



Red blood cells

Prepare by

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Blood

- Blood is fluid connective tissue that circulate through the vascular system .

composition of blood

Plasma (55%)

-water

-protein

-salt

-Glucose

Blood cells(45%)

-Red blood cells

- white blood cells

-platelets

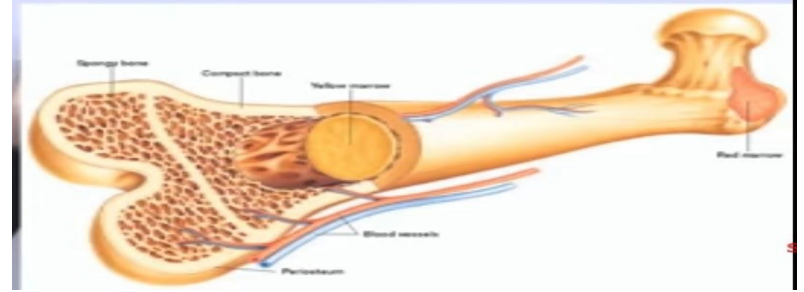
RBCs



Introduction

- Scientific name of Rbc -Erythrocytes
- present in large quantity
- nucleus is absent
- It lack cytoplasm organelles such as nucleus, mitochondria and ribosomes.

-Formation - Bone marrow



-Death - Spleen and liver

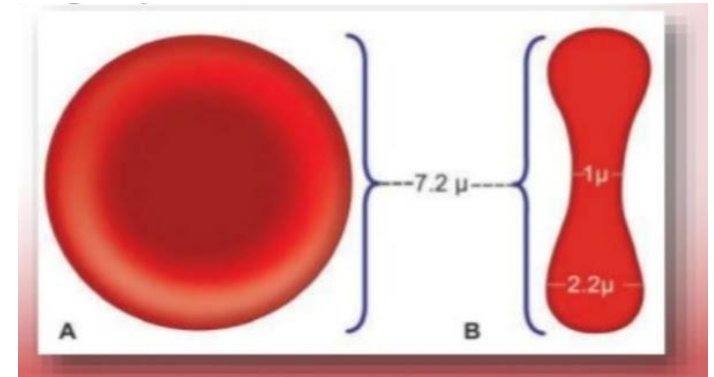
-Life span - 90-120 days

-Rbc is auxillary in construction in protein ,
vitamins B₁₂ and folic acid .

-The number of RBC cells was measured with a Hemocytometer .

Dimension

- Shape - Biconcave
- Size - 7.2 μm in diameter
- Thickness - 2 μm at the periphery and 1 μm at the center
- Volume - 87 μm^3



Composition

-water - 62.5%

-Hemoglobin -35%

-2.5%

-sugar-glucose

- Lipids , protein , enzyme , ions

Function of RBCs

- carry oxygen and carbondioxide
- provide acid base balance
- maintaining the ionic composition of the plasma
- Hemostatic

Why is the blood red colour?

- The red colour of RBCs is due to presence of Hemoglobin(90%).



Hemoglobin

Heamo =Iron (Fe^{+2})

Globin =protein

(capable of oxygen

and carbondioxide combin)

