



SNS COLLEGE OF ALLIED HEALTH SCIENCES
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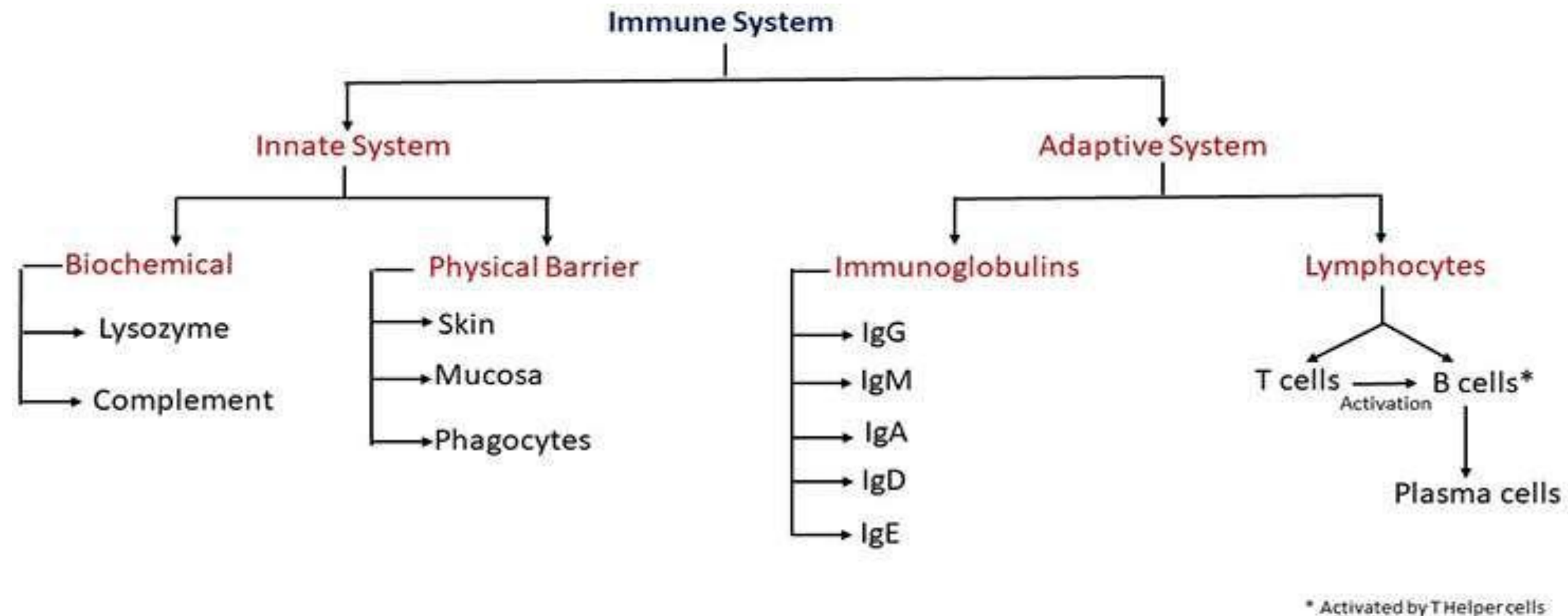
DEPARTMENT OF OPERATION THEATRE AND ANAESTHESIA
TECHNOLOGY

COURSE NAME :PATHOLOGY
TOPIC : Immunity



Immunity

- Immunity is defined as the capacity of the body to ***resist pathogenic agents***. It is the ability of body to resist the entry of different types of foreign bodies like bacteria, virus, toxic substances, etc.





