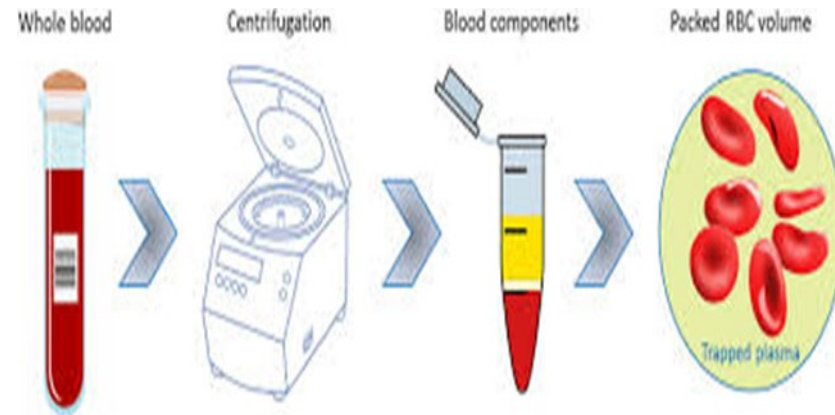


Basra University – Pharmacy College  
Practical Physiology  
HEMATOCRIT / PACKED CELL VOLUME (PCV)  
2nd Sem , 14-15 April 2024



Lecturer

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# Hematocrit / Packed Cell Volume (PCV)

- Packed cell volume (PCV) refers to the percentage of cellular elements ( Red blood cells RBCs, White blood cells WBCs, and platelets ) in the whole blood.
- The value is expressed as a percentage %.
- **Clinically**, it is the most accurate and simplest of all tests in clinical hematology for detecting the presence and degree of anemia or polycythemia.

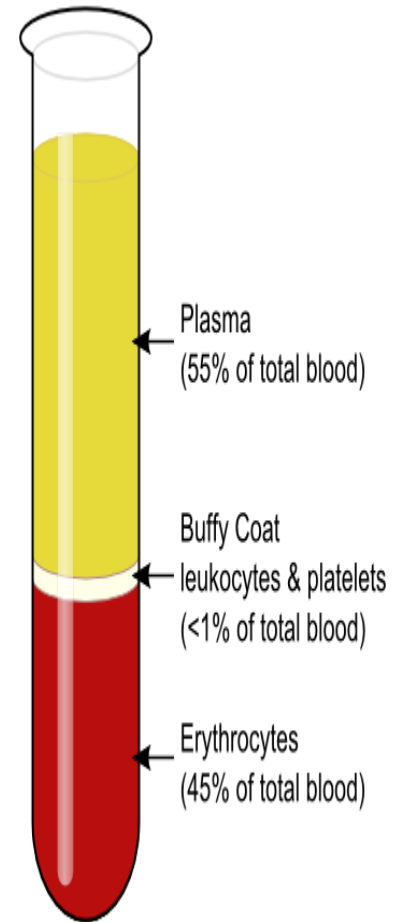
HOW IS A HEMATOCRIT RUN?



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# Packed cell volume (PCV) principle

