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## BCH 471

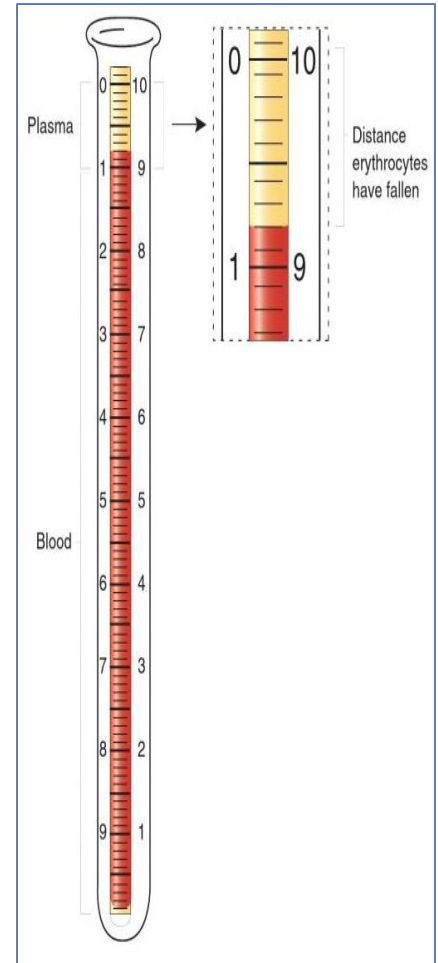
Erythrocyte Sedimentation Rate (ESR)  
and Hematocrit (HCT)

# 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.

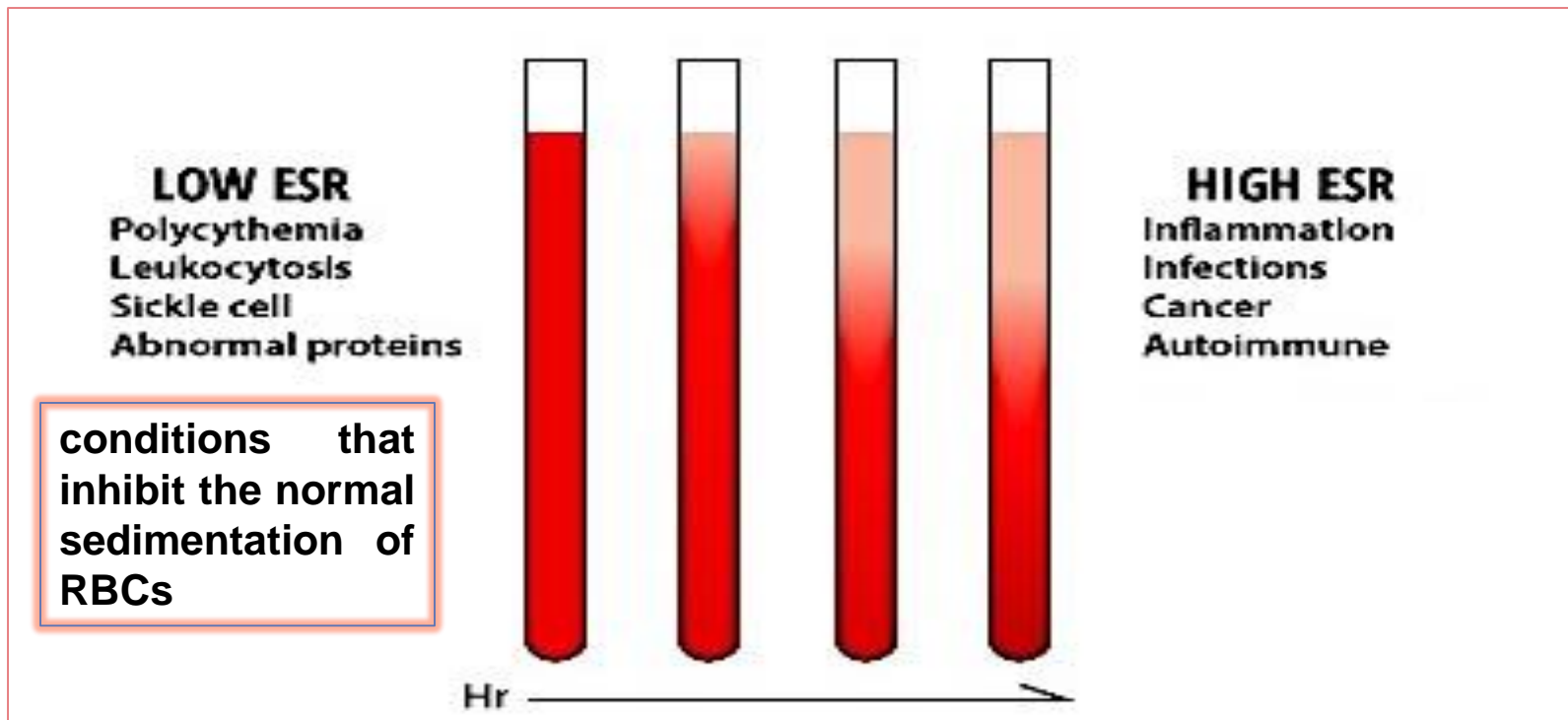
- This test is based on the fact that inflammatory and necrotic processes cause an alteration in blood proteins, resulting in an aggregation of RBCs, which make them heavier and more likely to fall rapidly when placed in a special vertical tube.
- The length of the column of **clear plasma** at the top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