ARCHITECTURE OF IMMUNE SYSTEM



The immune system which constitutes the body's defense system consists of immunological cells distributed in two main components:

Mononuclear phagocytic system (MPS)

Lymphoid component

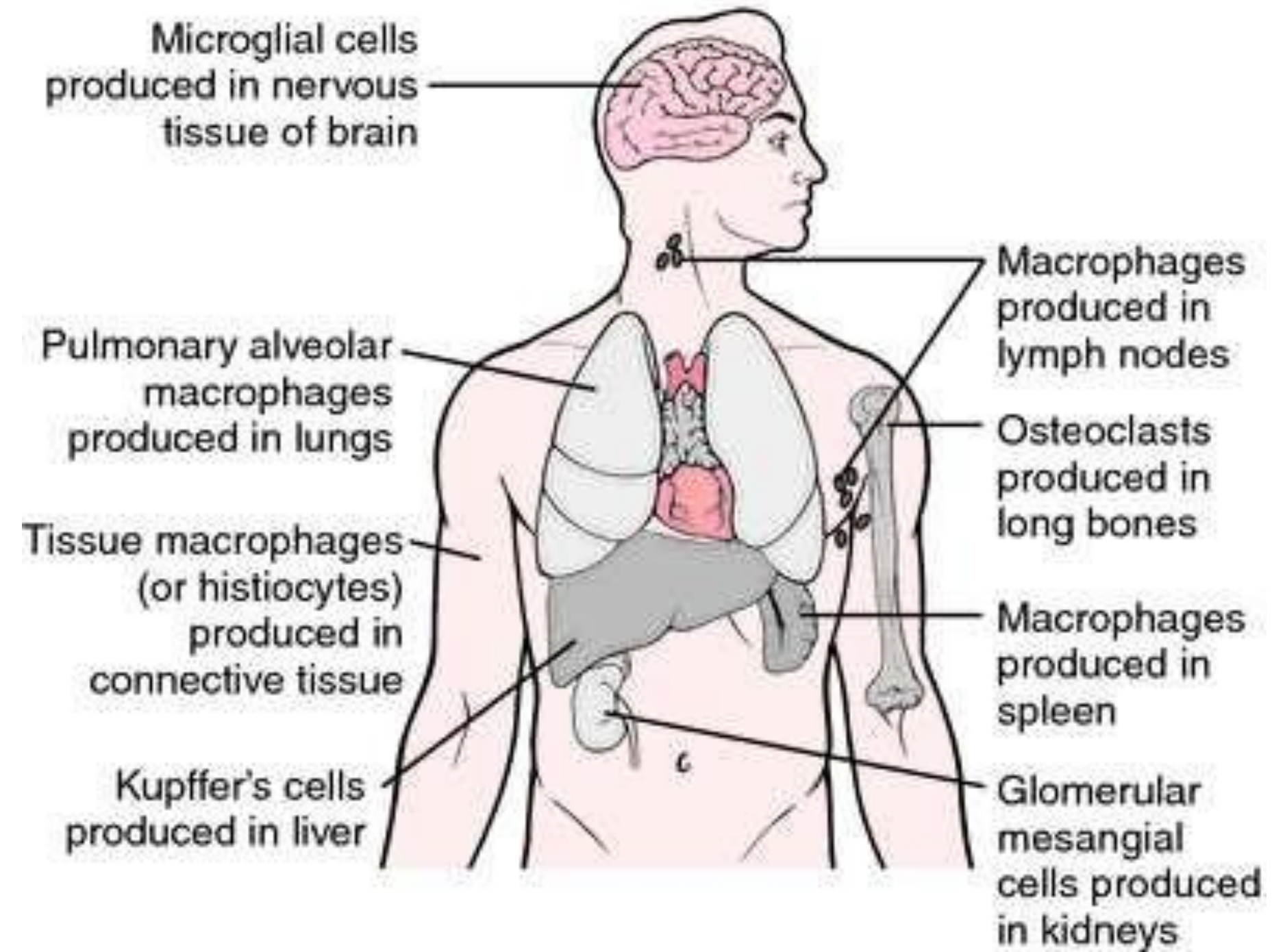


MONONUCLEAR PHAGOCYtic SYSTEM



- MPS otherwise called as *Reticuloendothelial system (RES)*.
- *Phagocytosis* - ingestion of microbes or foreign cells or solid materials.
- Phagocytes are *neutrophils, monocytes & macrophages*.
- Monocytes transform themselves into *macrophages* in tissues.

