Medical Physiology Laboratory. Lab. (3)

Packed Cell Volume PCV

The packed cell volume (PCV) or determination of Hematocrit (Hct) is the measure of the ratio of the volume occupied by the red cells to the volume of whole blood in a sample of capillary or venous blood. The ratio is measured after appropriate centrifugation and is expressed as a decimal fraction. It is the most accurate and simplest of all tests in clinical hematology for detecting the presence and degree of anemia or polycythemia.

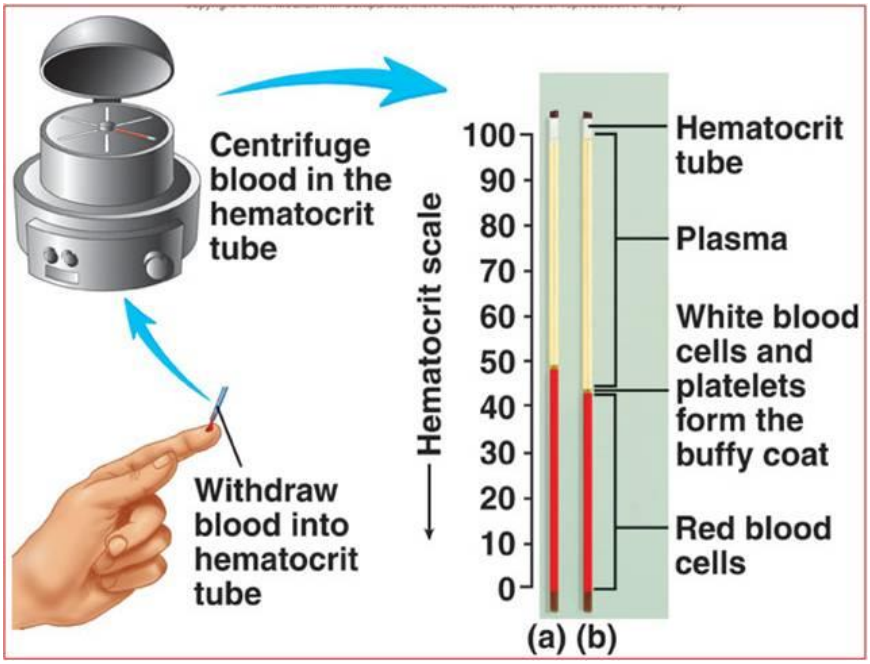
Materials and Method

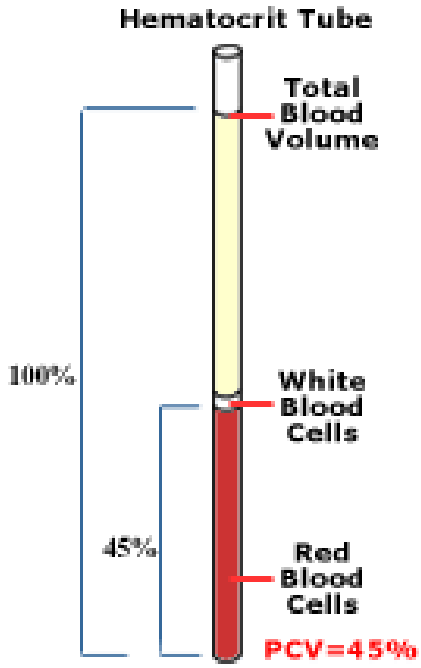
- Microhaematocrit tube (capillary tube) 75mm in length and 1mm in diameter which contains heparin and show a red ring at the end of the tube.
- Microhaematocrit centrifuge device.
- Plastic seal to seal one end of Microhaematocrit capillary tube.
- Microhaematocrit reader.

Procedure:

1. Clean your finger with 70% alcohol and let dry.
2. Prick finger with lancet, near the tip but not too close to the nail. Prick so that blood flows freely.
3. Place the tip of a capillary tube onto a drop of blood on your finger.
4. Seal the tube with clay or wax.
5. Spin the tubes in a centrifuge (5 minutes at 10000 rpm).
7. Using a special reading device to read result (since the capilary tube is not graduated),

Hct % = Height of RBCs **(mm)** / Height of RBCs and plasma **(mm) × 100**





Normal values

Males: 40 %–54 %

Females: 36 %–47 %

Newborns: 55-68 %.

Clinical implications

A lower than normal hematocrit may indicate:

- An insufficient supply of healthy red blood cells (anemia)
- A large number of white blood cells — usually a very small portion of your blood — due to long-term illness, infection, leukemia, lymphoma or other disorders of white blood cells.
- Acute kidney disease (lower Erythropoietin production lead to less RBCs production by the bone marrow).
- Pregnancy may lead to women having additional fluid in blood. This could potentially lead to a small drop in hematocrit levels

A higher than normal hematocrit may indicate:

- Abnormal increase in red blood cells (erythrocytosis)
- A disorder, such as polycythemia vera that causes your body to produce too many red blood cells (it may rise to as high as 70 %).
- At higher altitudes, there is a lower oxygen supply (hypoxia) in the air and thus hematocrit levels may increase over time.
- Lung or heart disease — if the body senses low oxygen levels, it will make more red blood cells in an effort to increase the amount of oxygen in the blood
- Dehydration.
- Burn(due to loss of plasma)