# Results

## Normal range

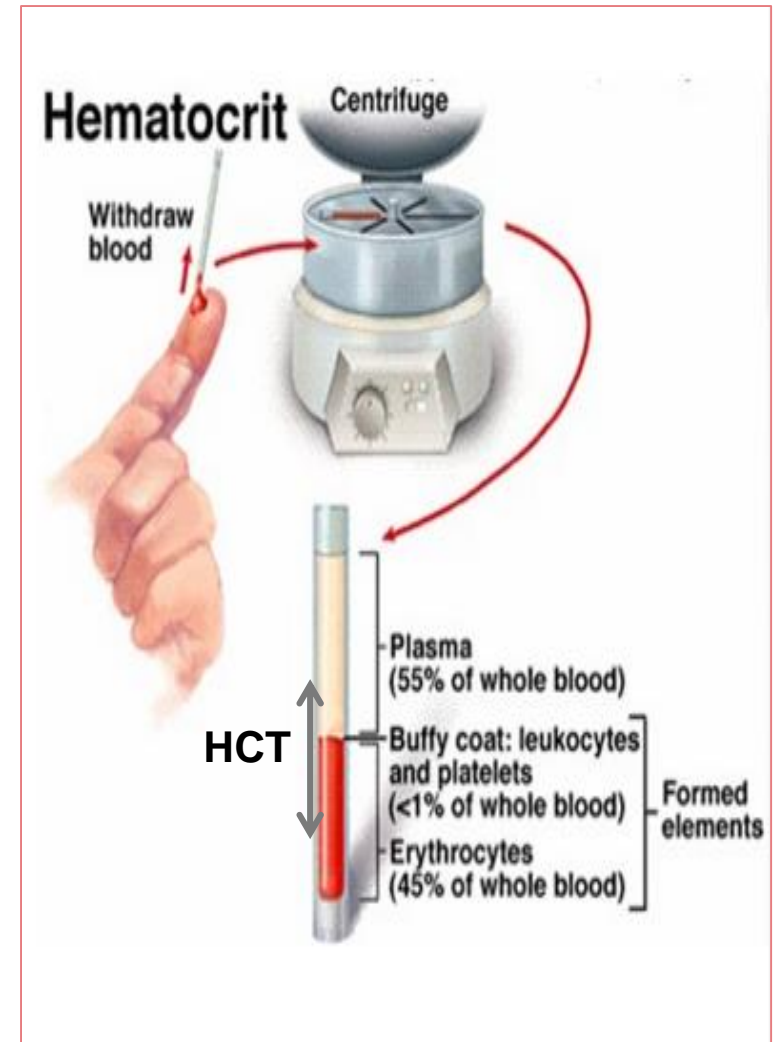
**Men** → 0 - 5 mm/ hr

**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%

