

WHITE BLOOD CELLS

SOWMYA G

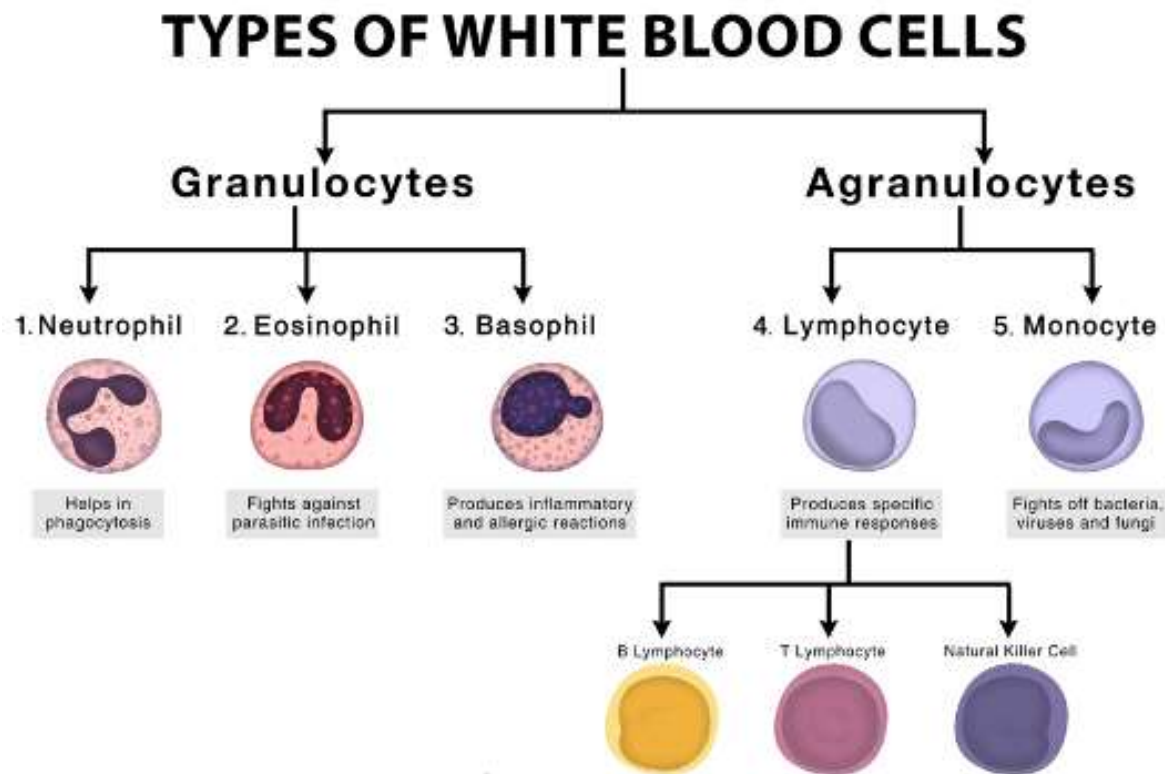
INTRODUCTION

- White blood cells also known as leukocytes are a part of innate immunity, which helps to fight against infection and protects the body against foreign materials hence they are also known as soldiers of immune system.
- WBC's are present and are involved in different roles, few are involved in recognizing intruders, some cells involved in killing bacteria and viruses which are harmful for our body, some are involved in antibody production.

INTRODUCTION

- White blood cells circulate throughout blood stream in our body, tissues in respond to injury or illness by attacking unknown organism.
- WBC's develops in bone marrow with hematopoietic stem cells.
- WBC's are small in size, colorless, but when the we examine it under microscope it appears as a very light purple to pink colour.
- An average white blood cell counts about 1000-11,000 per mm^3 .

