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College of Health and Medical Techniques
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Practical Physiology
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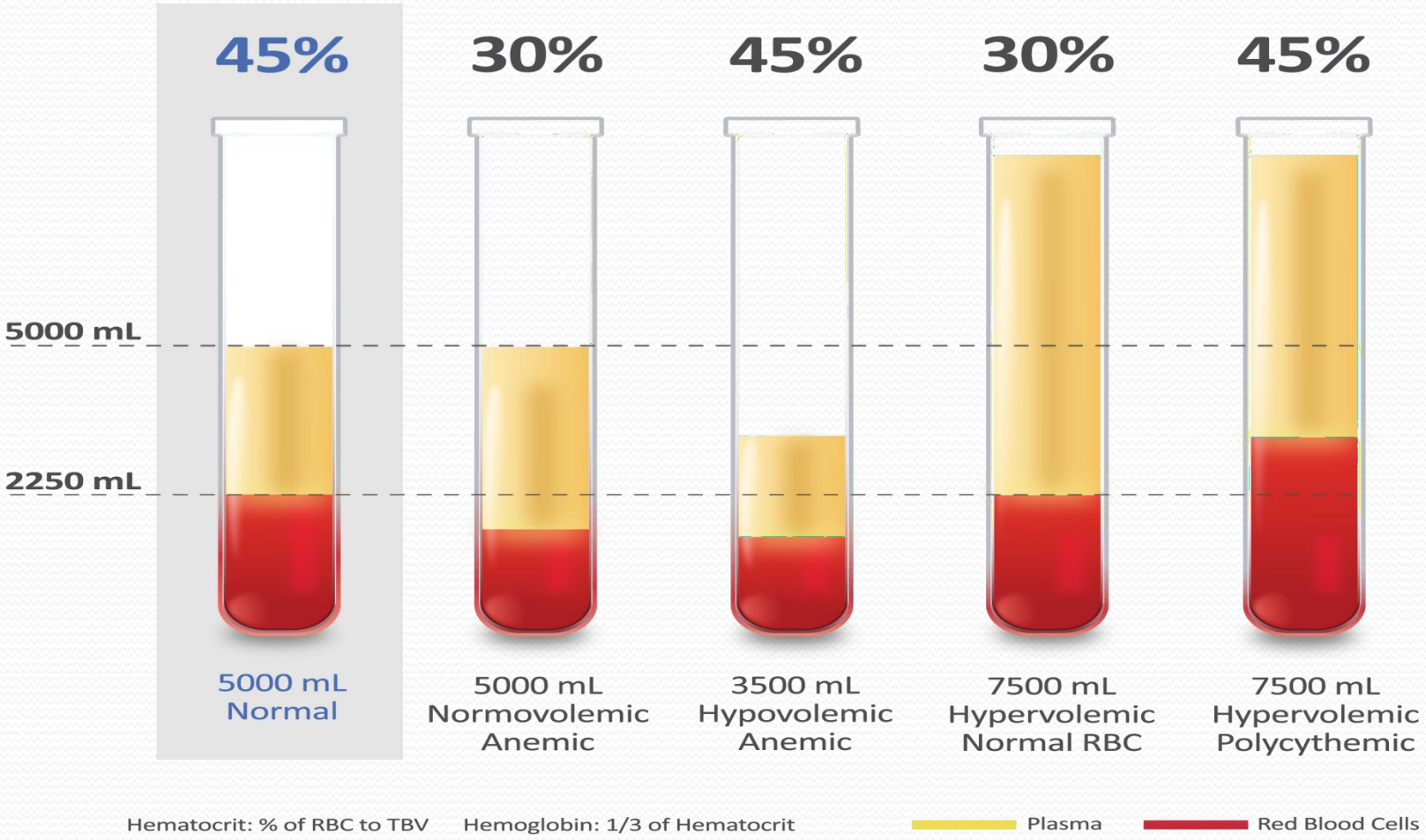
Hematocrit (Ht or HCT) or Packed cell Volume (PCV)

- ✓ packed cell volume (PCV) is the proportion of blood volume that is occupied by red blood cells.
- ✓ Or The PCV is the measurement of relative mass of red cells presentin sample of whole blood
- ✓ The increase in PCV value means increase the number of red blood cells per unit volume of the suspension

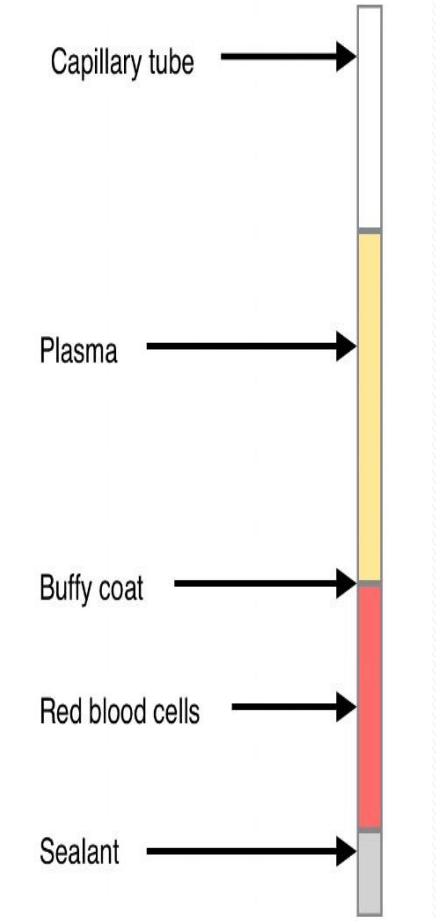

45%
30%
45%
30%
45%
5000 mL
2250 mL
5000 mL
Normal
5000 mL
Normovolemic
Anemic
3500 mL
Hypovolemic
Anemic
7500 mL
Hypervolemic
Normal RBC
7500 mL
Hypervolemic
Polycythemic
Hematocrit: % of RBC to TBV
Hemoglobin: 1/3 of Hematocrit
Plasma
Red Blood Cells