Normal value of Red blood cells

-Male - $4.5 - 6.0 \times 10^6 /\text{mm}^3$

-Female - $4.0 - 5.5 \times 10^6 /\text{mm}^3$

-At birth - $6.7 \times 10^6 /\text{mm}^3$

Abnormal condition of Rbc count

Increase of RBCs cells

-Polycythemia

-Diheria

-Dihydration

-Cholera

Decrease of RBCs cells

-Anemia

-pernicious

-Rheumaticfever

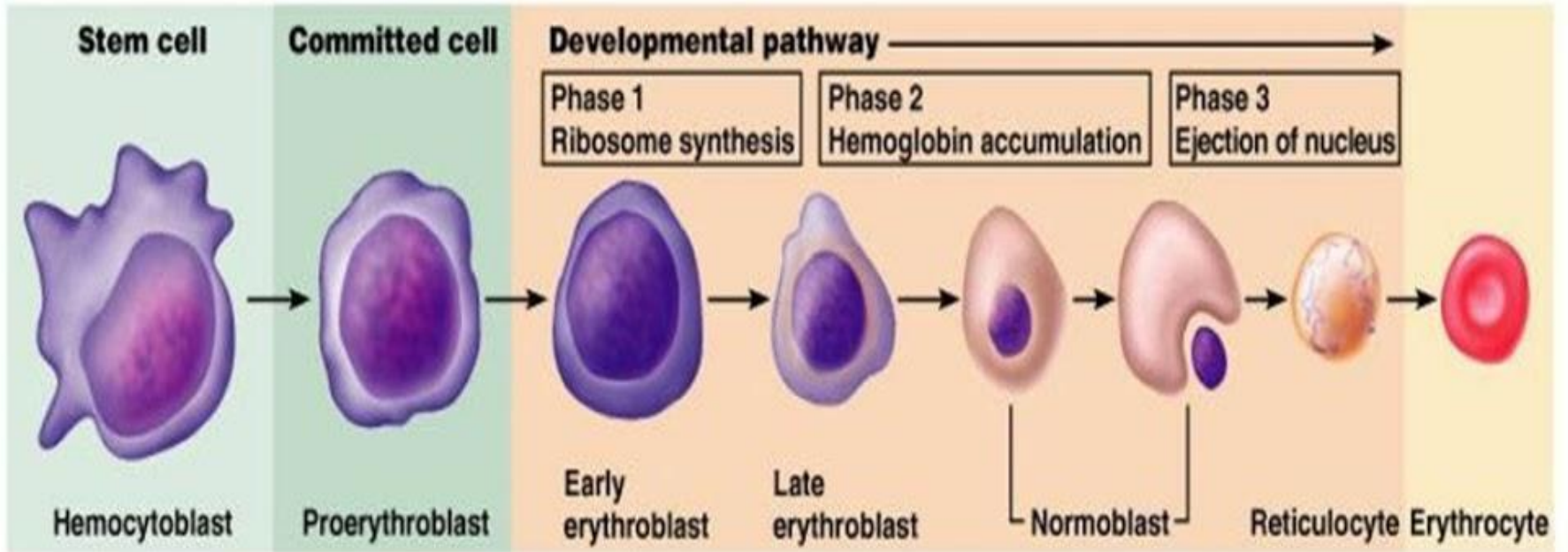
-Jundice

Erythropoiesis

Red blood cell production

- Myeloid stem cell transformed into proerythroblast
- In 15 days proerythroblast develop into basophilic, then polychromatic, then orthochromic erythroblast and then into reticulocyte.
- Reticulocytes enter bloodstream in 2 days mature RBC.

- As myeloid stem cell transforms
 1. ribosomes synthesized
 2. hemoglobin synthesized; iron accumulates
 3. Ejection of nucleus; formation of reticulocyte (young RBC)
 - Reticulocyte ribosomes degrade ; then become mature erythrocytes
 - Reticulocyte count indicates rate of RBC formation

