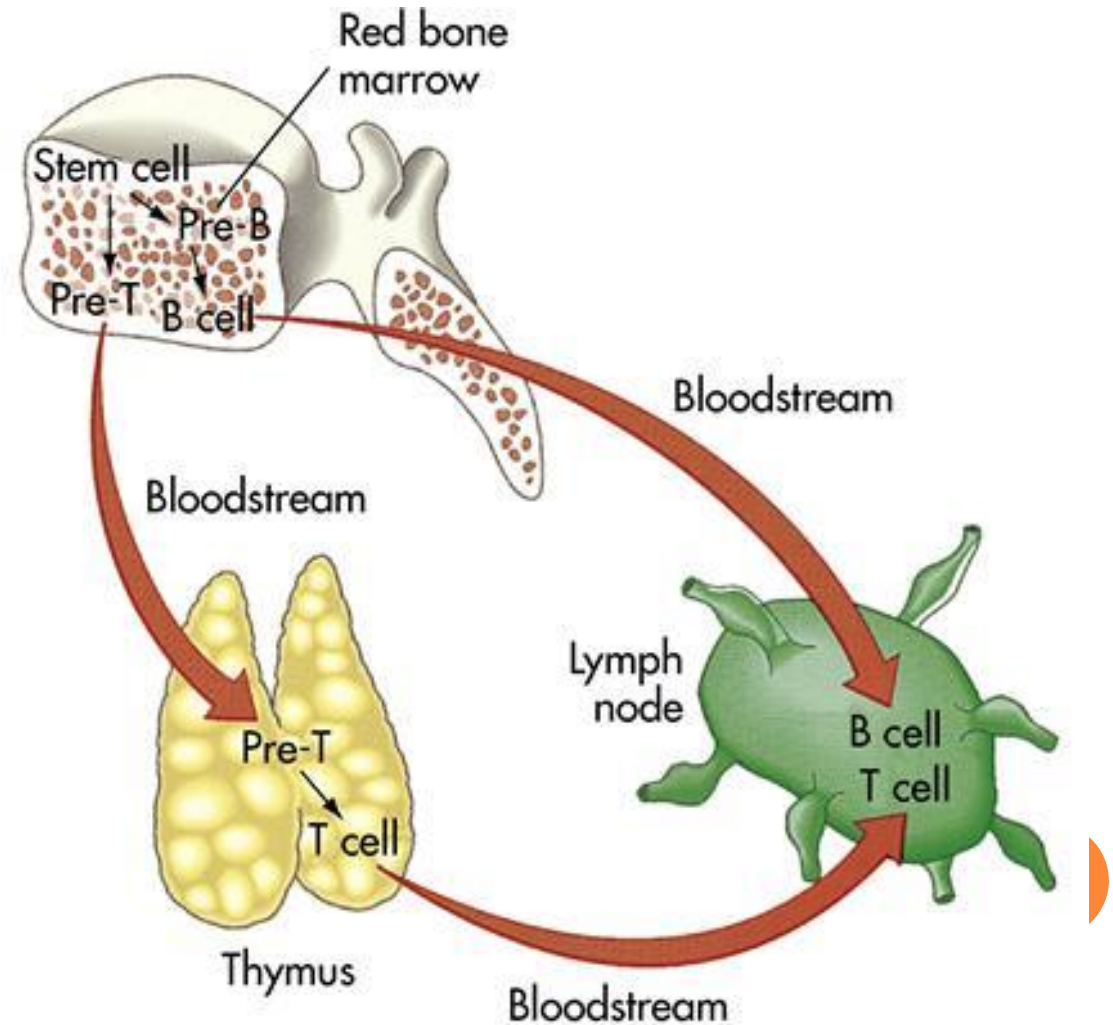
3. Complement system

4. Lymphatic system

5. Spleen

6. Bone marrow

7. Thymus



Cells of immune system

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graph TD; A[Cells of immune system] --> B[Innate immune system]; A --> C[Adaptive immune system]; B --> B1[Phagocytes (macrophages & neutrophils)]; B --> B2[Natural killer cells]; B --> B3[Dendritic cells]; C --> C1[T cells]; C --> C2[B cells]; C --> C3[Antigen presenting cells];
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Innate immune system

