

B.Sc. (H) Zoology
 Part - II
 Paper IV
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WBC (Leucocytes)

- Leucocytes are typical cells with amoeboid ability.
- In this Centriole near the nucleus, but mitosis & division not occur in the adult state.
- As in all true cells, Mitochondria & Golgi Complex is present.
- It is amoeboid, nucleated, non pigmented & 8-15 μ in size. (larger than RBC)
- It has no Haemoglobin pigment (Respiratory pigment).
- Its number is about between 6,000 to 10,000 / cubic mm of blood. The count in children is higher than in adults.
- Otherwise, in pathogenic states, there are variations from the normal cells, (numbers)
- The ratio between RBC & WBC is 1000:1 / 400:1.
- Its life span is 2 to 3 days (after two weeks).
- About 30% of WBC are destroyed per day.

Classification:

The Leucocytes (WBC) are divided into two main varieties.

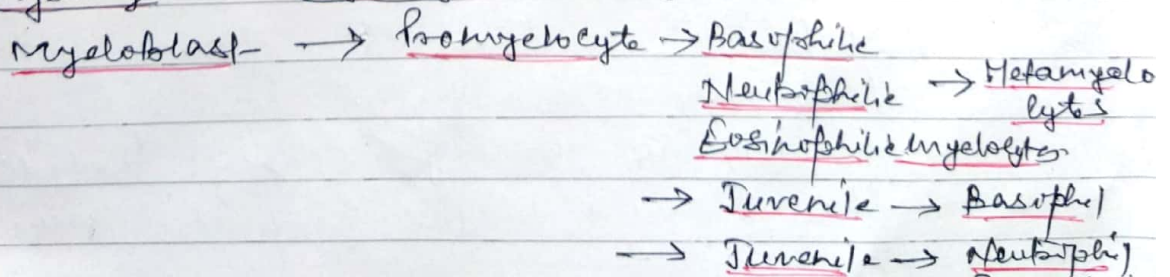
① Granular or Polymorphonuclear Leucocytes.

(ii) Agranular or Mononuclear Leucocytes.

- The above classification based on, the shape of nucleus the presence of granules or absence of granules in the cytoplasm, & the type of granules, if present.

Granular Leucocytes.

- They have granular cytoplasm lobated nucleus.
- They develop in the red bone marrow from the same parent cell, as the Erythrocytes (RBC).
- Before entering the blood-stream, they develop through Promyelocyte & Myelocyte - stages



- As these cells develop, specific granules appear in larger numbers & they retain their nucleus.

The Granulocytes constitute about 45% of total WBC & these varieties are described as follows -

- Neutrophil - Approximately - 70% (Most abundant).
- It's stained by neutral stain (Haematoxylin)
- It contains 3 to 5 lobed nucleus. Its life span about 50 hrs.
- Function - It's phagocytic in nature.
- Eosinophil (also phagocytic) - 4% (approx)
- It's stained by Acidic stain (Eosin)
- It contains bilobed nucleus with a connecting isthmus.
- Function - Eosinophil engulf the parasites, which are formed when Antigen & Antibodies react with each other.
- In Allergic conditions, such as Asthma, & parasitic infection of the digestive tract they are increased in no.
- It produce Antitoxins.

Basophil - Approximately - 1% (also phagocytic)

- It's stained by Basic stain (Methylene blue)
- It contains - 2-3 lobed nucleus.

Functions:

- Basophils are actively amoeboid & ingest small particles like carbon.
- It produce antitoxins, heparin, serotonin & histamine.

Agranular Leucocytes

- It comprises about - 25% of all WBC. They have a few or specific or no granules in the cytoplasm.
- Its nucleus is spherical to kidney shaped.
- It have two varieties.

- (i) Lymphocytes (large & small) (also phagocytic)
- (ii) Monocytes

Lymphocyte - It's very dense & dark because of heavy chromatin masses.

- Its nucleus generally kidney shaped.
- Its produced in the lymphatic tissue of the body which present in the spleen, lymph nodes, thymus, tonsils, & more scattered nodular masses.

Functions -

- Lymphocytes are concerned with the process of immunity
- It contribute to scar-formation after injury & thus facilitate wound healing.
- It play an important role in the immunological reactions to tissue transplantations
- It produce and carry antibodies.

Monocytes (Phagocytic)

- These are largest - (15 to 22 Micron) of the WBC.
- The nucleus varies from oval, round, or indented to kidney shape.
- It's originated from a system of primitive cells, the reticuloendothelial system, which is found in Liver, spleen, Lungs & lymphatic glands.

