

# Erythrocyte sedimentation rate (ESR) and hematocrit (HCT)

---

# Objectives

---

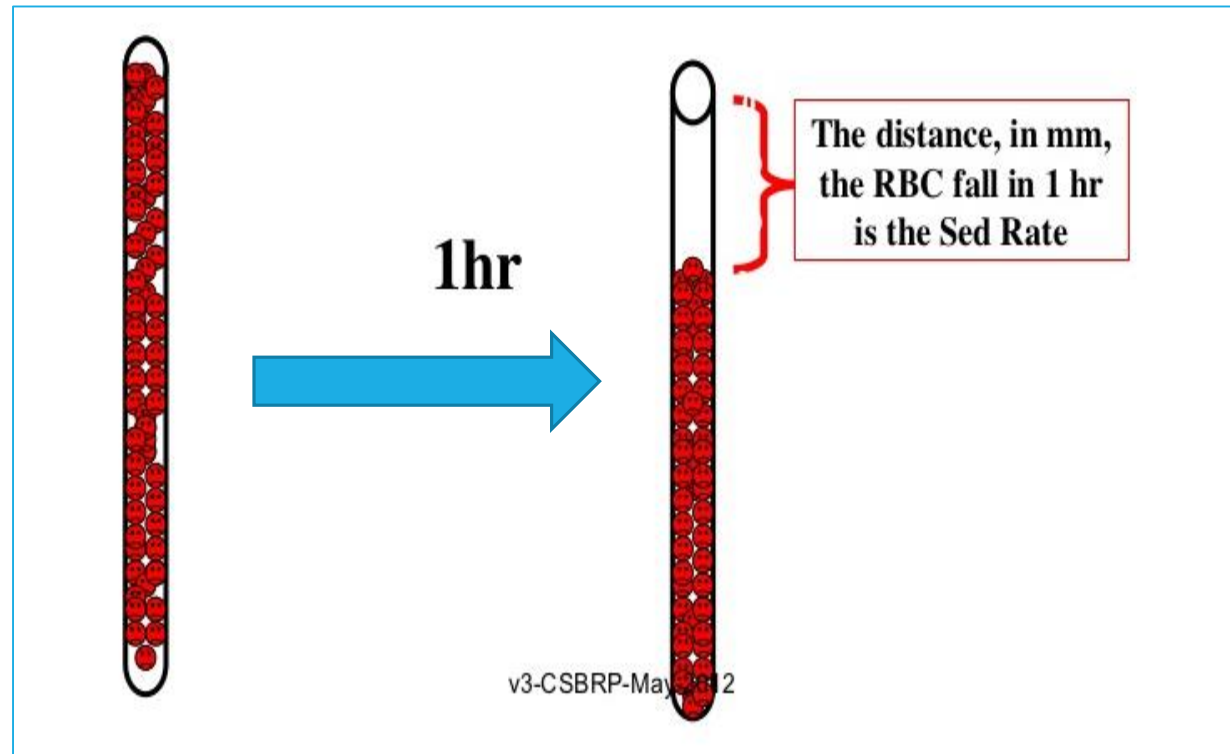
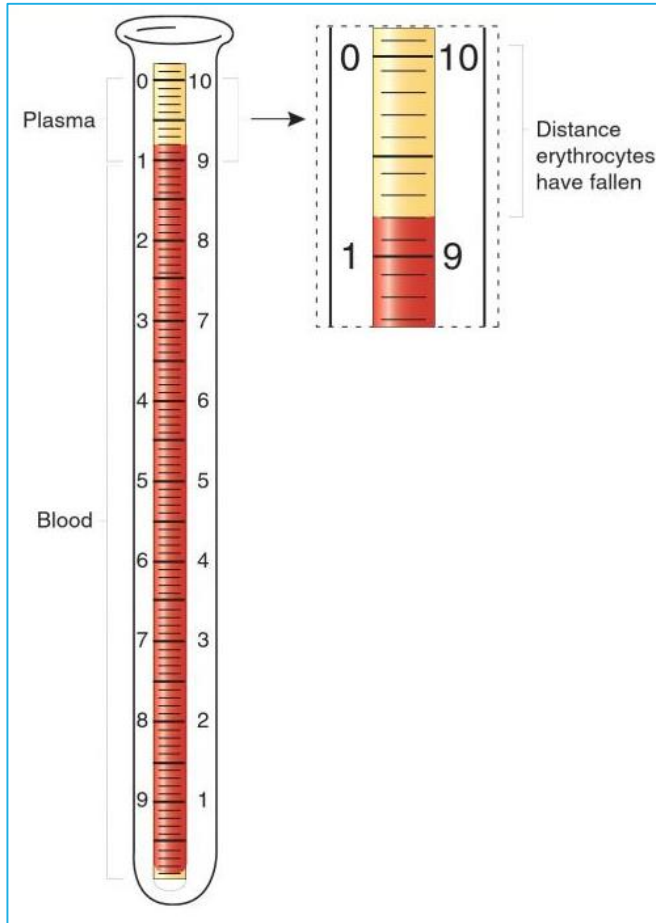
- 1) Determination of erythrocyte sedimentation rate (ESR).
- 2) Determination of hematocrit (HCT).
- 3) To assess the condition of a patient by such tests.