Phagocytes (macrophages & neutrophils)

Natural killer cells

Dendritic cells

Adaptive immune system

T cells

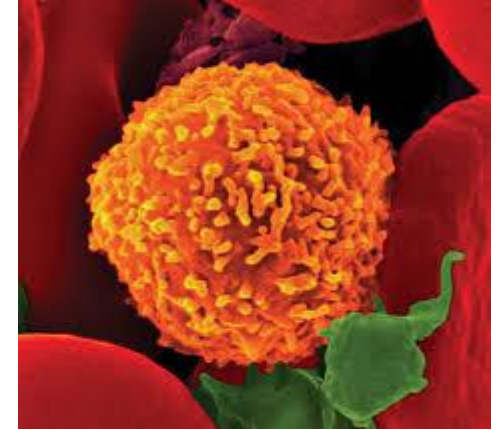
B cells

Antigen presenting cells



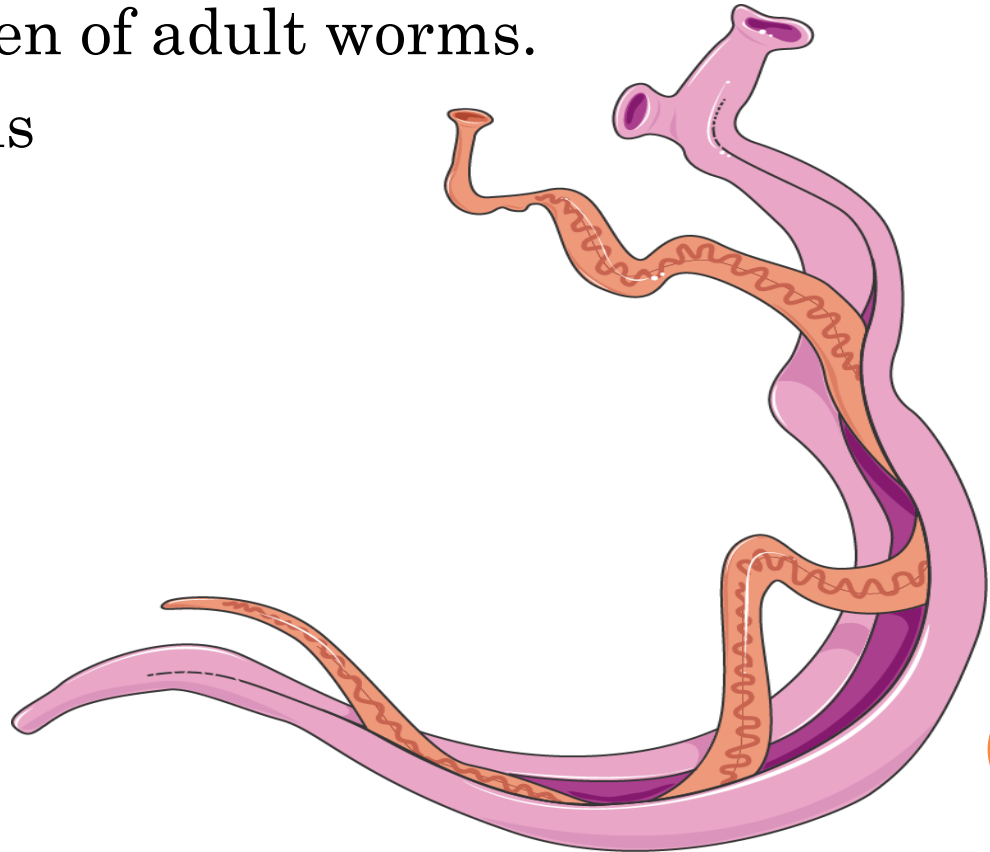
WHAT IS PREMUNITION

- Also known as infection-immunity
- Host response that protects against high number of parasites and illness without eliminating the infection.
- Relatively rapid,
- progressively acquired,
- short-lived and partially effective.
- e.g. toxoplasmosis, chagas' disease and malaria.



