

## BCH 471

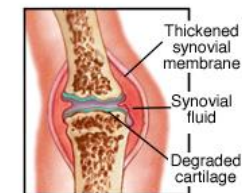
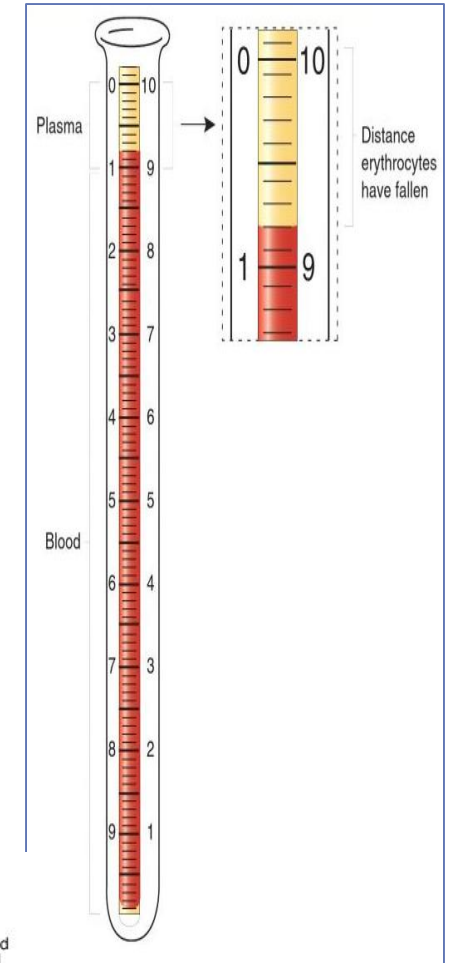
Erythrocyte Sedimentation Rate (ESR)  
and Hematocrit (HCT)

# 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.



# 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.

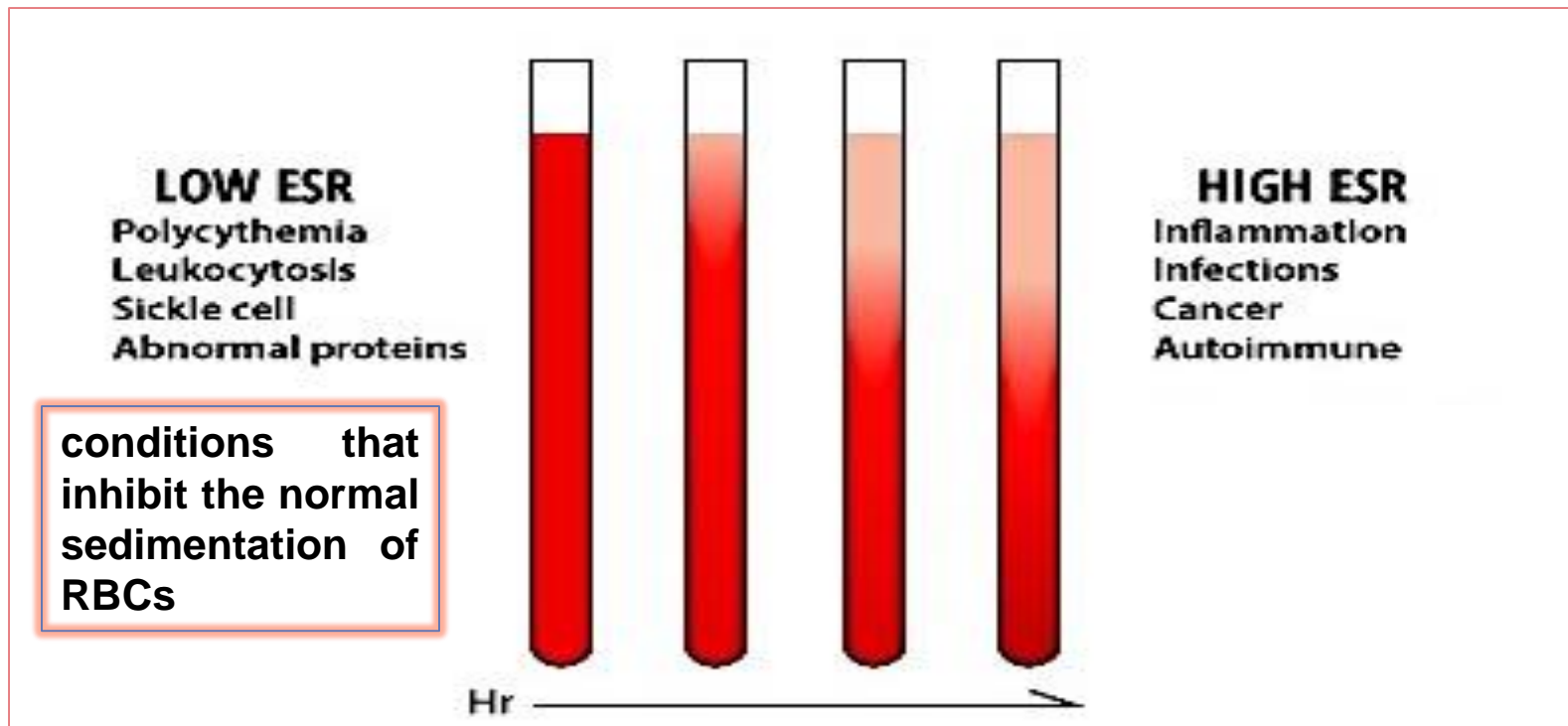
- This test is based on the fact that inflammatory and necrotic processes cause an alteration in blood proteins, resulting in an **aggregation of RBCs, which make them heavier** and more likely **to fall rapidly** when placed in a special vertical tube.
- The length of the column of **clear plasma** at the top is noted at the end of **1 hour**.

