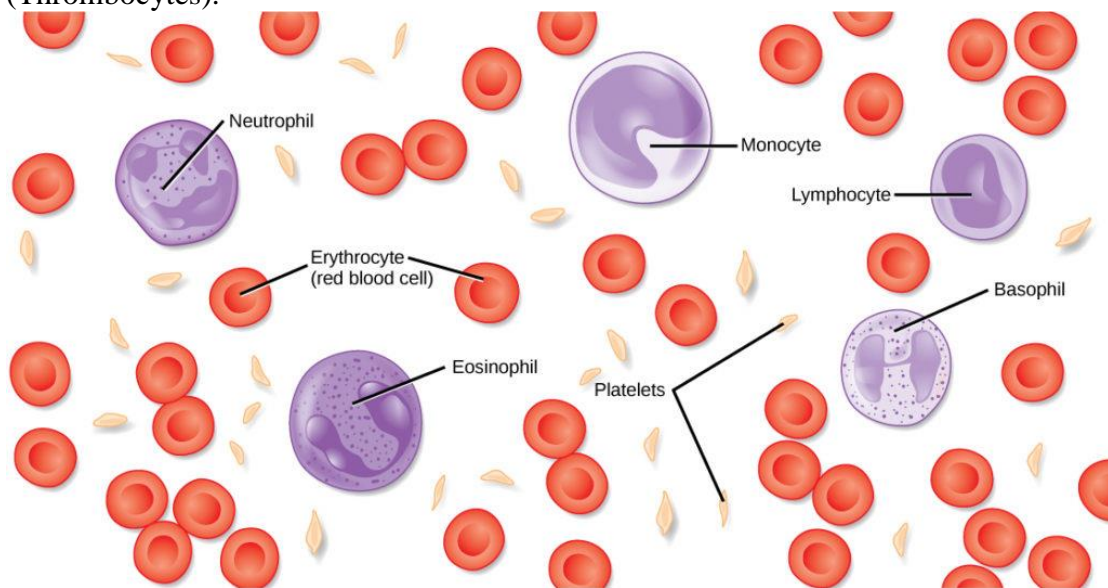


## ***Histology practical lecture 5 /2nd stage/Mrs.ekhlas s.***

### ***The Blood***

Blood is a specialized type of connective tissue , composed of formed elements in fluid matrix . Blood circulates throughout the body and is well adapted for its manifold functions in transporting nutrients, oxygen, waste products, carbon dioxide, hormones, cells, and other substances. Plasma (55%) is the fluid portion, called serum when depleted of Fibrin & Fibrinogen. The formed elements of blood (45%) include erythrocytes (red blood cell) , Leukocytes (whit blood cell) and Platelets (Thrombocytes).



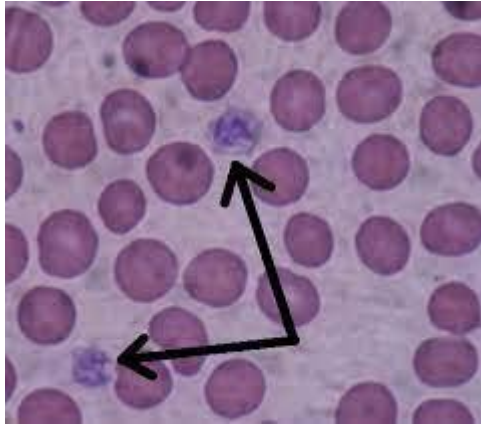
### ***Plasma***

The liquid in which peripheral blood cells are suspended. Composed of water, electrolytes such as  $\text{Na}^+$  and  $\text{Cl}^-$  , plasma proteins (such as albumin, fibrinogen, globulins), hormones, fats, amino acids, vitamins carbohydrates, lipoproteins as well as other substances. The normal plasma volume is 40 ml/kg of body weight.



### ***Platelets (thrombocytes)***

- 1- Fragments of ***megakaryocyte*** cytoplasm
- 2- central zone ( purple color) called granulomere
- 3- transparent zone (blue stained) called hylomer.



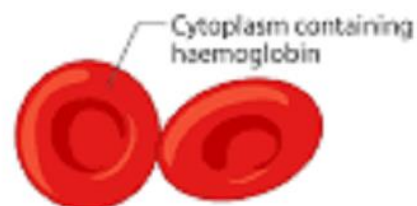
### ***Erythrocytes (Red Blood Cells or RBCs):***

Occupy about 40-45% of the total blood volume **Blood usually studied in stained smear by ....Wright's stain:( mixture of eosin Y and methylene blue.**

#### **Cells**

1. Non nucleated, Biconcave Disk 7.2um ( about 4  $\mu\text{m}$  in goat)
2. Mature = Filled with hemoglobin, Transports Oxygen, No mitochondria, NO protein synthesis
3. Flexible - to fit variable capillary diameter
4. 120 day life span then Death of RBC, removed by spleen & bone marrow
5. Produced in the ***RED Bone Marrow.***

