

Thanks goes to Zakaria Shkoukani
For his Notes.

Physiology - Lab (Practical Part)

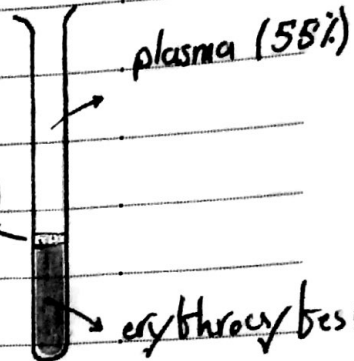
✓ RBC count:

- in men: (4.5-6) million / μL
around 5 million / μL

buffy coats (>1%)

- leukocytes

- platelets



- in women: (3.8-5) million / μL
around 4 million / μL

✓ WBC count:

4,500 - 11,000 / μL

✓ ESR (Erythrocyte Sedimentation Rate) $\text{♂} < 15$, $\text{♀} < 20$

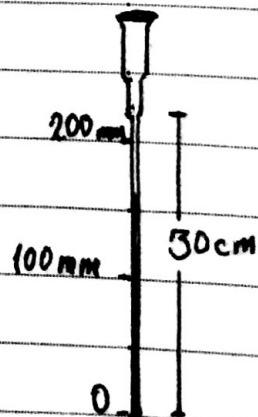
- it depends on density.

because of androgens &
blood loss in menstrual cycle.

→ is the rate at which RBCs sediment in a period of one hour. It is a common hematology test, and is a non-specific measure of inflammation.

→ to perform the test, anticoagulated blood was traditionally placed in an upright tube, known as a Westergren tube, and the rate at which the RBCs fall was measured and

reported in mm/h. (at room temperature).



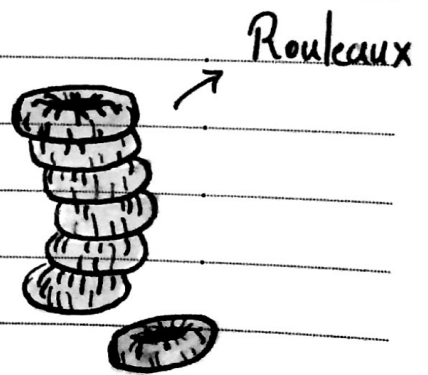
→ Erythrocytes consist mainly of ^{membrane} ~~hemoglobin~~, this gives RBCs a negative charge, creating a repulsion force between them.



But,

when an inflammatory process is present, the high proportion of fibrinogen in the blood, can neutralize these negatively charged RBCs & cause them to stick to each others, forming a structure called "rouleaux", which settle faster, due to their increased density.

↳ increasing ESR



✓ Bleeding time:

- superficial scratch for capillaries ⇒ finger / earlobe / wrist
- normally < 9 mins
- disorders ⇒ hemophilia

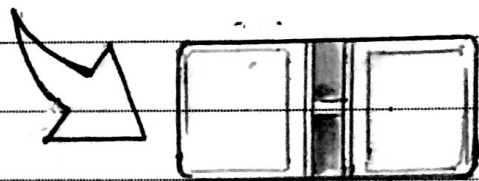
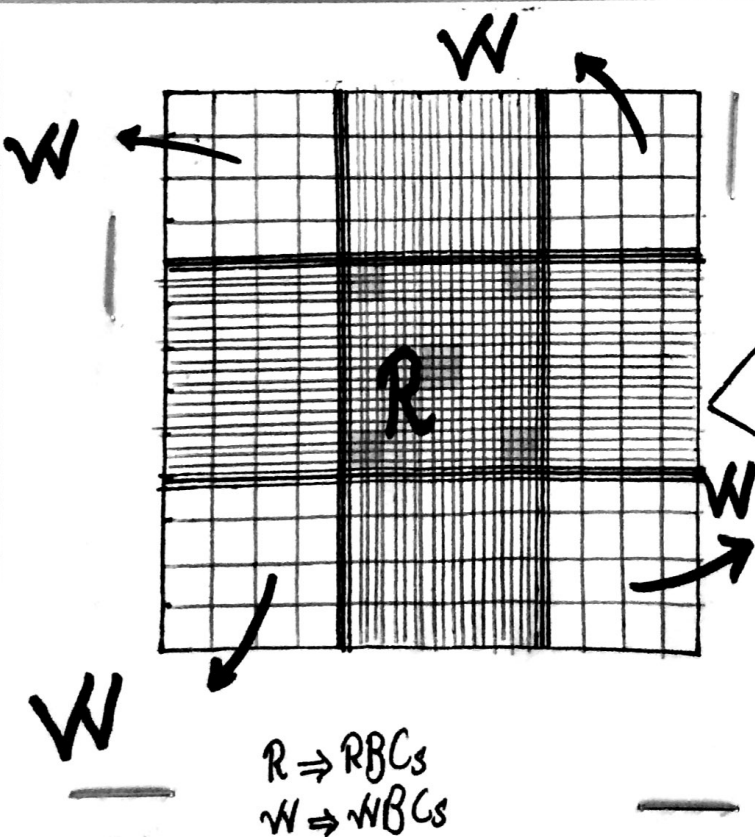
✓ clotting time:

- normally 4-10 mins

If you have done a blood test, you must look for each ^{single} detail in it as a whole test, that is why it's called CBC (complete blood count).

Now, we'll concern about studying erythrocytes & leukocytes, that is why we use a special device (slide) for counting them.

↳ this slide is called Hemocytometer



on the microscope, it will appear like this

usually we use the magnification 10X for WBCs & 40X for RBCs.

WBCs appear dark blue white, RBCs seem to be pink.

- The 4 unnamed squares are not used.
- we use special stains to see either WBCs or RBCs, we can't see both of them at the same time.

Note: ~~the~~

each W square is equal in its size to the R square. (this picture is ~~not~~ accurate in dimensions).

Now, let us discuss the way of counting:

✓✓ For WBCs \Rightarrow We count WBCs in all squares (WBCs dilution factor 20X) then we multiply them with 200 (10 depth) \times 20 (dilution))

✓✓ For RBCs \Rightarrow We count RBCs in 5 squares (RBCs dilution factor 200X) (4 at the 4 corners & 1 in the center) inside the central large square, then we take their average.

shown in pink colour in the picture.

Then:

$$\begin{aligned} & \text{cells counted per square} \times 10 (\text{depth}) \times \\ & 25 \times 200 (\text{dilution}) = \\ & \text{cells counted per square} \times 50000 \end{aligned}$$

By this way, the cells will be measured per μL or mm^3

By Tariq Bushnaq

Good luck...