TYPES OF WHITE BLOOD CELLS



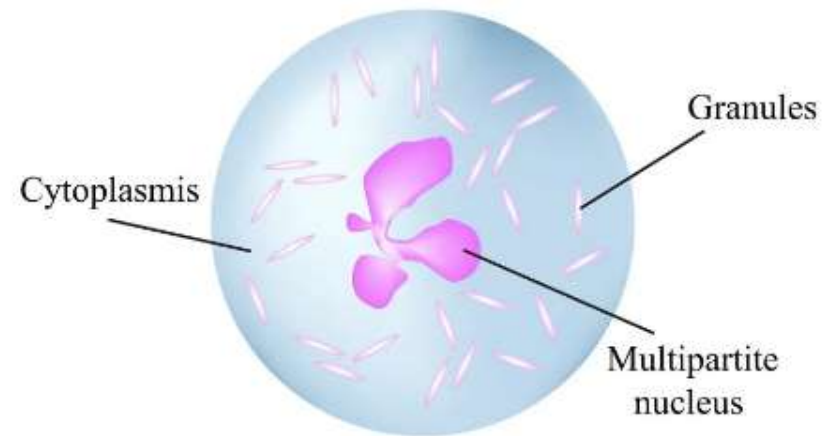
Types of White Blood Cells

GRANULOCYTES

- WBC's which contains granules.
- These cells consists of multilobed nuclei and cytoplasmic granules.
- These granules contains a variety of proteins with distinct functions, some damages pathogens directly, some regulates trafficking and activity of other WBC's including lymphocytes and some contributes to the remodeling of tissues at the site of infection.

NEUTROPHILS

- ❑ Neutrophils comprises about 60% of peripheral blood leukocyte population.
- ❑ They are also known as polymorphonuclear(PMN) cells.
- ❑ More than 100 billion neutrophils enter the circulation daily in normal adult.
- ❑ 10-12 μm diameter nucleus has 2-5 lobes cytoplasm has very fine, pale granules.
- ❑ Functions: it has ability to engulf the bacteria through phagocytosis.



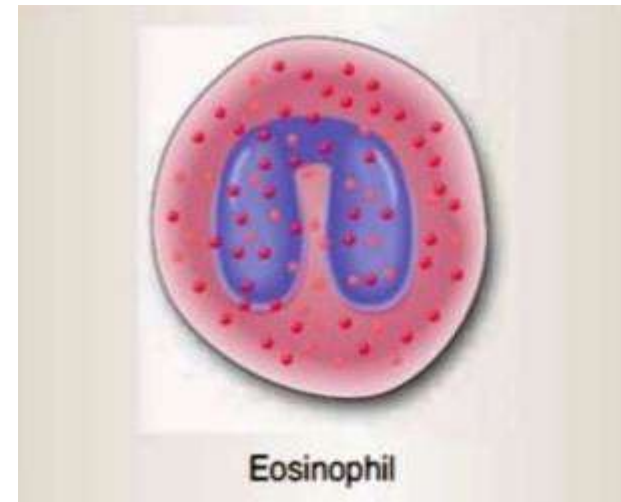
BASOPHILS

- They are non phagocytic granulocytes which contains large granules filled with basophil proteins.
- They are relatively rare in the circulation, but can be very potent.
- In response to binding of circulating antibody, the basophil release the content of their granules.
- Histamine granules increase blood vessel permeability and smooth muscle activity.
- Functions: They liberate heparin, histamine and serotonin in allergic reaction that intensify the overall response.



EOSINOPHILS

- They are named because of their eosin loving granules.
- They are bilobed cells where the cytoplasmic granules contain a basic protein.
- It comprises 0.1-5% of total WBC's.
- Nucleus has 2 lobes
- They are actively participated in innate and adaptive immune response, caused by helminthic parasites.
- Functions :They are critical to response to parasites (helminthes)