# Erythrocyte Sedimentation Rate (ESR)

---

- ESR is the mm of plasma separated per hour.
- It is used clinically as a non-specific screening test to:
  - Detect the presence of infection in the body **in general**.
  - Monitor the status of chronic inflammatory disease such as rheumatoid arthritis.
- ESR is not diagnostic of any particular disease, but rather is an indication **that a disease process is ongoing and must be investigated**.
- It does not tell the health practitioner exactly where the inflammation is in the body or what is causing

# Erythrocyte Sedimentation Rate



# Principle

---



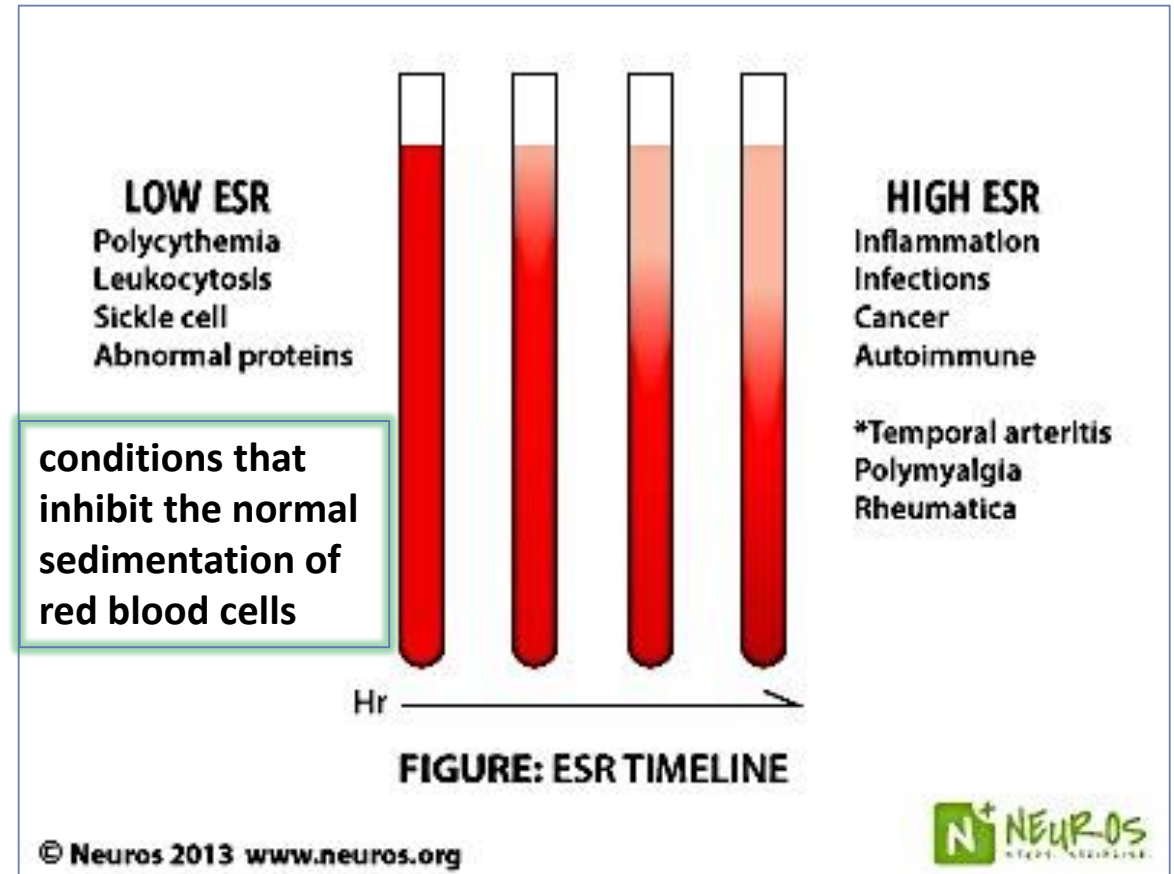
- In this technique, anticoagulated whole blood are allowed to sediment under the effect of gravity, using a narrow vertical tube called Westergren's tube.
- This test is based on the fact that inflammatory and necrotic processes cause an alteration in **blood proteins**, resulting in an **aggregation of red cells**, which make them heavier and more likely to fall rapidly when placed in a special vertical tube.
- The length of the column of clear plasma at the top is noted at the end of **1 hour**.

