

## 14. Observe the prepared slide of blood smear to identify different types of blood cells.

Date : / /

**Aim :-** To identify and observe the types of blood cells in freshly prepared blood smear.

**Requirements :-** Blood sample, two slides, Leishman's stain, compound microscope, etc.

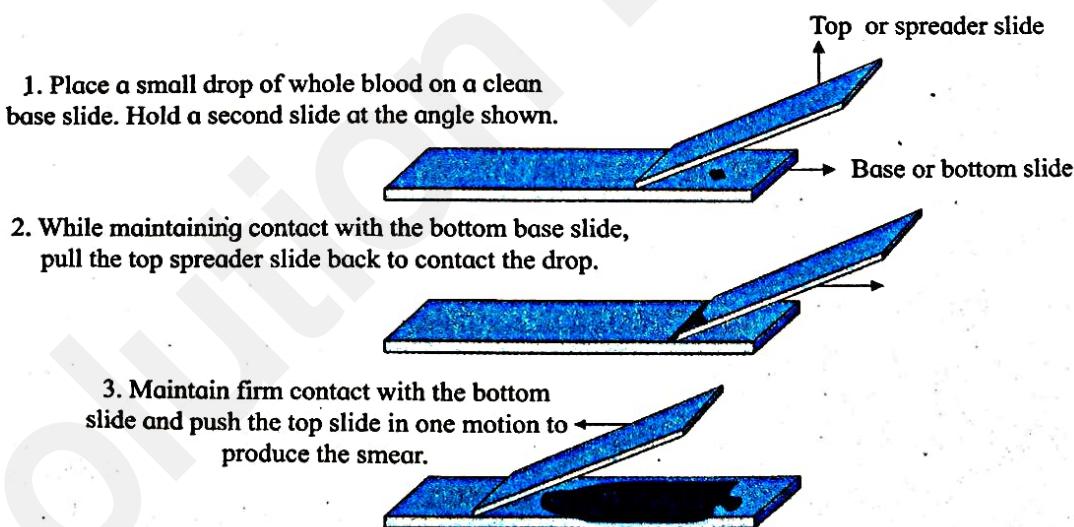
**Procedure :-** A blood smear is used to study not only the types of blood cells but also the parasites, if any, in the blood eg *Plasmodium*. To be able to see the different types of cells in the blood, the blood must be spread in a thin uniform layer on the slide. This spread of blood on a slide is called **Smear**.

To observe all the cells present in the blood sample under the microscope, they must be stained appropriately. This process is called **Staining**. Various stains like Leishman's stain or Wright's stain can be used for staining the blood cells.

### Preparation of the Smear :-

1. Take two clean and dry slides.
2. Place a drop of blood towards one end of a slide (base slide).
3. Hold this slide having the drop of blood by one hand.
4. Take the other slide (viz. the spreader slide) and keep it inclined on the first slide such that it is just touching the edge of the drop of blood.
5. Hold the second slide in this position till the drop has spread evenly along its edge.
6. Gently move the spreader slide once over the base slide to form a thin layer of blood, called Blood Smear. The smear should cover approximately half the slide.
7. Leave the smear for air drying.

### Figure :



### Staining of the Blood smear :-

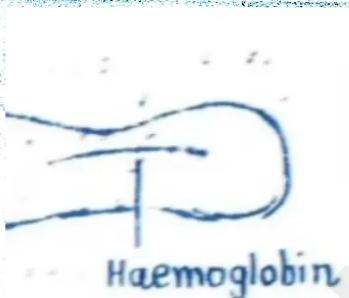
1. With the help of a dropper, put few drops of Leishman's stain on the slide to cover the smear completely.

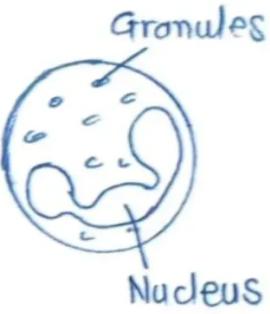
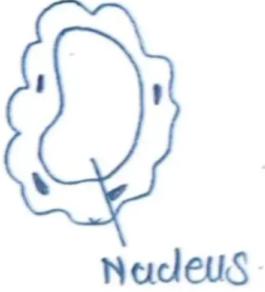
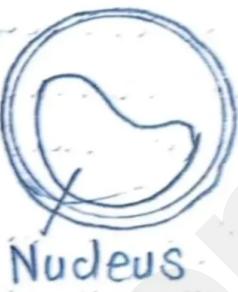
- Keep the stain on the slide for about 5 minutes for its action. Do not allow the stain to dry. Add a few drops of distilled water, if the stain dries.
- Drain off the excess stain and wash the slide under gentle running tap water till excess stain is removed.
- Allow the slide to dry at room temperature. Observe it first under low power and then under high power of compound microscope.
- Observe and identify the different types of blood cells.