CONCOMITANT IMMUNITY

- Ability of a host to mount an effective defence against larval stages whilst being unable to clear a persistence burden of adult worms.
- e.g. Schistosomiasis



DEFENCE MECHANISMS

- This system is a specific **defense mechanism** in which **immune** cells respond to specific pathogens and also provide protective immunity.

e.g. Innate immunity

Adaptive immunity



TYPES OF DEFENCE MECHANISMS

1. Non specific defence mechanisms

First line of defence

- Skin
- Mucous membrane
- Secretions of skin and mucus membrane

Second line of defence

- Phagocytic white blood cells
- Antimicrobial protein
- The Inflammatory response

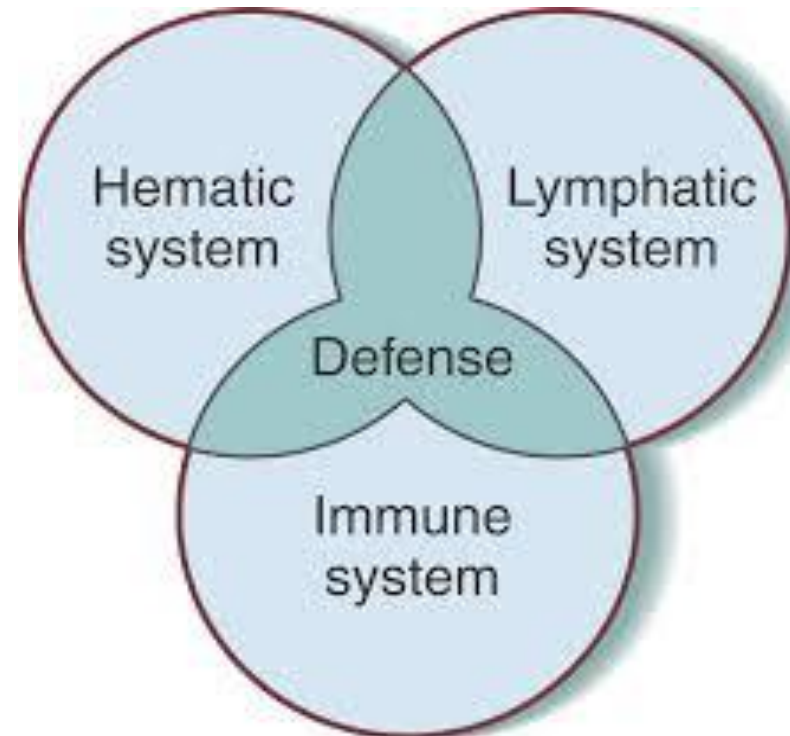


TYPES OF DEFENCE MECHANISMS

2. Specific Defence mechanism

Third line of defence