Functions

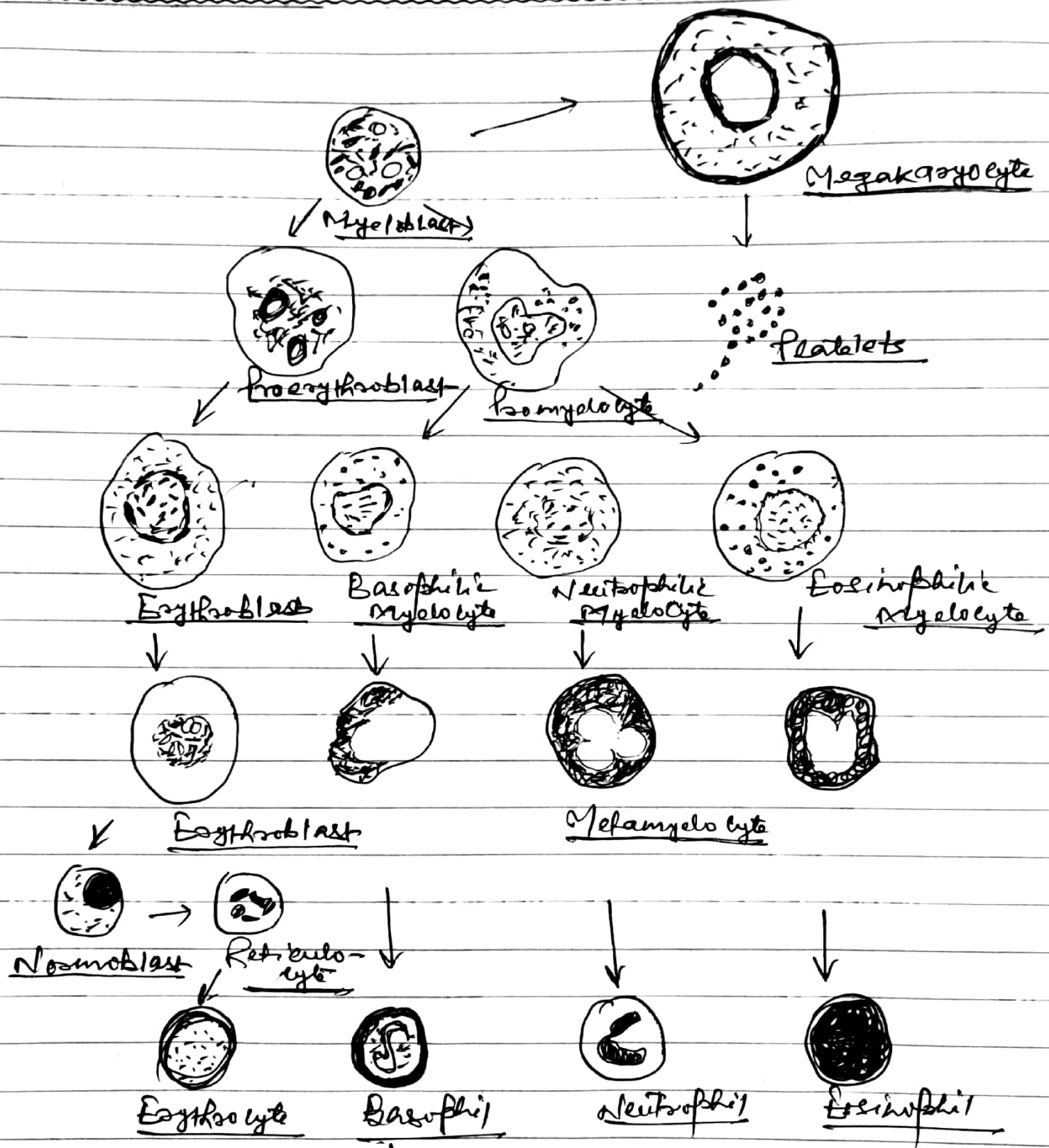
Its function closely resembles that of the neutrophilic phagocyte in action. It leaves the blood capillaries to ingest micro-organism & other foreign particles that may be introduced in to the tissue.

Increase - WBC

- ① When increase the number of WBC is called Leucocytosis.
 - More than 12,000 per cubic million, indicates some disease, pus-forming infection, Chicken pox (Basophil), Whooping Cough (Lymphocytes), Tuberculous (Monocytes).
 - And when its number is above more than lakis, then cause - Blood cancer (Leukaemia)
- ② When the number decrease below 6,000/mm³ is called Leucopenia (as in Typhoid fever).

Functions (WBC)

- It acts as Scavengers & Soldiers, known as (White police men)
- It acts as Military System of Body.



the sp shows Blood cells