# Results

## Normal range

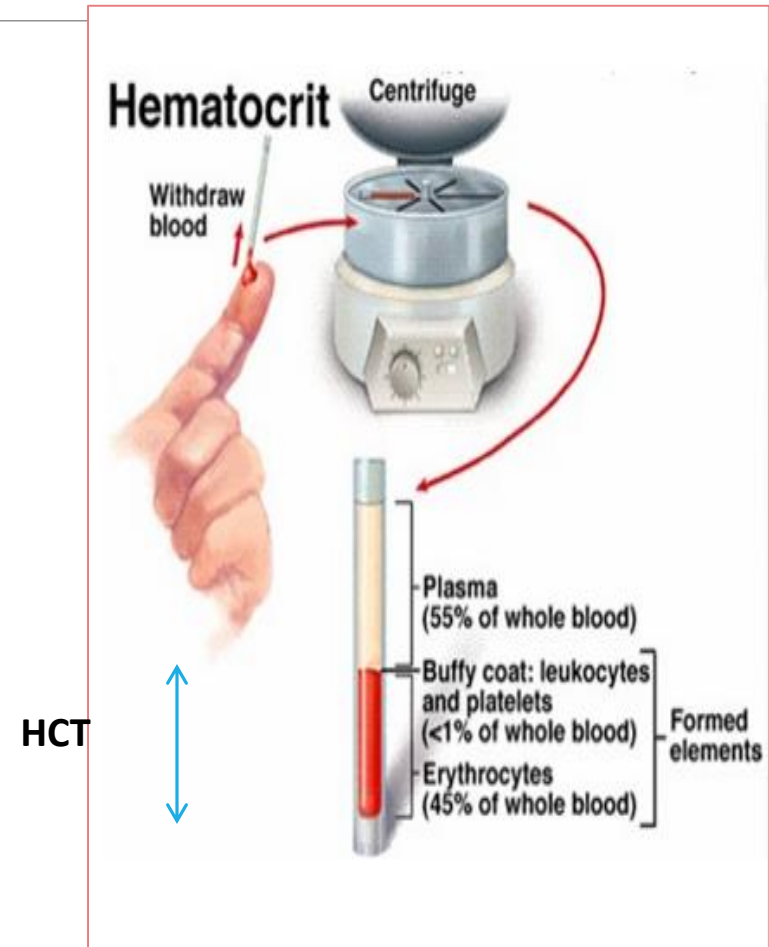
**Men → 0 - 5 mm/ hr**

**Women → 0 - 10 mm/hr** [They tend to have a higher ESR, and menstruation and pregnancy can cause temporary elevations ]



# Hematocrit (HCT)

- *HCT or packed cell volume (PCV)* is the volume percentage (%) of RBCs in blood
- It is used as a **simple screening test for anemia.**
- Blood is collected in heparinized *capillary tube*, which is then sealed, centrifuged and the red cell volume expressed as a percentage of the whole blood.