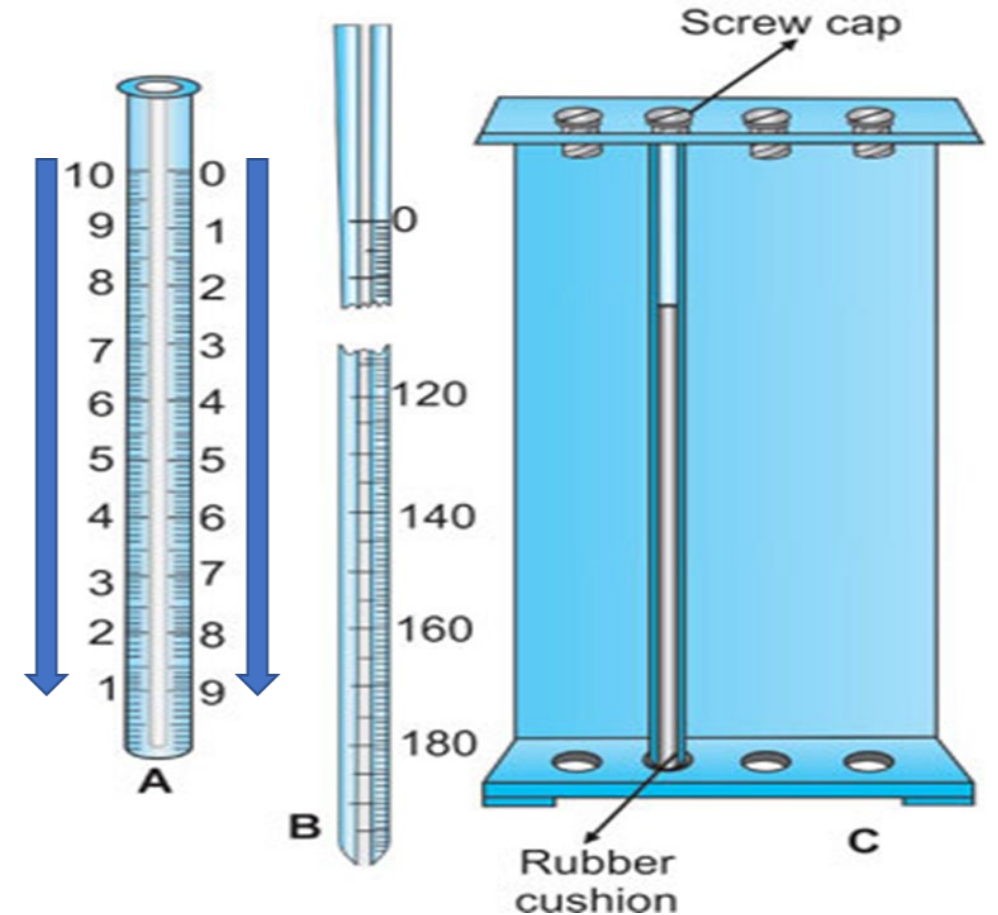
- Since the volume of white blood cells (WBCs) and platelets is very less, the packed cell volume PCV value is considered equivalent to the volume of packed red cells or it is called hematocrit (Hct) value.
- . For example, a packed cell volume (PCV) of 40% means that there are 40 milliliters of cells in 100 milliliters of blood



# APPARATUS AND MATERIALS

## A / WINTROBE'S method

It is graduated 0 to 10 cm from above downwards on one side (for erythrocyte sedimentation rate ESR) and 10 to 0 cm on the other side (for hematocrit Hct/ packed cell volume PCV) test.



## B/ The microhematocrit method

- Microhematocrit tube(capillary tube):

- ✓ Heparinized tubes are red coded (sodium or ammonium heparin).