DIFFERENT FORMS OF MACROPHAGES





FUNCTIONS OF MONONUCLEAR PHAGOCYtic SYSTEM



- Role in *inflammation and healing*
- Role in *defense* against the bacteria invading the body tissues
- Role in *immune response*
- Role in *removal* of old RBCs, WBCs and platelets.



LYMPHOID COMPONENT



Lymphoid organs can be classified into the following:

Central or primary lymphoid organs

Thymus

Bursa equivalent (fetal liver & bone marrow)

Peripheral lymphoid organs

Lymph node

spleen

mucosa-associated lymphoid tissue (MALT)

includes tonsils, adenoids, and gut associated lymphoid tissue (GALT).



FUNCTIONS



FUNCTIONS OF IMMUNE SYSTEM

- To mount immune response in the body
- The lymph nodes constitute a series of inline filters

FUNCTIONS OF SPLEEN

- Role in *immune response*
- Role in *removal* of old red blood cells, white blood cells and platelets.
- Role in *haematopoiesis*. During fourth and fifth month of fetal life, erythropoiesis occurs in spleen.



TYPES OF IMMUNITY

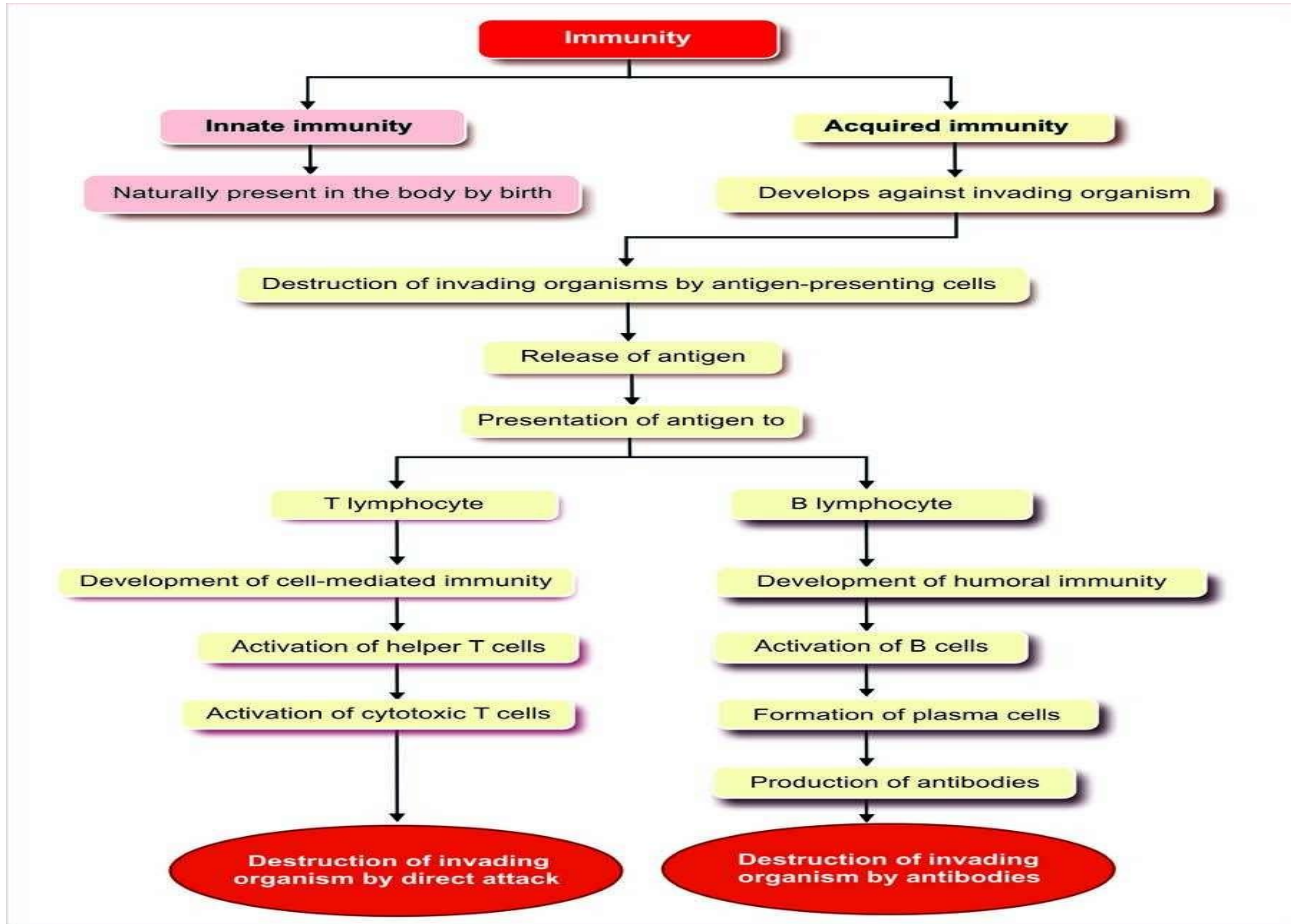
INNATE	ACQUIRED
Innate or natural immunity is the <i>inborn</i> capacity of the body to offer resistance to pathogens and their toxic products	The resistance that an individual acquires <i>during his life time</i> is known as acquired immunity
It is called as <i>natural</i> or non-specific immunity	It is antigen <i>specific</i> or antibody mediated immunity
It is the first line of defense against any type of pathogens	Types of acquired immunity <i>Cellular immunity</i> <i>Humoral immunity</i>