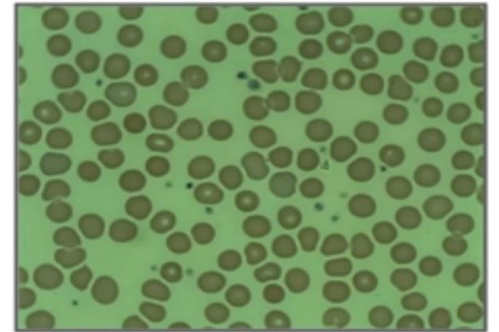


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Variation in RBCs size

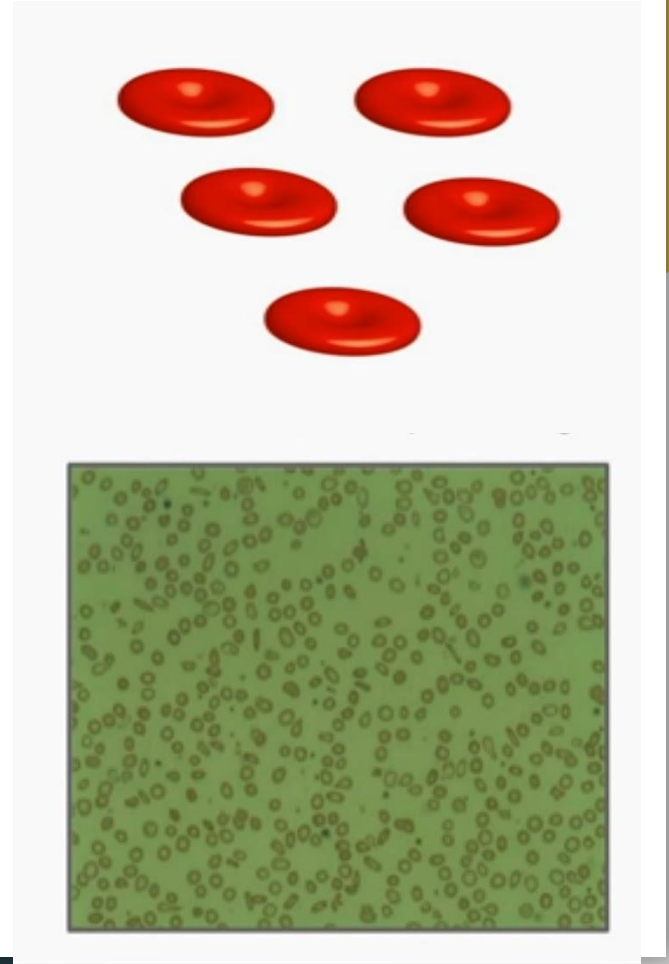
❖ Macrocytosis

1. Large red blood cells
2. As measured with MCV(mean corpucular volume)
3. High value of MCV indicates large size of rbc
4. Associated with - folic acid deficiency,.
Lever disease, aplastic anemia



Microcytosis

1. Small red blood cells
2. Measured with MCV
3. Low value of MCV indicates small size of RBC
4. Associated with - iron deficiency, thelesemia, lead poisoning



