TOTAL COUNT OF RBCs

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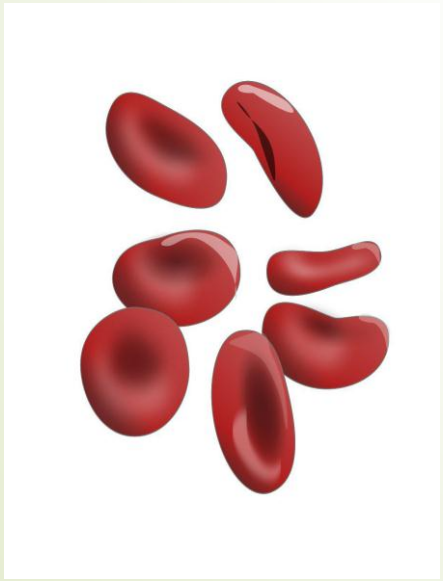
INTRODUCTION

- Red blood cells make up almost 45 percent of the blood volume. Their primary function is to carry oxygen from the lungs to every cell in the body. Red blood cells are composed predominantly of a protein and iron compound, called hemoglobin, that captures oxygen molecules as the blood moves through the lungs, giving blood its red color. As blood passes through body tissues, hemoglobin then releases the oxygen to cells throughout the body. Red blood cells are so packed with hemoglobin that they lack many components, including a nucleus

- Each RBC is a biconcave disc having a diameter of 7.2 microns and a thickness of 2.2 microns These cells contain the pigment hemoglobin which enables them to transport oxygen around the circulation. They also contain the enzyme carbonic anhydrase which enables them to carry CO2.



AIM OF THE EXPERIMENT

- RBC count is done to determine whether there is an adequate number of RBC in the circulation or not

METHODS

1- Manual method

2-Electronic cell counting

MANUAL RBC COUNT

MATERIAL AND INSTRUMENTS

1-Anticoagulated whole (using EDTA or heparin as an anticoagulant) or capillary blood can be used.

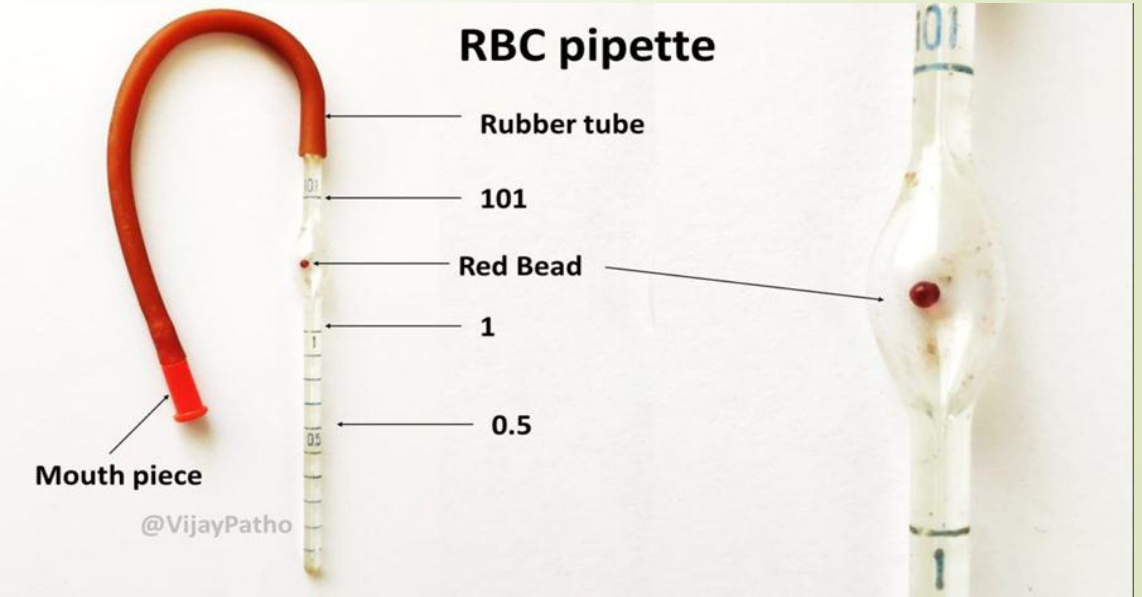
2-Hayem's solution (diluting fluid) composed of

Hgcl2 0.05 g

Na2so4 2.5 g

Nacl 0.5 g

Distilled water 100 ml



- 3-RBC pipette which is composed of a stem & a mixing chamber with a red bead, it is function is to mix blood with the substance and for differentiation from the WBC pipette.

