

# Physiology

## Practical

---

Assist. L . Mohammed ali nadhum



# The blood

---

Blood is a specialized body fluid , it has many different functions, including,

- Transporting oxygen and nutrients to the tissues.
- Carrying cells and antibodies that fight infection.
- Bringing waste products to the kidney and liver, which filter and clean the blood.
- Regulating body temperature.

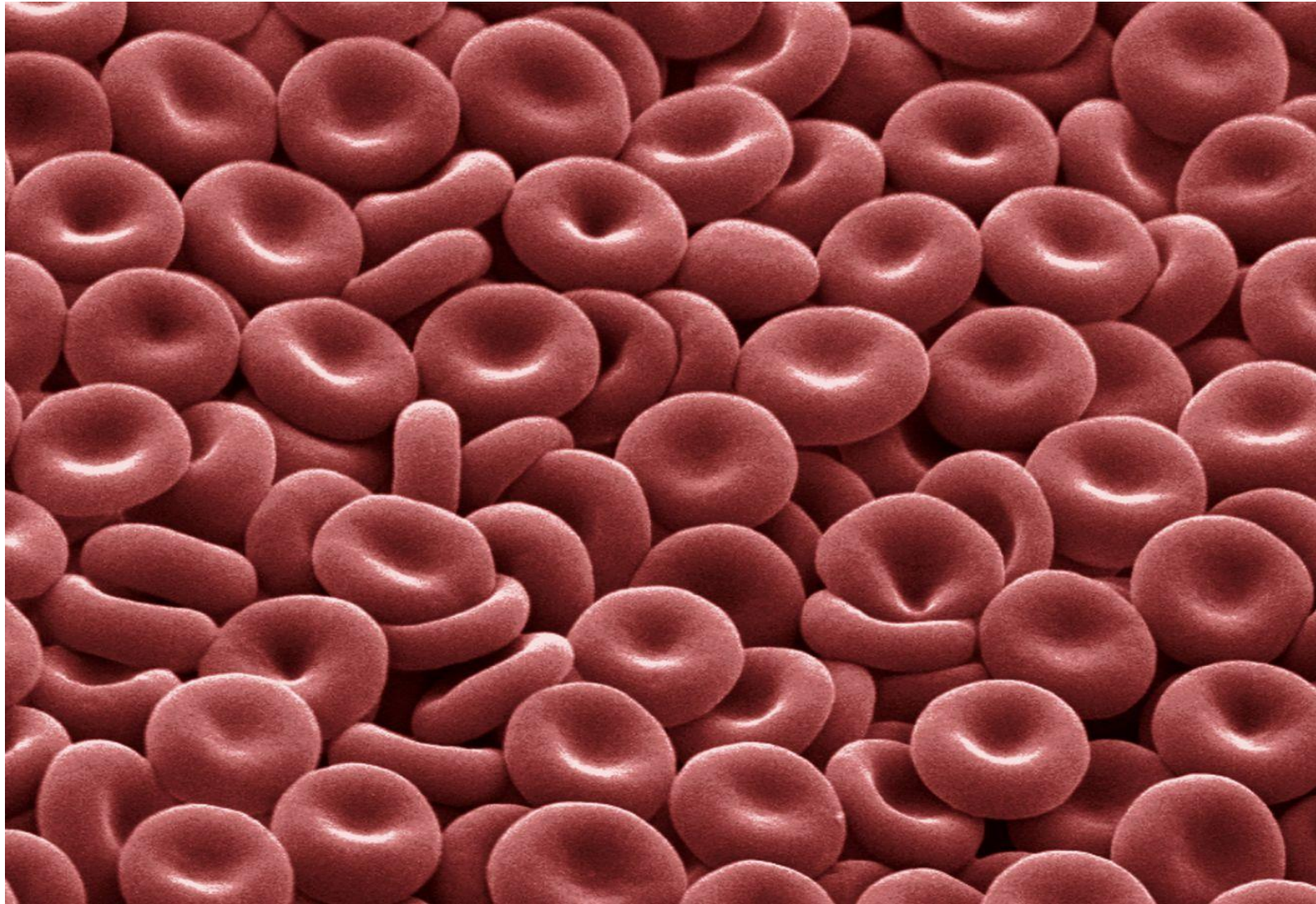
The blood that runs through the veins, arteries and capillaries is known as whole blood. a mixture of about 55 percent plasma and 45 percent blood cells . About 7 to 8 percent of your total body weight is blood.