# Results

## Normal range

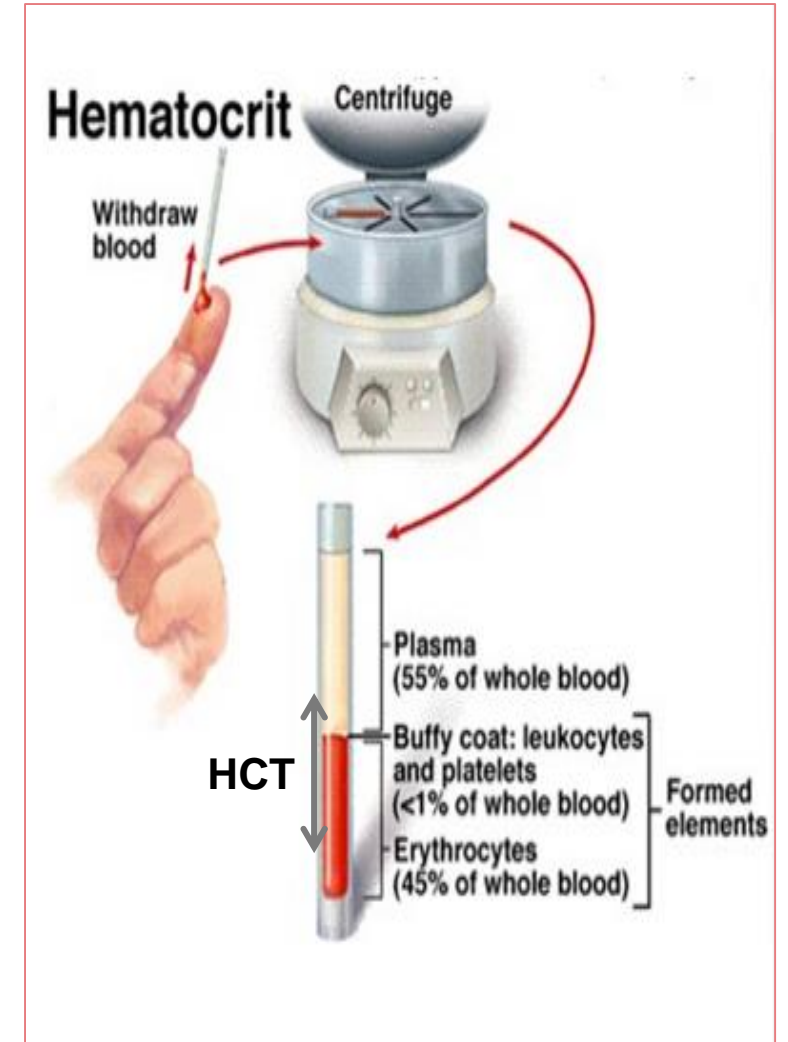
**Men** → 0 - 5 mm/ hr

**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%

