



Red Blood Cell count

The count of red blood cells, is the number of red blood cells in mm^3 of whole blood.

Normal average in male is $5.500.000 \text{ cell/mm}^3$ (range $5.000.000 - 6.000.000 \text{ cell/mm}^3$) in female $4.800.000 \text{ cell/mm}^3$.

Range ($4.000.000-5.500.000$) cell/mm^3 and child from (10-12 years) $5.400.000 \text{ cell/mm}^3$.

To count red blood cells required sample of **blood with EDTA**.

Principle:

The blood is diluted 200 time with RBCs diluting fluid ($1/200$) in practice (20ul blood and 4 ml dilution).

Materials and instruments for manual Rbc Count:

- 1-Venous blood mixing with EDTA or capillary blood with heparin.
- 2-Neubauers chamber with cover slid.
- 3-Micropipette or red blood cell pipette.
- 4-Microscope.
- 5-Diluting fluid include:

a-**Disodium citrate solution** its composition disodium citrate 3.8mg, formalin 1ml and distilled water 99ml.

b-**Hayems fluid** its composed of –mercuric chloride 0.5mg (act as antiseptic), sodium chloride 1mg, sodium sulphate 5mg (have effect to prevent blood clotting) and distilled water 200ml.

The purpose of this fluid: its isotonic solution diluted blood, prevent lysis and prevent blood sedimentation.

Procedure:

- 1-Draw blood by micropipette 20 ul.
- 2-Mix the blood with diluting fluid 4ml.
- 3-Mix the contents in glass tube for 2 min.
- 4- Introducing the sample into the Neubauer chamber (10ul from mixture).



5-To count the RBCs the microscope must be switched to 40X objective.

Count the cells in the respective areas as stated early.
count the cell in 5 squares of the center square.

Rbcs count in*10.000 cells of blood

Purpose of test to detect the causes of blood count decreasing:

1-leukemia 2-bone marrow failure 3- hemorrhage 4- Anaemia 5-RBCs lysis

And causes of blood count increasing:

1-defect in erythropoietin 2-polycythemia 3-cardaic failure 4-dehydrtion 5-smoking 6-vomiting 7-lungs fibrosis 8-type of abnormal Hb

Physiological effect on Rbc count: -

1-age 2-sex 3-Activity 4-nutrition 5-pregnancy 6-brest feeding 7-psychological Emotions.

Automated Red blood cell count:

Electronic counter is based on the principle of aperture impedance method.

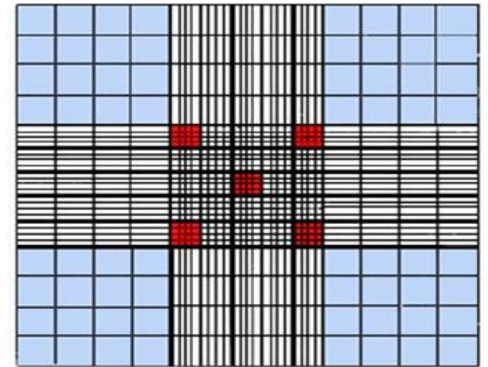
Anticoagulated blood is diluted with particle free diluting fluid such as physiological saline.

Particles passing through a chamber in single file scatter converted to pulses proportional to size of the cells which are then counted electronically (we were mention that in the lecturer of hemoglobin automated estimation).

References

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- 2-Buttarelo, M., & Plebani, M. (2008). Automated blood cell counts: state of the art. *American journal of clinical pathology*, 130(1), 104-116.
- 3-Chadha, G. K., Srivastava, A., Singh, A., Gupta, R., & Singla, D. (2020). An automated method for counting red blood cells using image processing. *Procedia Computer Science*, 167, 769-778.

■ areas of the grid where WBC are counted



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