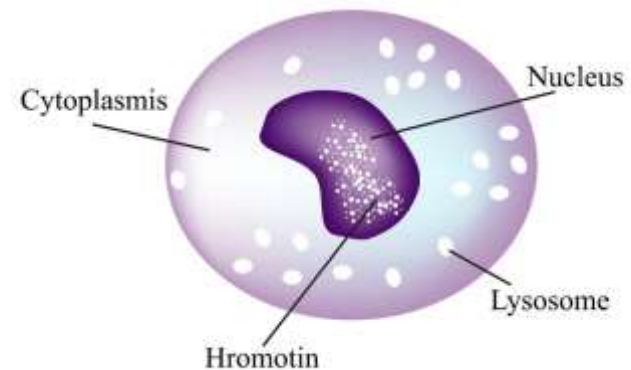
AGRANULOCYTES

- Cells with a single, unlobed nucleus and cytoplasm that contains few or no granules.
- These leukocytes derived from lymphoid or myeloid progenitor.

MONOCYTES

- They are the types of WBC's that reside in body to find and destroy germs and eliminate infected cells.
- They are irregular in shape having kidney shaped nucleus cytoplasmic vesicles.
- Monocytes are large mononuclear cells and accounts for approximately 5-7% of total WBC's.
- Monocytes spent 1-2 days in circulation then crosses the endothelium and enters tissue.

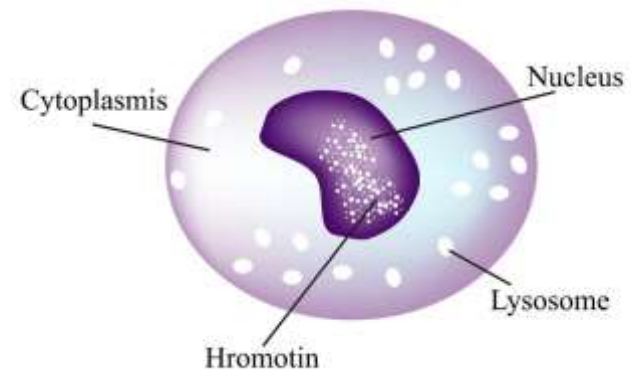
Monocyte



MONOCYTES

- They reside up to several months in tissues and serves as macrophages and dendritic cells.
- Functions: It functions as phagocytic cells and antigen presenting cells in the peripheral blood to remove microorganism and dead and damaged cells.