#### **RED BLOOD CELLS (RBC)**

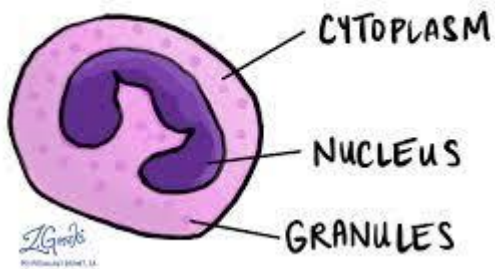


***White Blood Cells - Leukocytes are Myeloid & Lymphoid elements:***

***Neutrophil***

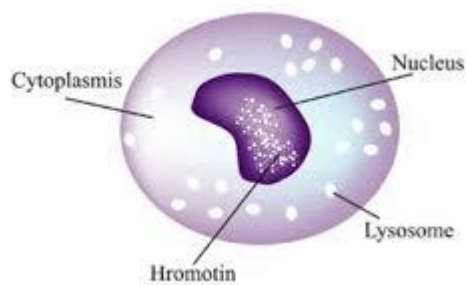
- a. diameter 12 $\mu$ m
- b. Lobed nucleus( 2-5) shape variable, drumstick or s shape
- c. Granules: fine granules
- d. Increased in Acute infection, highly mobile, highly phagocytic
- e. Immature neutrophil called **band cell** have a horse shoe nucleus

**NEUTROPHIL**



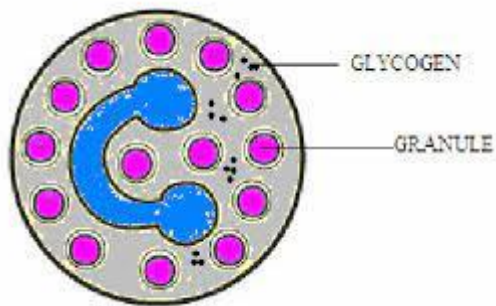
***Eosinophil***

- a- diameter 9 $\mu$ m
- b- Bilobed nucleus
- c- Granules
  - 1. Ovoid
  - 2. Red with Wrights stain, Eosinophilic
  - 3. Larger than neutrophils
- d- Increases in number in allergic reactions and parasitic infections
- e- Myeloid element



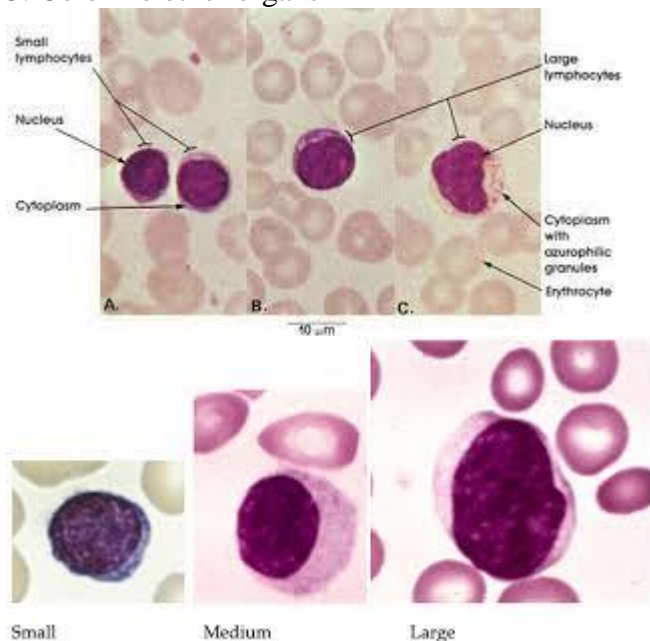
## Basophil

- a- diameter 12um
- b- Large twisted s shaped nucleus
- c- Granules,
  - 1. Irregular in size and shape
  - 2. Blue/metachromatic staining Basophilic
  - 3. Larger than other granulocytes
- d- Myeloid element.



## *Large lymphocytes, small lymphocytes*

- a- diameter 6-8um
- b- Round nucleus
- c- Cytoplasm few, rim cytoplasm
- d- Origin Bone marrow in later fetal and post natal life
  - 1. Become immunocompetant outside of the bone marrow
  - 2. Differentiate into B cells & T cells
  - 3. Colonize other organs



## Monocytes

- a- Nucleus - oval, kidney, horseshoe; chromatine stains lightly
- b- Basophilic cytoplasm with azurophilic granules (lysosome)
- c- Major cell of chronic infections.
- d- Moves into the tissues and becomes a macrophage .
- e- Diameter about 16  $\mu\text{m}$  .