**Observation :-**

- The main cellular component of mammalian blood are the erythrocytes or RBCs. They are circular biconcave cells without a nucleus. The cells contain large amount of haemoglobin.
- A number of leucocytes or WBCs are also found. They are generally irregular in shape and show prominent nucleus. The leucocytes are divided in two main types i.e Granulocytes having a granular cytoplasm and Agranulocytes ( W.BCs with a clear non-granular cytoplasm). Depending upon the shape of nucleus and the nature of granules, the granulocytes are further divided into acidophils, basophils and neutrophils. The Agranulocytes are divided into two sub-types as lymphocytes and monocytes.
- Thrombocytes (platelets) are also present in the blood. They are spindle shaped cells. However normally these are not visible in the casual preparations.

Complete the following table after observing your slide.

Cells	Diagram	Function
Erythrocytes		<ul style="list-style-type: none"> <li>1) responsible for the transport of respiratory gases like <math>O_2</math> and <math>CO_2</math>.</li> <li>2) contribute in the process of blood clotting.</li> </ul>
Acidophils		<ul style="list-style-type: none"> <li>1) They destroy antigen antibody complex by Phagocytosis.</li> <li>2) They produce antitoxins.</li> </ul>
Basophils		<ul style="list-style-type: none"> <li>1) They are present in infected and allergic conditions only.</li> <li>2) They secrete heparin and histamine.</li> </ul>

Neutrophils		<p>1) They are responsible for destroying pathogens by the process of Phagocytosis.</p>
Lymphocytes		<p>1) B-lymphocytes are responsible for antibody production and humoral immunity. 2) T-lymphocytes are responsible for cell mediated immunity.</p>
Monocytes		<p>1) They are actively motile and give rise to Macrophages. 2) They are mainly phagocytic and destroy the bacteria.</p>
Platelets		<p>1) They secrete platelet factors which are essential in blood clotting. 2) They also seal the ruptured blood vessels. 3) They secrete serotonin.</p>

## Questions

1. Give the function of haemoglobin.

**Hemoglobin is essential for transferring oxygen in your blood from the lungs to the tissues.**

2. What is haemopoiesis?

**Hematopoiesis is the process of creating a wide variety of blood and bone marrow cells, namely erythrocytes, platelets, granulocytes, lymphocytes, and monocytes.**

3. What is the haemoglobin count for a normal healthy male and female in humans?

**The healthy range for hemoglobin is: For men, 13.2 to 16.6 grams per deciliter. For women, 11.6 to 15 grams per deciliter.**

4. Which blood cell is known as scavenger?

**Macrophages are cells in the immune system that belong to the phagocyte family, or so-called scavenger cells.**

5. Why is RBC enucleated?

RBC is enucleated to enhance blood cell circulation and prevent possible blockage of small capillaries by deformed red cells. The lack of a nucleus is also thought to provide more intracellular space for hemoglobin.

6. What is stain?

**Stains and dyes are used to highlight the specimen at the microscopic level to study it at higher magnification for histopathological studies and diagnostic purposes.**

7. What is the purpose of using Leishman's stain?

**Leishman's stain is for the general differentiation of blood cells for malaria and trypanosomes in prepared slides from clinical specimens.**

## **Multiple Choice Questions**

1. The life span of RBC is 120 days.  
a. 120 days                          b. 12 days  
c. 90 days                            d. 100 days

2. The % of neutrophils among WBCs is 62%.  
a. 3 %                                b. 0.5 %  
c. 25 to 30%                        d. 62%

3. Platelets are produced from special cells in the bone marrow called as megakaryocytes.  
a. red blood cells                    b. thrombocytes  
c. megakaryocytes                    d. microkaryocytes

4. The two main types of lymphocytes are B-lymphocytes and T-lymphocytes.  
a. monocytes and B-lymphocytes                            b. neutrophils and T-lymphocytes  
c. lymph cells and WBCs                                      d. B-lymphocytes and T-lymphocytes

5. The WBCs with twisted nucleus are basophils.  
a. basophils                            b. lymphocytes  
c. eosinophils                        d. neutrophils

*Remark and Signature of Teacher .....*