MECHANISM OF INNATE IMMUNITY



STRUCTURES, MEDIATORS	MECHANISM
GASTROINTESTINAL SYSTEM	Enzymes in digestive juices and the acid in stomach destroy the toxic substances or organisms entering digestive tract through food Lysozyme present in saliva destroys bacteria
RESPIRATORY SYSTEM	Defensins and cathelicidins in epithelial cells of air passage are antimicrobial peptides Neutrophils, lymphocytes, macrophages and natural killer cells present in lungs act against bacteria and virus.
UROGENITAL SYSTEM	Acidity in urine and vaginal fluid destroy the bacteria
SKIN	The keratinized stratum corneum of epidermis protects the skin against toxic chemicals
PHAGOCYtic CELLS	Neutrophils, monocytes and macrophages ingest and destroy the microorganisms and foreign bodies by phagocytosis
INTERFERONS	Inhibit multiplication of viruses, parasites and cancer cells
COMPLEMENT PROTEINS	Accelerate the destruction of microorganisms





ACQUIRED IMMUNITY



Lymphocytes are classified into two types:

- ***T Lymphocytes*** or T cells, which are responsible for development of ***cellular immunity***

(maturation and differentiation in the thymus)

- ***B lymphocytes*** or B cells, which are responsible for ***humoral immunity***. (maturation and differentiation in the bone marrow)