- Lymphocytes
- Antobodies



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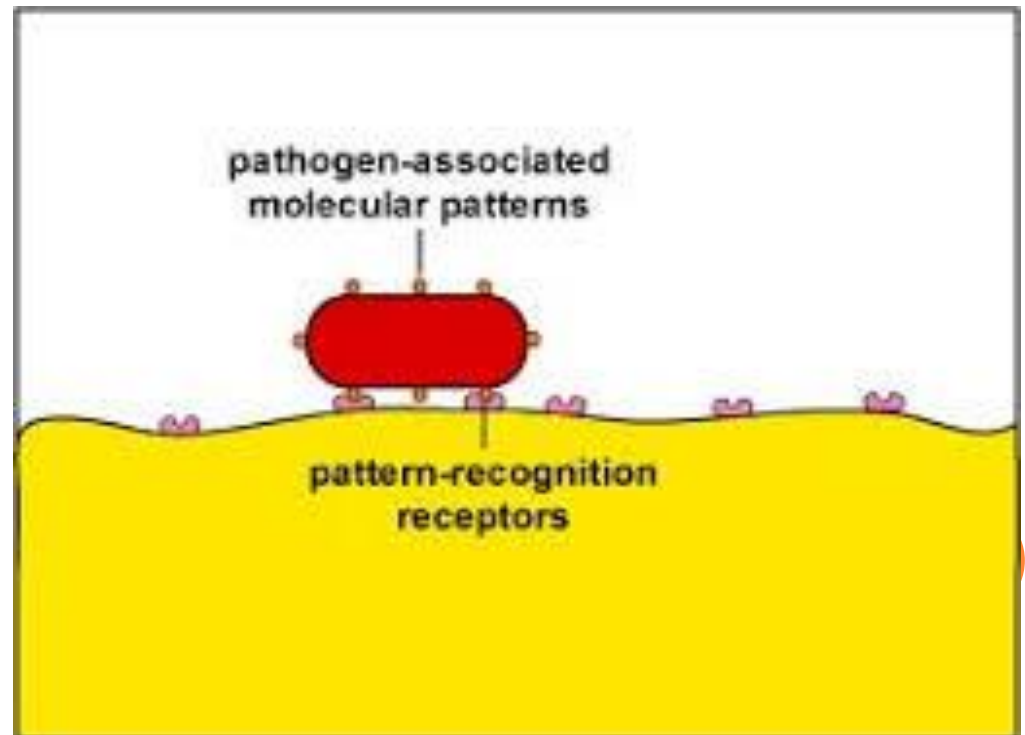
RECEPTORS INVOLVE IN DEFENCE MECHANISMS

Pattern recognition receptors (PRRs)

- Stimulated by various pathogen –associated molecular patterns (PAMPs).
- PPR binds to PAMPs triggers various inflammatory immune response intended to destroy the pathogen.

Examples:

- Scavenger receptors
- Complement receptors
- Toll like receptors



PHAGOCYTOSIS

- Process by which a cell uses its plasma membrane to engulf a large particle, giving rise to an internal compartment called the phagosome. It is one type of endocytosis pinocytosis.

- **Phagocytes**

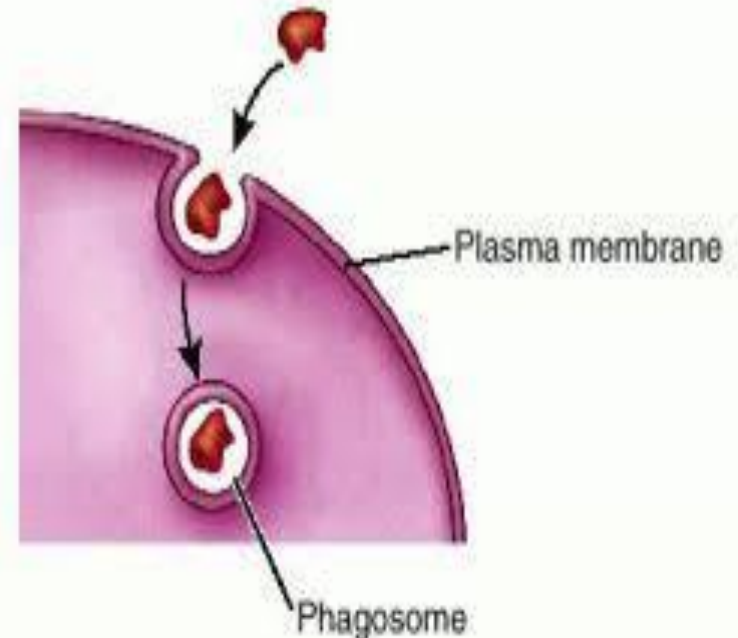
(neutrophil and macrophages)

- **Dendritic cells**

(monocytes, bone marrow)