Blood is a highly specialized tissue composed of more than 4000 different kinds of components. Four the most important ones are red cells, white cells, platelets, and plasma.

# Red Blood Cells (RBCs)

---

Also known as erythrocytes are flattened, doubly concave cells that carry oxygen. There are about 4 to 6 million cells per cubic millimeter of blood . Red blood cells are continuously made in the bone marrow . Each red blood cells lives for only 120 days, after which they are destroyed in liver and spleen



Red Blood Cells (RBC)

# White Blood Cells (WBCs)

---

Also called leukocytes , are associated with the immune system. The main classifications of leukocytes: Granulocytes, and Agranulocytes.

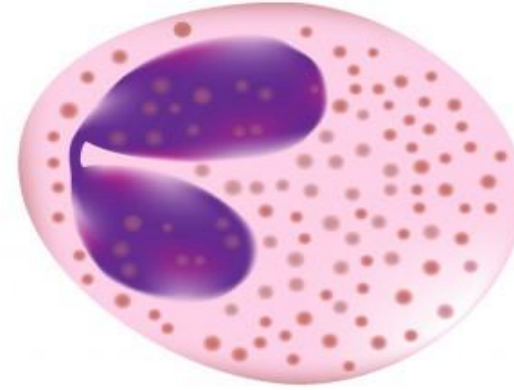
- Granulocytes as their name suggests are white blood cells that have granules present in their cytoplasm
- Agranulocytes do not have these granules

- Neutrophils 60-70 % of total WBCs
- Basophils less than 1 %
- Eosinophils 2-4 %
- Monocytes 3-8 %
- Lymphocytes 20 %

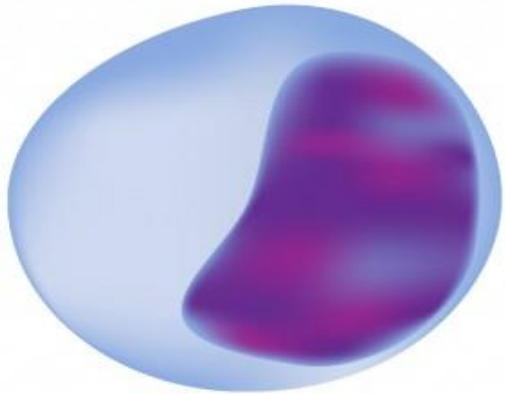
Neutrophils, basophils and eosinophils are all polymorphonuclear granulocytes. Polymorphonuclear Cells have nuclei with multiple lobes. Monocytes and lymphocytes are mononuclear Agranulocytes .