T lymphocytes



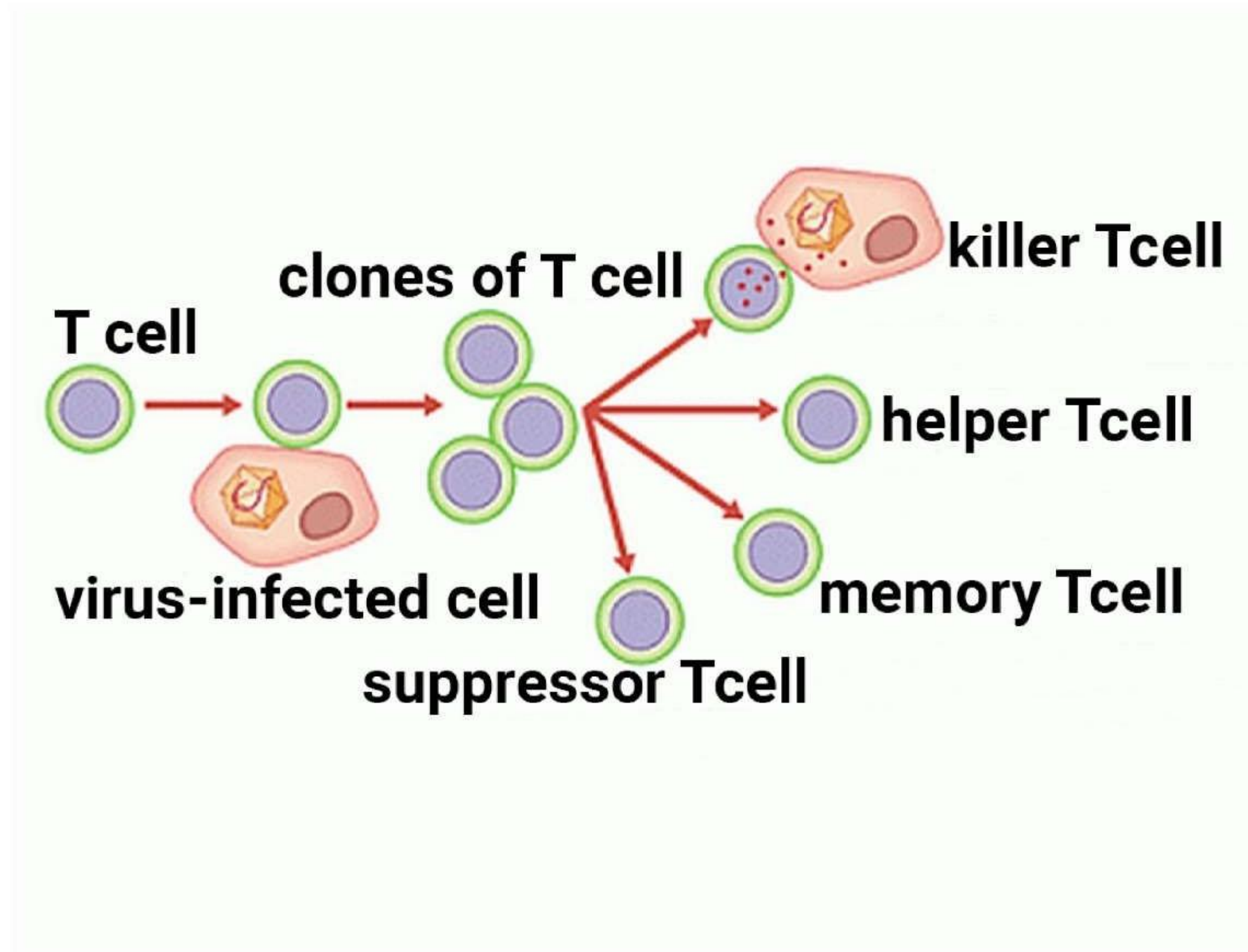
- T lymphocytes are processed in *thymus*. The processing occurs mostly during the period between just before birth and few months after birth.
- ***Thymus secretes a hormone called thymosin, which plays an important role in immunity.*** It accelerates the proliferation and activation of lymphocytes in thymus



TYPES OF T - LYMPHOCYTES



- *Helper T cells or inducer T cells* - These cells are also called **CD4 cells** because of the presence of molecules called CD4 on their surface.
- *Cytotoxic T cells or killer T cells* - These cells are also called **CD8 cells** because of the presence of molecules called CD8 on their surface.
- *Suppressor T cells.*
- *Memory T cells.*





B LYMPHOCYTES



B lymphocytes were first discovered in the birds.

Processing of B lymphocytes takes place in liver (during fetal life and bone marrow after birth).

Types of B lymphocytes:

After processing, the B lymphocytes are transformed into two types:

Plasma cells.