- **Granulocytes**

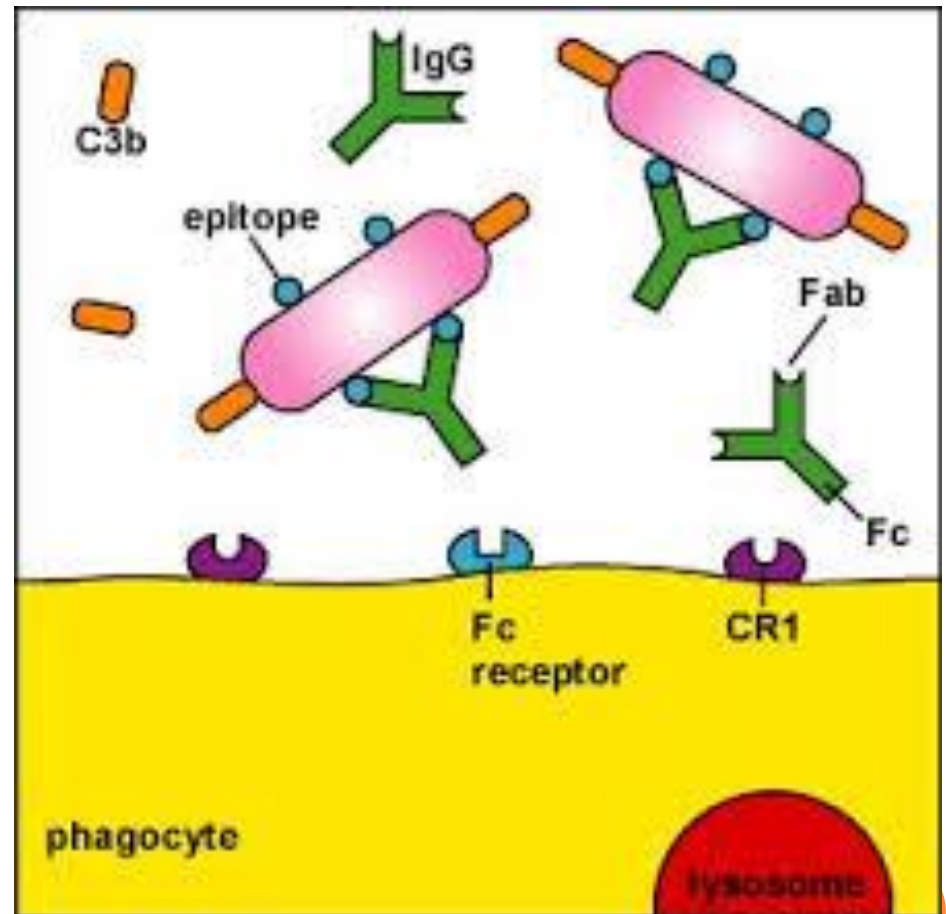
(neutrophil, eosiniphil, basophil)