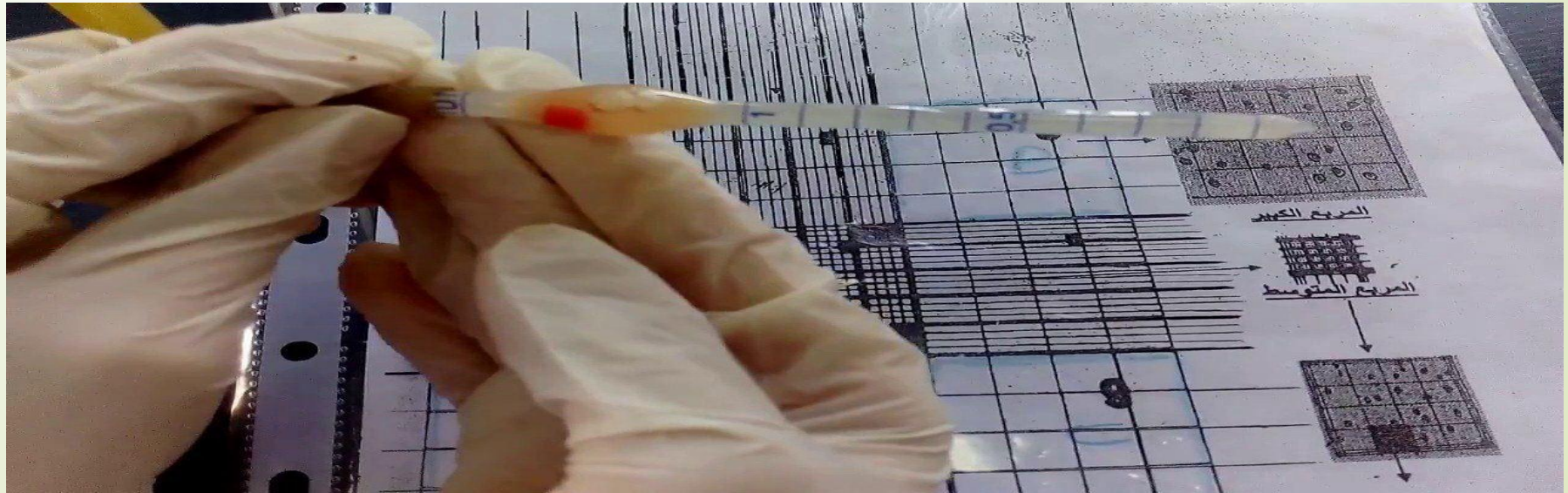
4- " Neubauer" chamber is counting chamber with a cover slip. The same counting chamber is used also for counting total white blood cells.