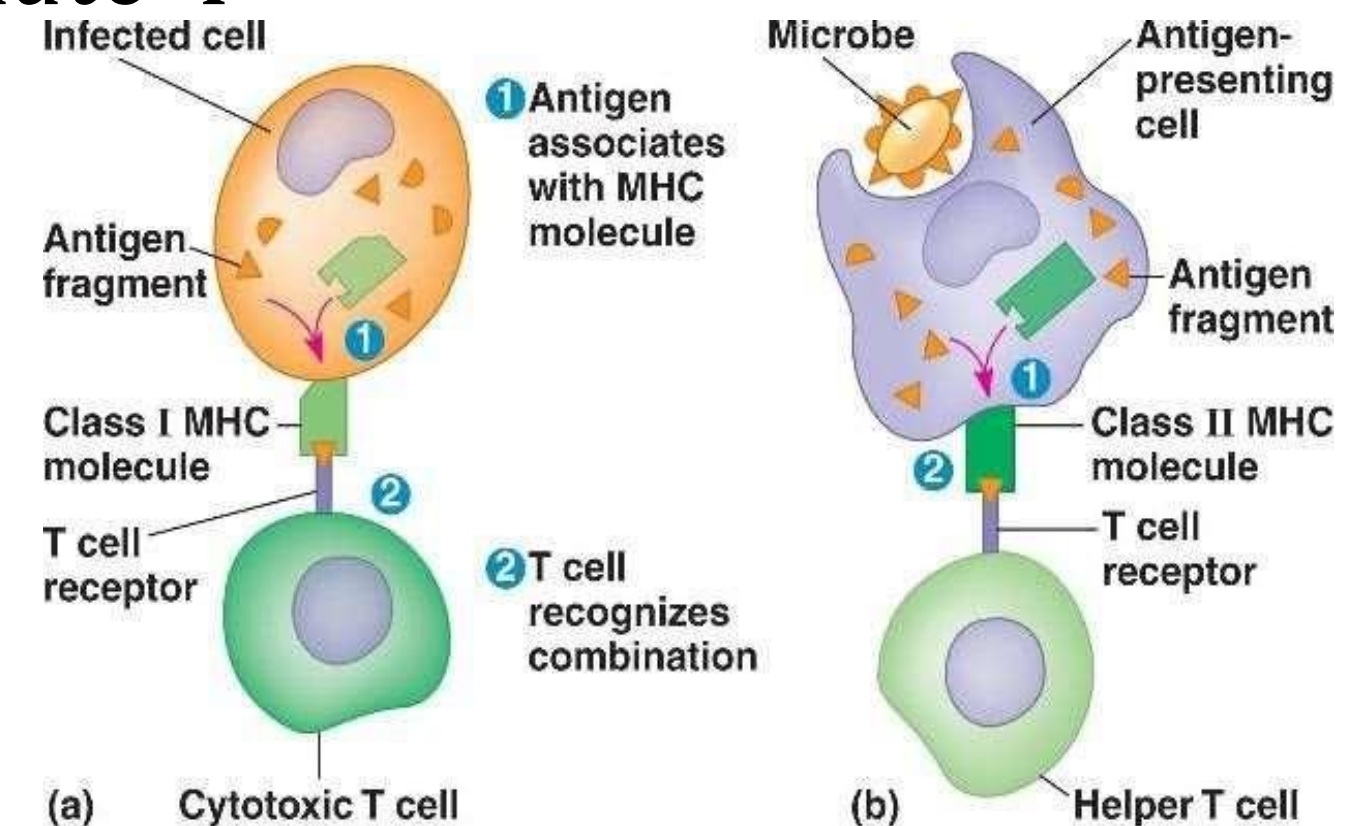
Memory cells.