FUNCTIONS OF ANTIBODIES IN HOST DEFENCE SYSTEM

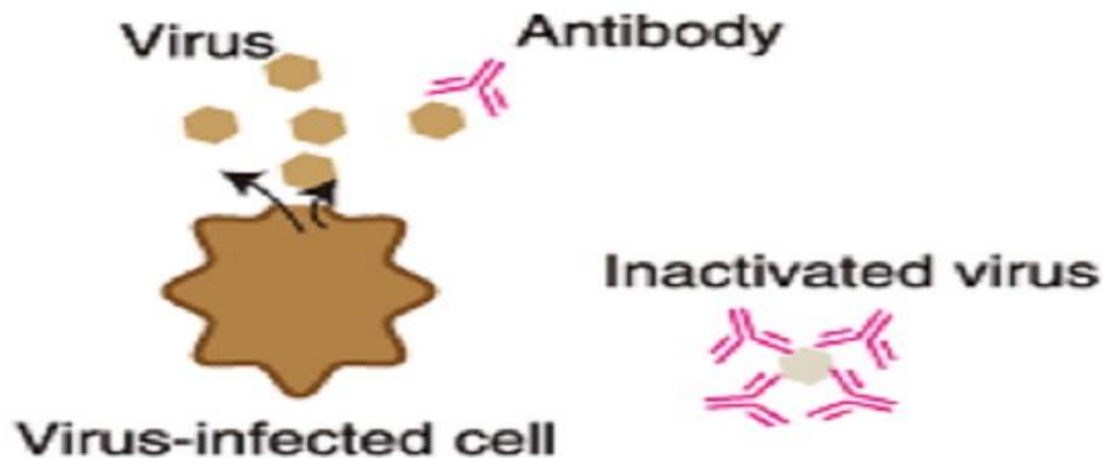
1. Opsonization

- Means of identifying the invading particle to the phagocyte
- Foreign particles become coated with IgG which stimulate the macrophages to engulf the particles.
- Fc receptors are involve



2. Neutralization

- IgG and IgM antibodies can neutralize toxins that are secreted by bacteria and prevent toxin molecules from binding to their target cells.



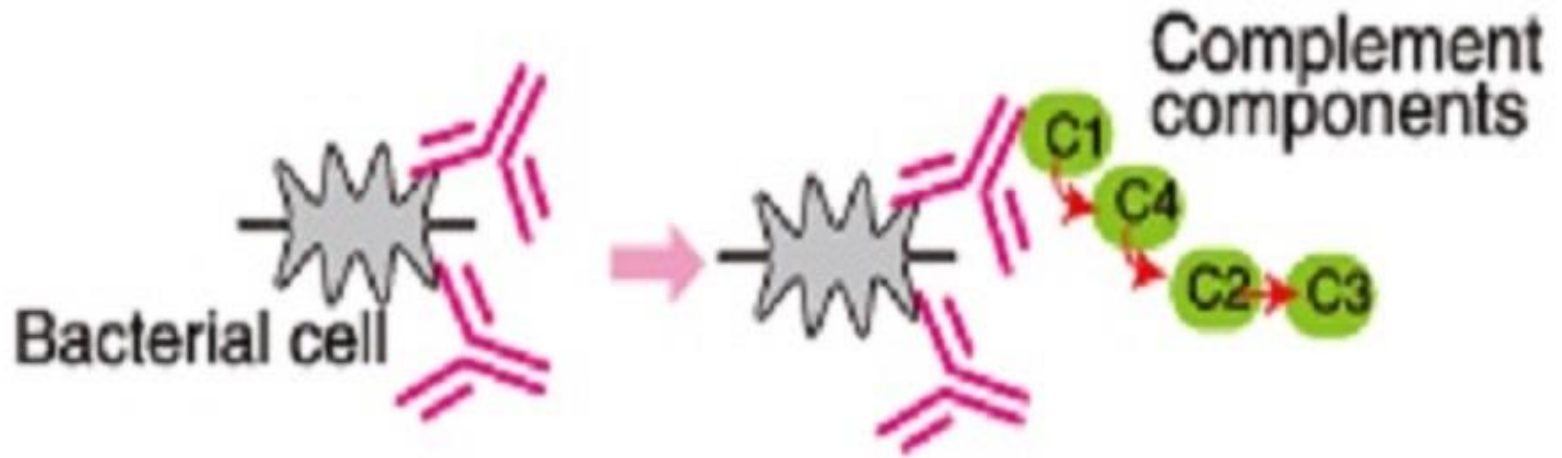
Antibodies bind to and inactivate viruses and toxins.

These antibodies are called "neutralizing antibodies."