Variation in RBCs shape

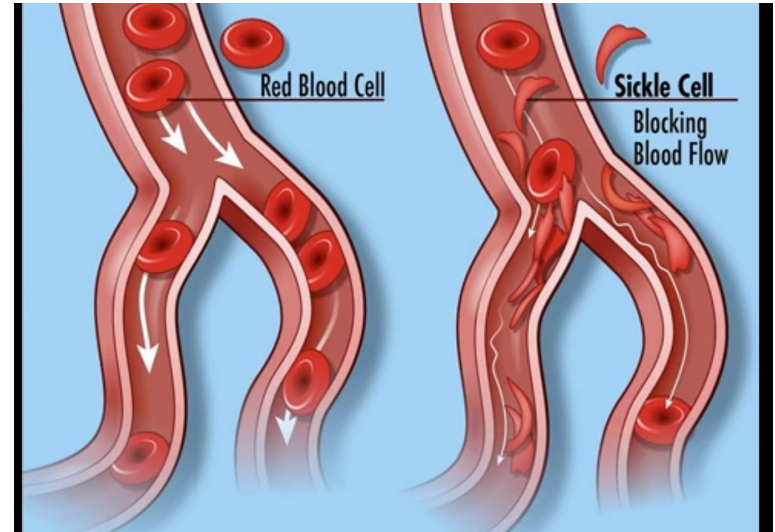
- Sickle cells

Red blood cells fragments

-Associated with sickle cell anemia

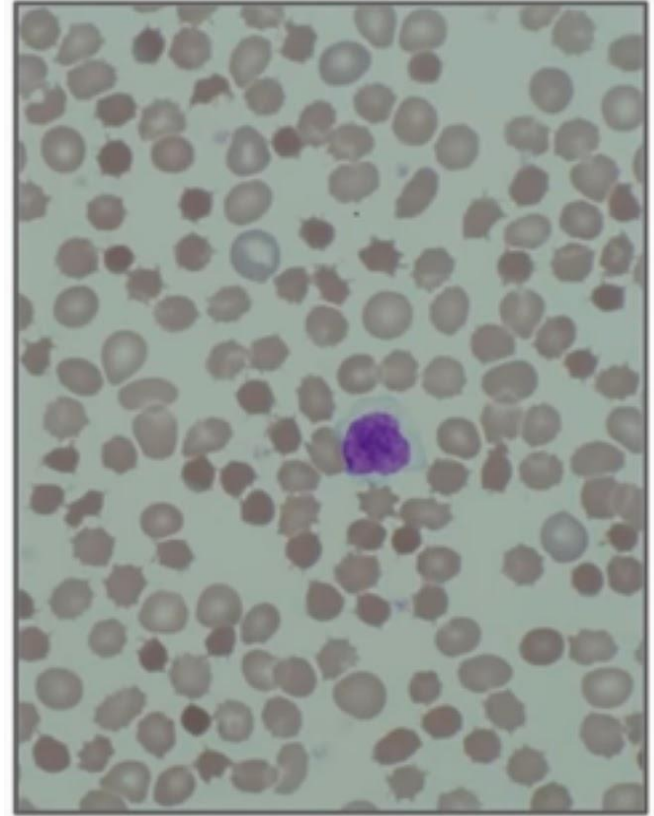
-Hemoglobin molecules with

-Point mutation that changes glutamic acid to valine



Acanthocytes

- Also called spur cells.
- projections that are irregular and large .
- Associated with liver disease.



Total count of erythrocytes

Principal

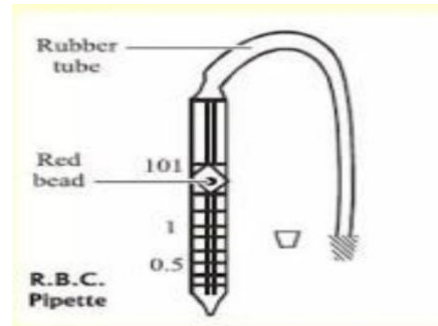
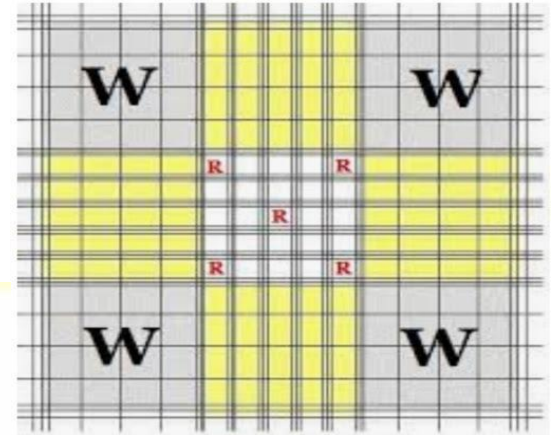
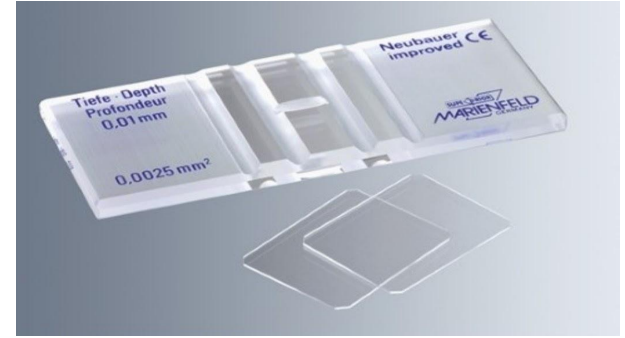
The blood specimen is diluted 1:200 with the RBC diluting fluid and cells are counted under high power by using a counting chamber.

-The number of cells in undiluted blood are calculated and

Reported as the number of red cells per mm^3 of whole blood.

Requirement

- Microscope
- improved Neubauer chamber
- Hayem's RBC diluting fluid
- Thoma's RBC pipette



Procedure

- Mix the anticoagulated blood carefully by swirling the Bulb .
- in the case of capillary blood then lancet stab should be sufficiently deep to allow free flow of blood .it is drawn quickly in RBC pipette
- Draw blood up to 0.5 marks.
- Carefully wipe the excess blood outside the pipette by using cotton or a gauze.
- Draw diluting fluid up to 101 marks .

- The pipette is rotated rapidly by keeping it horizontal during mixing .
- Discarding few drops from the pipette and holding it slightly inclined, a small volume of the fluid is introduced under the cover slip , which is placed on the counting chamber .
- Allow the cells to settle for 2 to 3 minutes .
- Place the counting chamber on the stage of the microscope.
- Switch to low power objective. adjust light and locate the large square in the center with 25 small squares .

- Now switch to high power objective
- The red blood cells in the four corner squares and In the center square are counted .
- Use the following formula for counting of the blood cells.

Thank you