## Calculation:

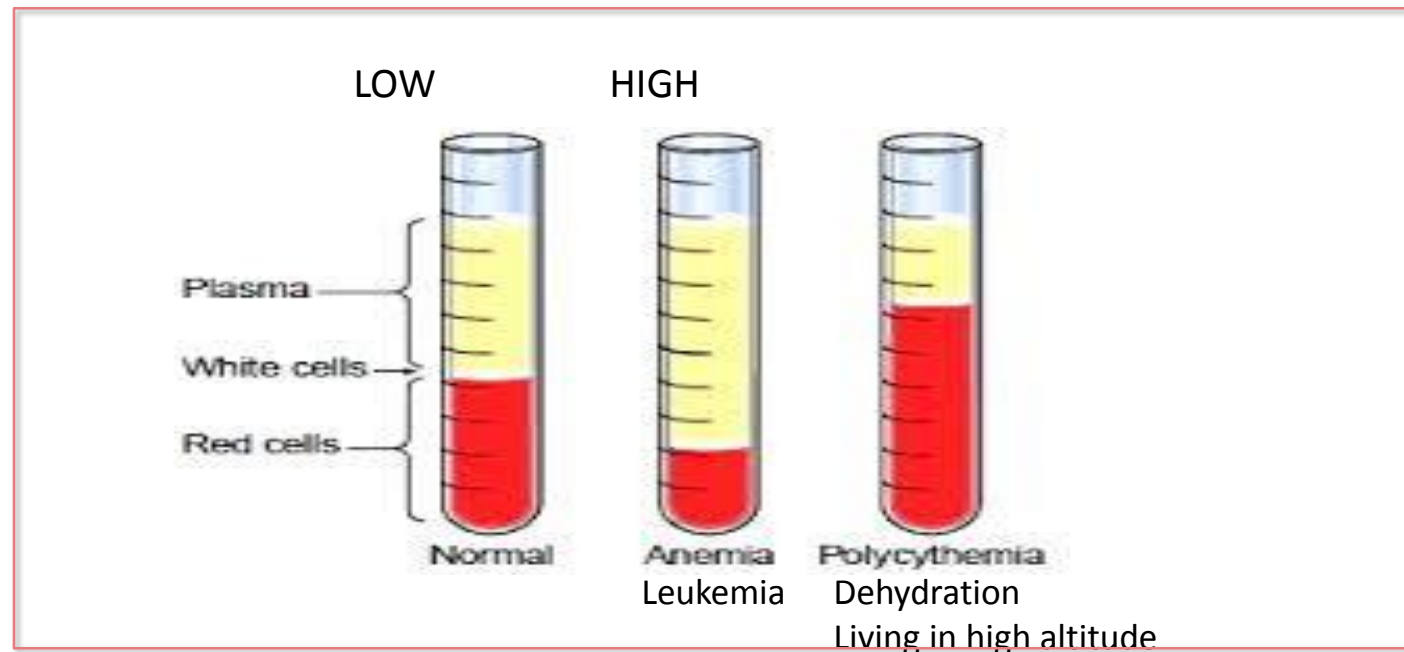
$$\text{HCT} = \frac{\text{Length of column of RBC}}{\text{Total length of blood component}} \times 100$$

---

## Normal ranges:

Male: 40.7 - 50.3%

Female: 36.1 - 44.3%





# Animation

---

[https://www.youtube.com/watch?v=ow\\_SENCieAw](https://www.youtube.com/watch?v=ow_SENCieAw)