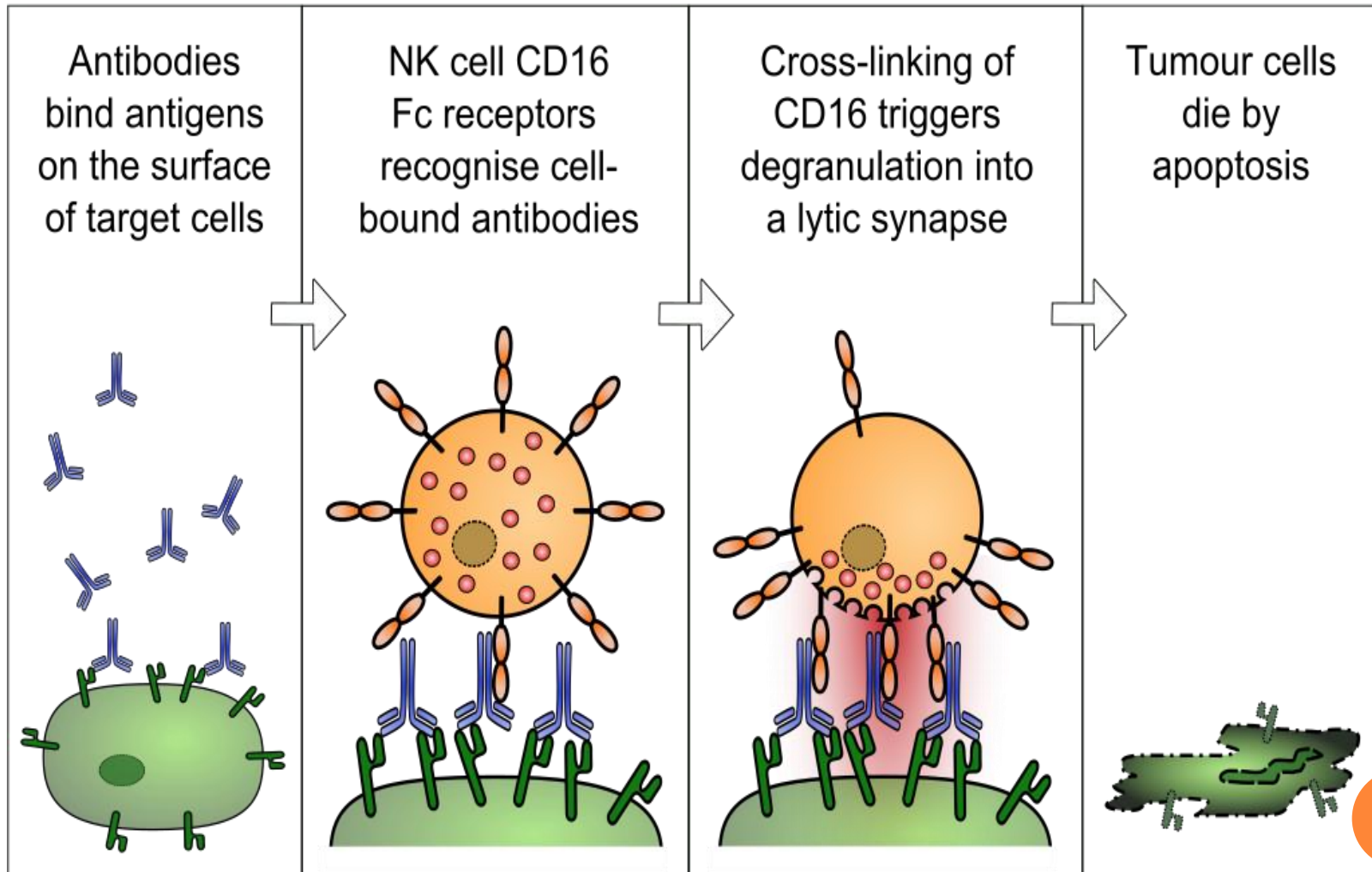


3. Activation of compliment

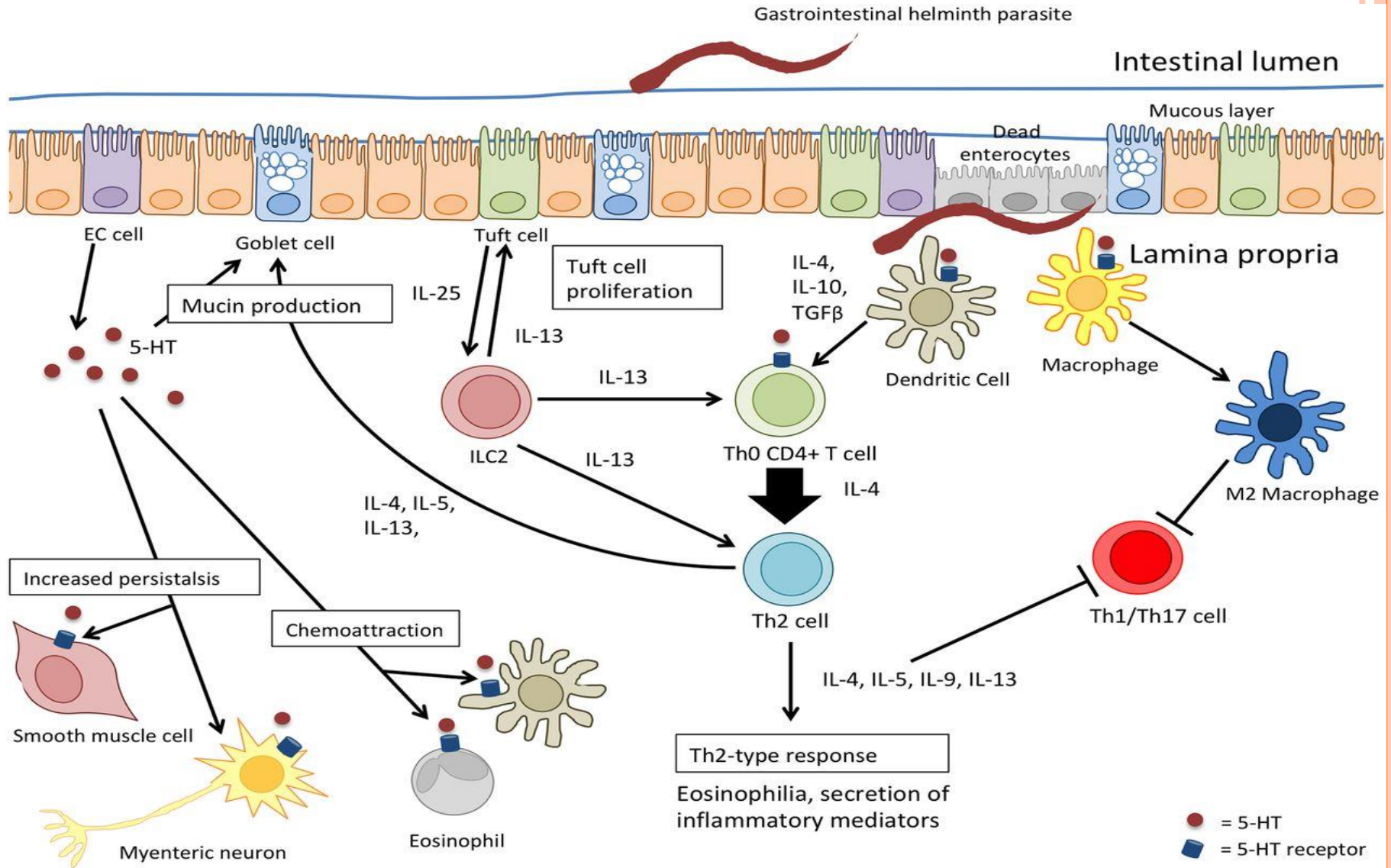
- Important process, particularly in destruction of bacterial cells
- Antigen-antibody complexes activate in the compliment system triggering its antibacterial activity.



4. ANTIBODY-DEPENDENT, CELL MEDIATED CYTOTOXICITY (ADCC).



MAJOR PATHWAYS INVOLVED IN THE IMMUNE RESPONSE TO PARASITIC INFECTION AS MEDIATED BY CYTOKINES



VACCINATION

- No efficient vaccine preparation has yet been developed against parasite?
- WHY??????????????



BECAUSE

- Complexity of the lifecycle of the parasite makes the stage to be chosen for vaccine preparation difficult.
- Difficulty of identification and isolation of protective antigen to be used as vaccine
- Possibility of inducing immunopathological lesions in response to the vaccine.
- Parasites may evade the immunity produced by the vaccine.
- Vaccine preparation may not be equally effective.





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