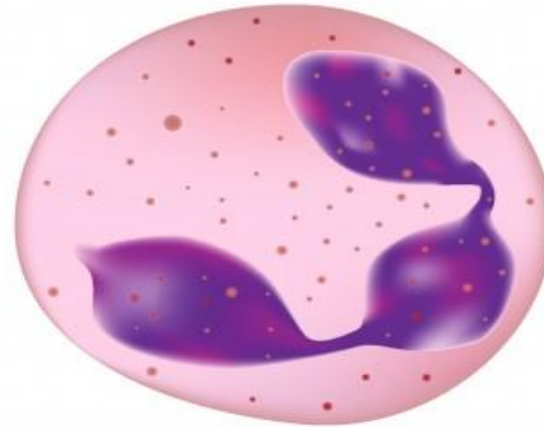
Monocyte



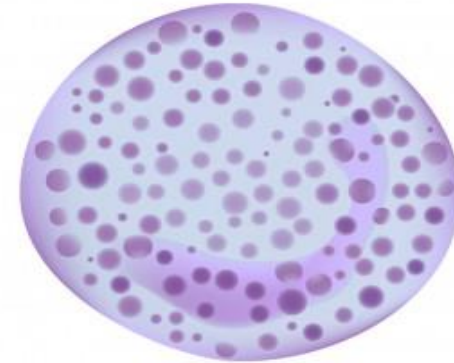
Eosinophil



Lymphocyte



Neutrophil

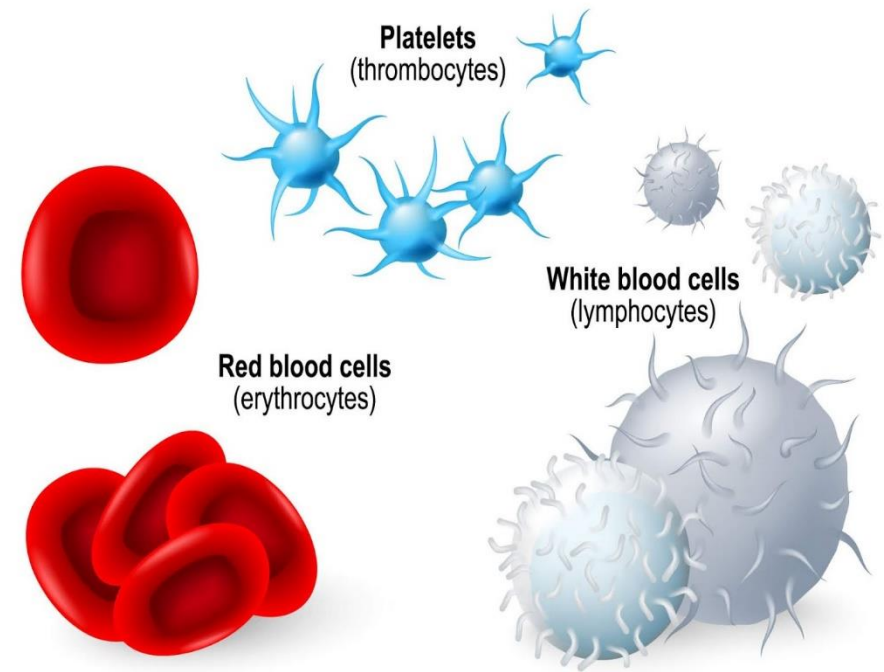


Basophil



# Platelets

Platelets, also called thrombocytes, are important in blood clotting. Platelets are cell fragments that bud off bone marrow cells. They make up less than one percent of blood volume.



# Plasma

---

Plasma is the golden-yellow liquid part of the blood. Plasma is 90% water and 10% dissolved materials including proteins, glucose, ions, hormones, and gases. It acts as buffer, maintaining pH near 7.4

# Experiment (Blood Film)

---

The aims of this experiment :

- Examination of the blood film for detection of different types of leukocytes and erythrocytes

The stain that used is called **Leishman's stain** which is consist of:

- **Eosin stain** : red in color & acidic reaction , used for staining of cytoplasmic granules .
- **Methylene blue stain** : blue stain , alkaline reaction , used for staining all nuclei of leukocytes .

# The materials

---

- Sterile disposable lancet.
- Cotton or gauze
- 70% alcohol or any sanitizer
- Clean glass slide & cover slide

# Finger puncture

---

1. Rub the finger to allow coming of more blood
2. The skin is cleaned with sanitizer, then dry the finger.
3. With disposable lancet do the puncture , quickly , vertically , so the puncture wound bleed freely
4. Remove the first drop of the blood by a dry gauze.
5. Then put a small drop of the blood on clean slide.
6. Do not touch the slide with the finger skin.

# Making the blood film (smear)

---

1. Prepare two clean glass slides , put small drop of blood on one of them
2. Put this slide on the surface of the bench
3. Apply the edge of the next slide distal to the drop of blood , then move this slide backward until it touches the drop of blood
4. The drop of blood will immediately spread across the edge of spreading slide
5. With the spreading slide at an angle  $45^\circ$  draw the blood steadily across the horizontally placed slide.
6. The spread film should be allowed to dry by shaking in the air at room temperature.

# Staining

---

1. Put prepared film on staining rack.
2. Cover the slid with sufficient amount of Leishman's stain & allow it to act for one minute.
3. Add an equivalent amount of distilled water carefully to the stain on the slide
4. Remove the stain, with water, dry& and examine under oil immersion lens.