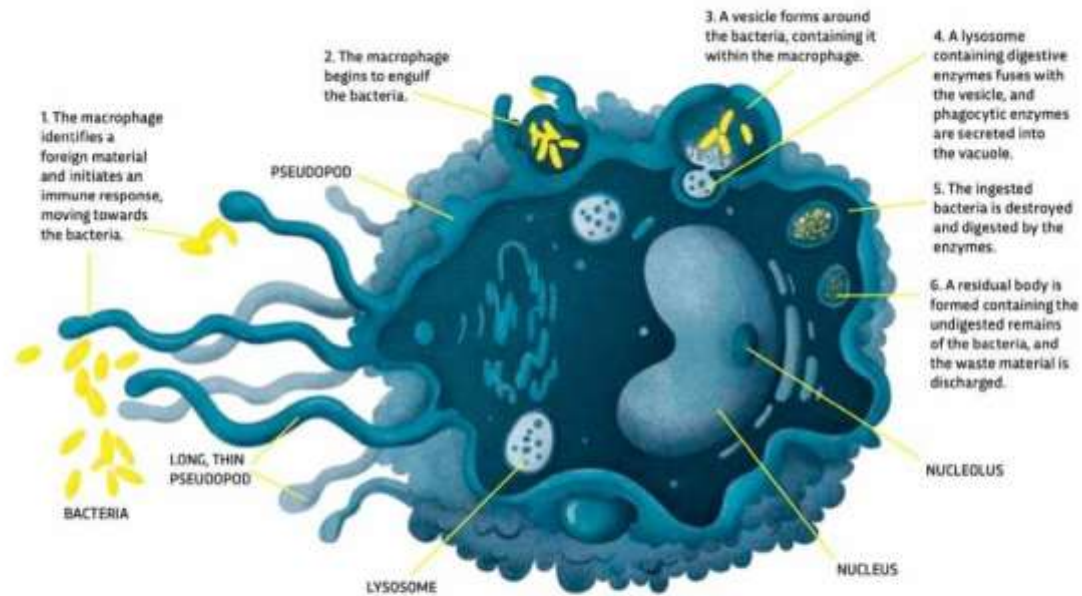
Monocyte



MACROPHAGES

- They act as phagocytes in order to remove dead or harmful pathogens.
- These are the larger phagocytic cells that occur in essentially all types of tissues and their structure and shape depends on the stage of maturation of the cells.
- They are found in different organs and having different names like macrophages of lungs – alveolar macrophages, liver- kupffer cells.
- Size of the cells – 10-30 μ in diameter.
- Cytoplasm contains vacuoles and granules that are basophilic in nature.

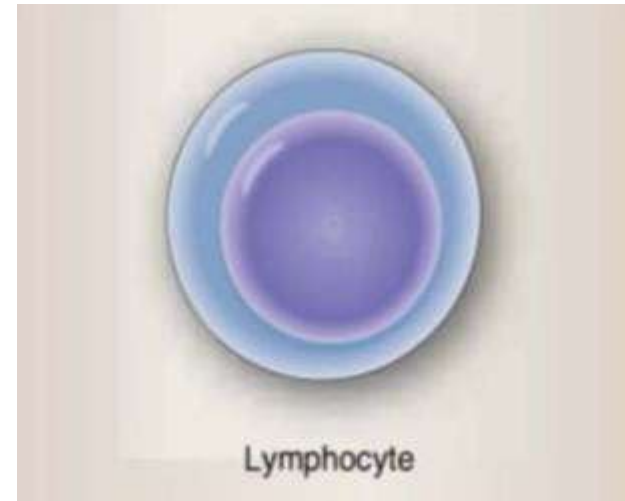
HOW DO MACROPHAGES WORK??



How do macrophages work to kill bacteria? © Dan Bright

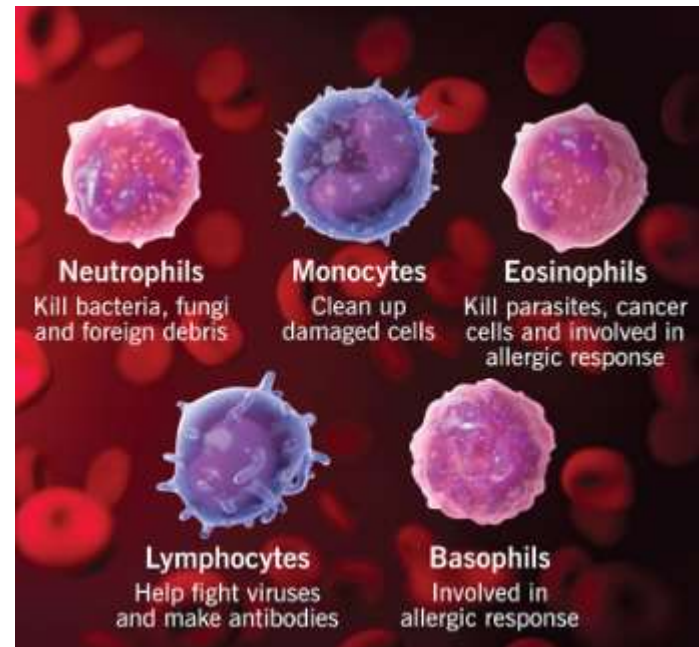
LYMPHOCYTES

- They are the principle cells plays in adapative immune system.
- They represents 20-40% of circulating WBC's and 99% of the cells present in the lymphs.
- They can be broadly classified into three major groups
B lymphocytes,
T lymphocytes and
natural killer cells.



FUNCTIONS:

- ❑ Neutrophils has the ability to engulf the bacteria by phagocytosis.
- ❑ Formation of fibroblast.
- ❑ Production of thromboplastic substances.
- ❑ Destroys cancerous cells.
- ❑ Manufacture of trephones.





THANKYOU