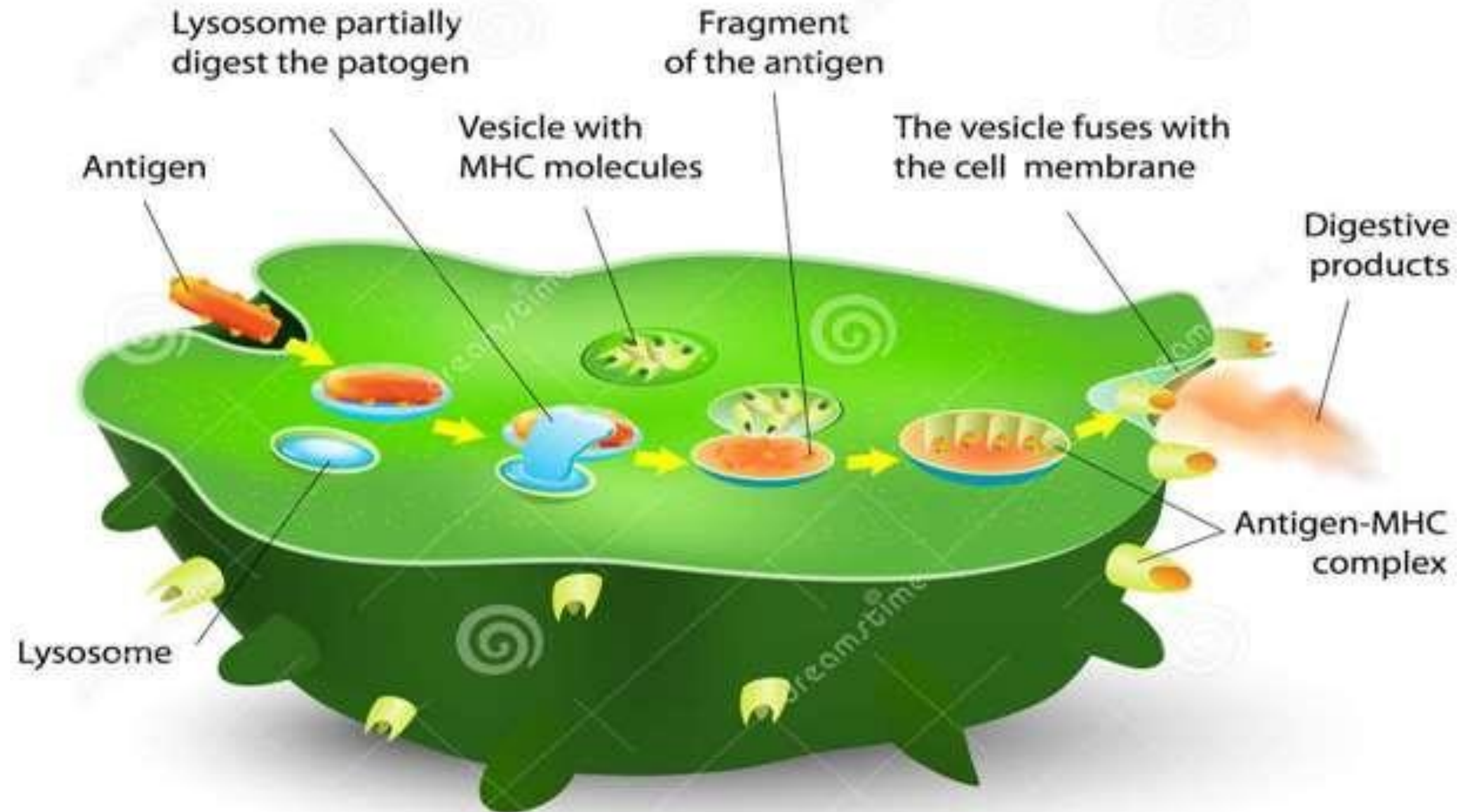
Major Histocompatibility complex



- Major histocompatibility complex (**MHC**), group of genes that code for proteins found on the surfaces of cells that help the immune system recognize foreign substances
- The function of **MHC** molecules is to bind peptide fragments derived from pathogens and display them on the cell surface for recognition by the appropriate T cells.