- ✓ Non-heparinized are blue coded

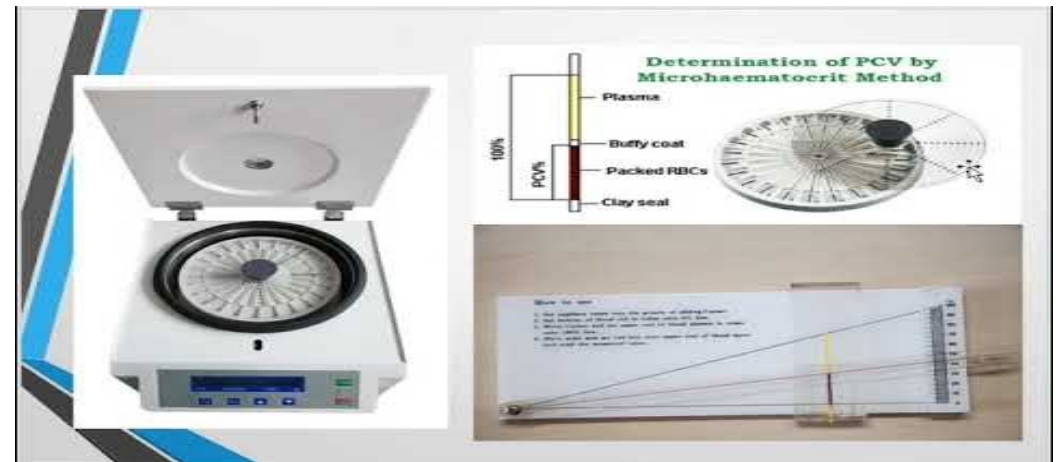
- ✓ 75 mm in length ,1 mm in diameter

- Blood sample.

- Clay

- Microhematocrit centrifuge.

- Packed cell volume (PCV) reader



## For the microhematocrit method:

- Fill a Hematocrit (heparinized) tube ( $\frac{3}{4}$  full) with blood sample.
- Seal the opposite end into a clay sealant 3-4 times .
- Place the capillary tube in micro centrifuge, with plug end to the outside and centrifuge in 5min. at 10,000 R.P.M. Following centrifuge three layers will be produced:

- ✓ Red Blood Cells are packed in the bottom .
- ✓ The Buffy Coat (WBC + Platelets) in the middle .
- ✓ The yellowish plasma on the top .



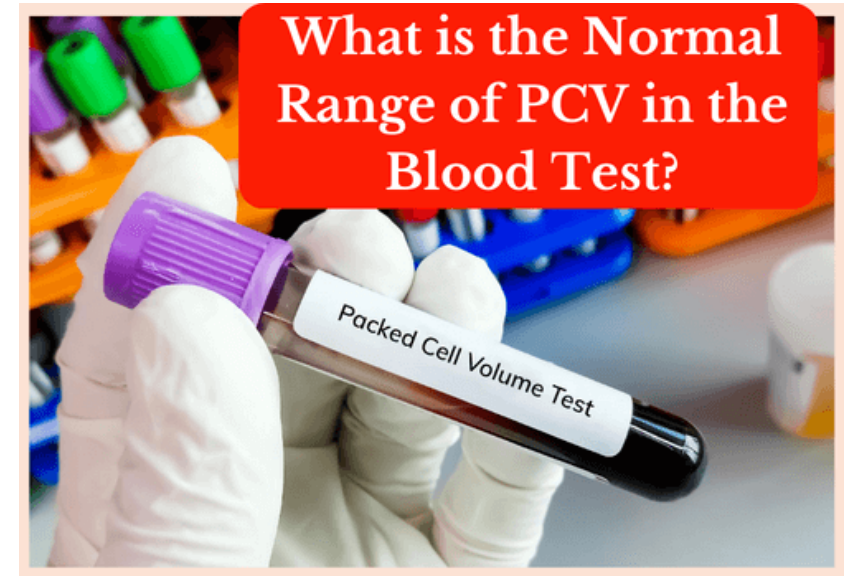
# Measuring the packed cell volume PCV layer using PCV reader



- The PCV layer is measured using PCV scale.
- Place the bottom of the RBCs column exactly on the base line of the reader.
- Move the holder until the top of the plasma layer exactly 100%.
- Move the microhematocrit ruler till the line passes across the top of the RBCs layer.
- The reading facing the microhematocrit tube holder is the reading of the PCV value.

# Clinical significance of PCV

- The normal values of the packed cell volume PCV:
  - ✓ Male is about 42% - 52%
  - ✓ Female is about 37% - 47%
  - ✓ Children 30% - 44%
- The PCV value is increased in polycythemia.
- It is decreased in anemia.





# References

- ❑ A TEXTBOOK OF PRACTICAL PHYSIOLOGY
- ❑ A TEXTBOOK OF ANATOMY & PHYSIOLOGY FOR NURSES AND ALLIED HEALTH SCIENCES