Erythrocyte Sedimentation Rate (ESR)

An **erythrocyte sedimentation rate (ESR):** is a type of blood test that measures how quickly erythrocytes (**red blood cells**) settle at the bottom of a test tube that contains a blood sample. Normally, **red blood cells** settle relatively slowly. A faster-than-normal rate may indicate inflammation in the body.

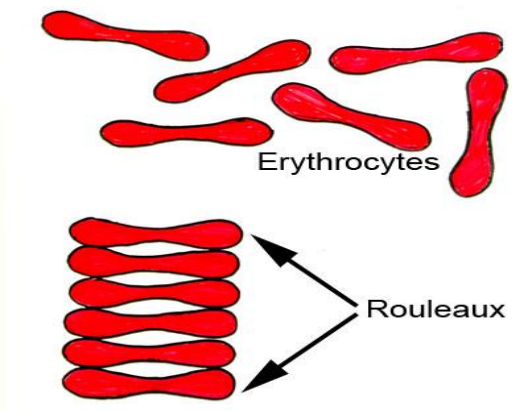
Objective: To calculate the rate at which the blood cells (**RBC**) sediment to the bottom of the tube. It is measured in **mm/ hr**.

Inflammation causes erythrocytes (**red blood cells**) to stick together and form clumps. These clumps are heavier than normal red blood cells. So, if there is **inflammation**, the red blood cells will clump together and fall quickly to the bottom of the tube. The red blood cells will settle more slowly if there is **no inflammation**.

After some time, a clear liquid (**plasma**, which has **no red blood cells**) will form at the top of the tube. The ESR measures the height of the column of plasma at the top of the tube after one hour.

- A **low ESR** means few cells have settled.
- A **high ESR** means a lot of cells have settled, which can suggest inflammation.

1) They form rouleaux.
2) Sinking of the rouleaux.
3) Packing of the rouleaux at the bottom of the tube.



Procedure: Two methods are available:

1. **Wintrob** or **micro method**
2. **Westergren method** (**Macro method**). Using a tube of 30 cm in length with a graduation extending over the lower 20 cm

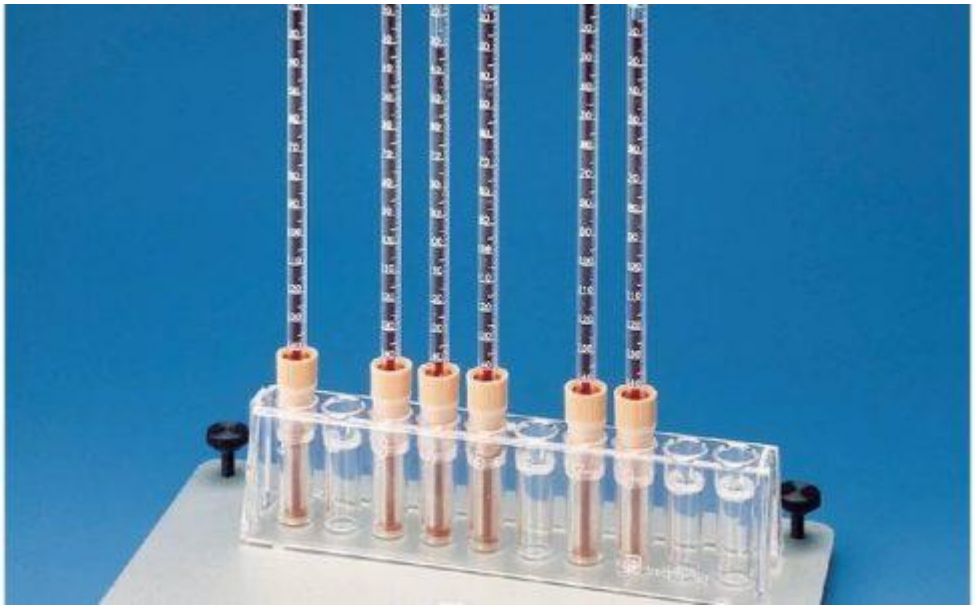
Westergren method:

1. Fill the tube with anticoagulant venous blood.
2. Placed the tube in its rack vertically for one hour.
3. The ESR was obtained by calculating the distance traveled by the RBC column during this hour.

ESR is measured in millimeters per hour (mm/hr). The normal values are:

- 0 to 15 mm/hr in men
- 0 to 20 mm/hr in women

*Note anticoagulant (**trisodium citrate**).





ESR: - Increased normally in Old age and pregnancy

Abnormally increased in Acute and chronic infection, Rheumatoid arthritis, Anemia, and Cancer.

ESR: - It decreased normally in newborn infants and abnormally decreased in allergic conditions and polycythemia.