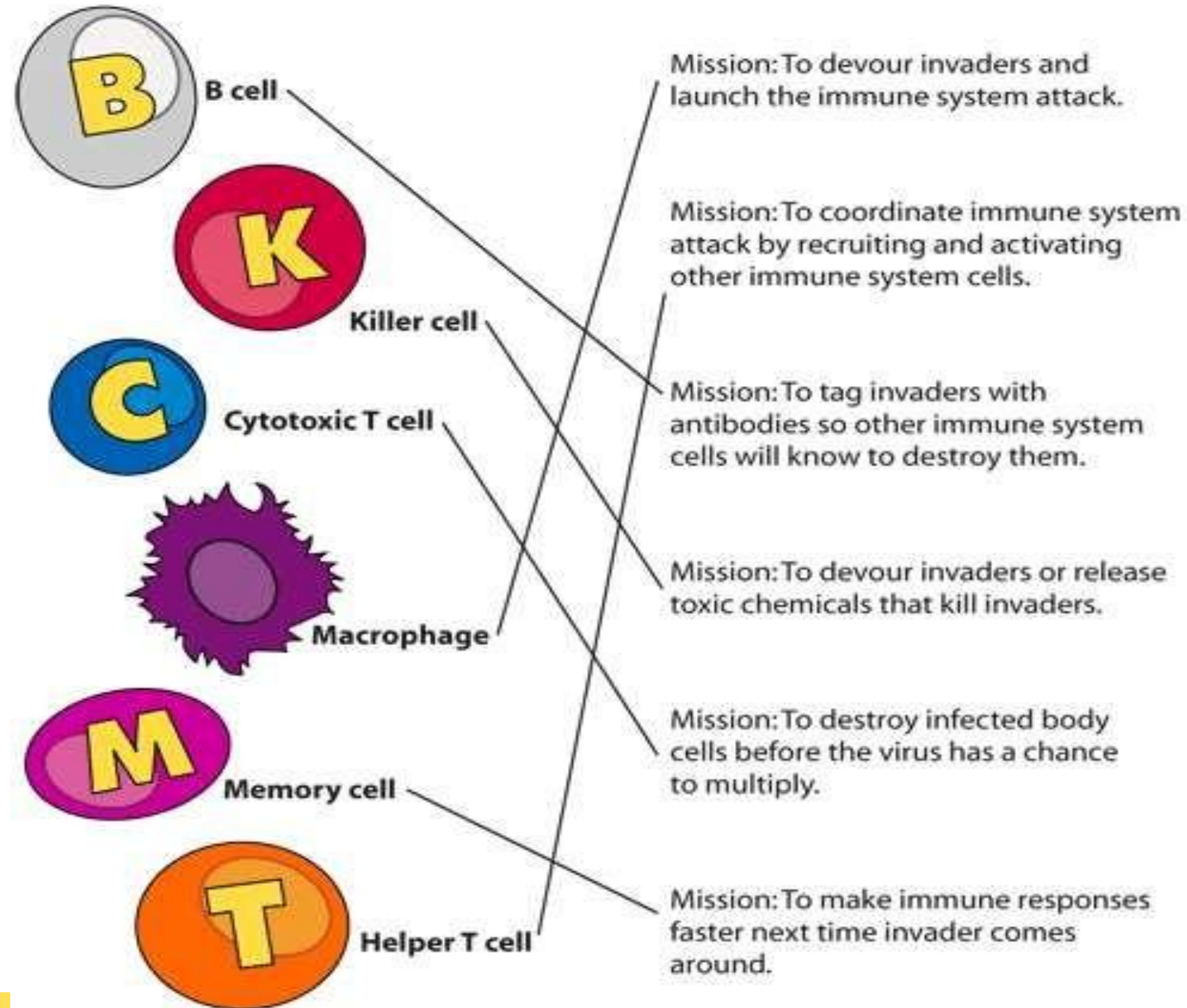


ANTIGEN-PRESENTING CELLS



HOW THE BODY WORKS

Cells That Keep You Well Solution





THANK YOU