5- Microscope , Lancet , Alcohol 70% & Cotton

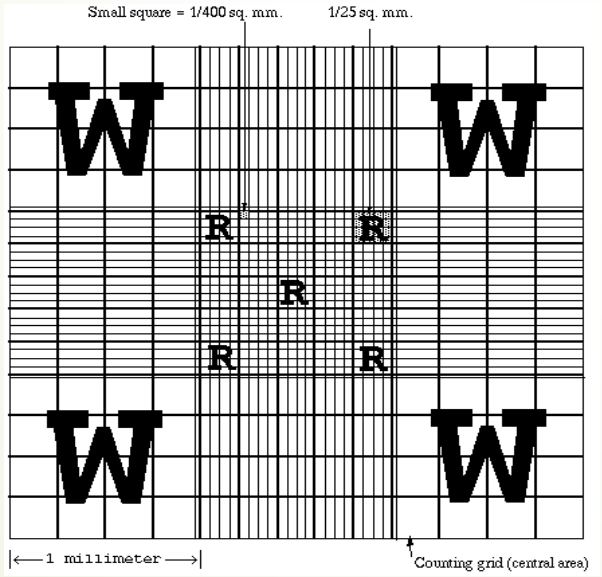
PROCEDURE

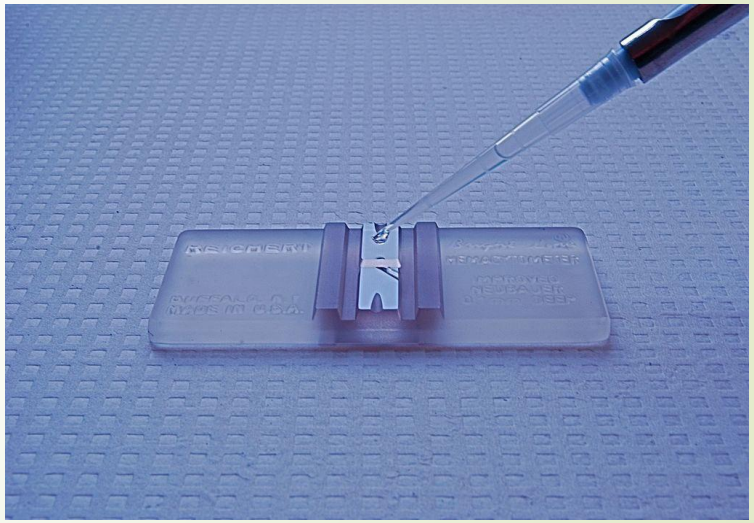
- Wipe your partner's finger with cotton soaked with alcohol and allow it to dry. With a sterile disposable lancet do small prick on the finger tip, when a drop of reasonable size has collected, hold the red blood cell pipette slightly tilted from the vertical position, apply its tip to the drop and aspirate blood to the mark 0.5

- Wipe off any blood adhering to its outer side. If the blood gets beyond 0.5 marks tap the tip gently till the blood is exactly at the mark. Never allow the blood to clot inside the pipette. If the blood clots in the pipette blow the sample out, clean the pipette and begin all over again. Aspirate diluting Hayem's solution to the 101 mark, thus making 1:200 dilution of blood. Hold the pipette horizontally and role it with both hands between finger and thumb



- The actual total number of cells should be = N x 50 x 200= N x 10000
  Example: 520 cells x 10000= 5,200,000 cells/ mm3





PRINCIPLE

- The red blood cell count:- is the number of red blood cells per unit volume of whole blood. Normal red blood cells values at various ages are Newborn: 4.8-7.2 million/ Adults (males): 4.9-5.5 million/ (Females): 4.4-5.0 million/ Pregnancy: slightly lower than normal adult values/ Children: 3.8-5.5 million

MEDICAL CONSIDERATIONS

- Pathological conditions:- Polycythemia is a disease of unknown origin that results in an abnormal increase in red blood cells due to over production of red blood cells in the bone marrow not caused by physiologic need (primary polycythemia vera), while secondary polycythemia vera occur in response to hypoxia.

- Anemia: is a general term that refers to a decrease in red blood cells. Anemia can occur from either a decrease in the number of red blood cells, a decrease in the hemoglobin content, or both. A lower than normal RBC can result from a number of causes, including: Massive RBC loss, such as acute hemorrhage Abnormal destruction of RBC Lack of substances needed for RBC production Chemotherapy or radiation side effect from treatment of bone marrow malignancies such as leukemia can result in bone marrow suppression.

NORMAL PHYSIOLOGICAL CONDITIONS

 A normal physiological increase in the RBC count occurs at high altitudes or after strenuous physical training. The drugs gentamicin and methyldopa have been associated with increasing the number of red blood cells. Smokers also have a higher number of red blood cells than non smokers