In a centrifuge blood is separated into three layer including:

1 -The mass of the erythrocytes at the bottom which is referred to as packed corpuscles volume (P.C.V.)

2-White or gray layer of leukocytes and thrombocytes immediately above the red corpuscles mass that referred to as the buffy coat.

3-The blood plasma.



Decreased PCV

- A decreased PCV reflects a low number of circulating red blood cells and is an indicator of a decrease in the oxygen-carrying capacity or of over hydration.
- Examples of conditions causing a low hematocrit (anemia) include
- bleeding
- kidney disease
- vitamin-B12 deficiency
- Hemolysis
- Bone marrow disorders such as leukaemia , lymphoma
- Some medicines– including chemotherapy
- pregnancy.

PCV Test Normal Range

- **The values of the PCV test normal range are:**
- **Between 35% - 48%**
- **The range of new born is 53%-65% while children is 30%- 43%**
- **The range for females is 35.5 %- 44.9%, and for males it is 38.3%- 48.6%**
- **Low PCV in blood test results is less than 30%, and High PCV is more than.50%**

Increased PCV

- A increased PCV may reflect an absolute increase in the number of erythrocytes, or a decrease in plasma volume, in conditions such as
- Severe dehydration – e.g. in case of burns, diarrhea or excessive use of diuretics
- Erythrocytosis – excessive red blood cell production
- Polycythemia vera – abnormal increase of blood cells
- Hemochromatosis – an inherited iron metabolism disorder

Apparatus and reagent

- Microhematocrit centrifuge.
- Whole blood in heparin or EDTA tube
- Microhaematocrit (capillary(
- tubes
- Plasticine clay
- Microhaematocrit reader

Procedures

1.Fill hematocrit tube to about three-fourth of its length

EDTABy sample

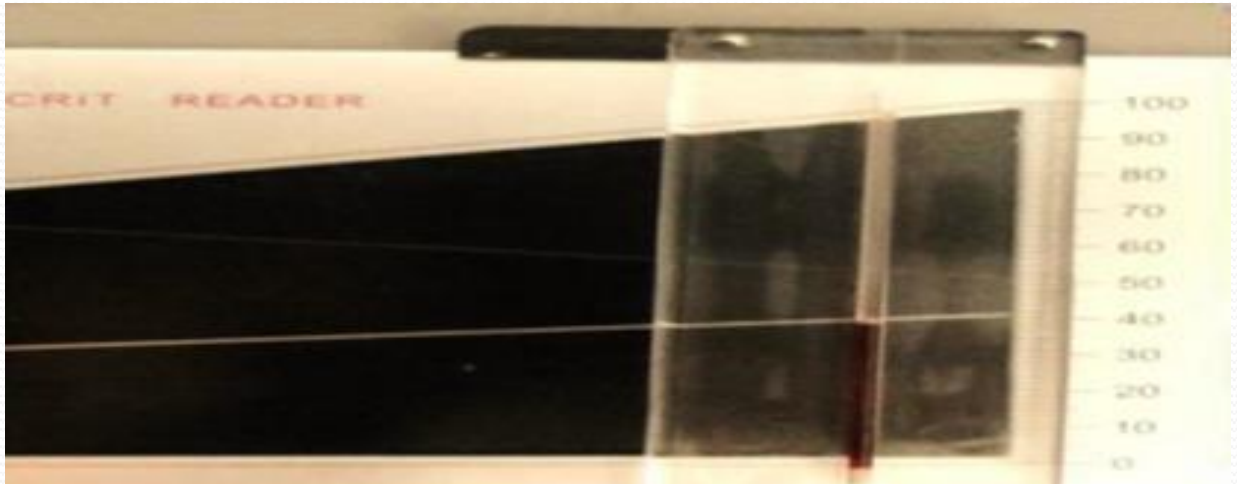
Or by lancet

2. Place hematocrit tube the "non-blood" end of the tube and push the opposite end into a clay sealant 3-4 times (clay length about 1 cm(

3.Check there is a sufficient plasticine .plug

4.Fill 2 tubes and place them opposite each other in the centrifuge. This is to balance the centrifuge; every tube must have another tube opposite it. Place the plasticine plug end of the tube against the rubber (outer) edge to stop the contents spilling out when spun(3 minutes at 15,000;5minutes at 10,000).

- Place the capillary tube onto the haematocrit reade Adjust the tube on the slide so that the top of the pleistocene is level with the bottom line)(0%)·
- Move the slider to the top of the plasma fraction is level with the topline) .(100%)
- Use the adjuster on the left to align the middle line with the top of the red cells. Read the PCV from the right hand side scale.



Whole blood form after centrifugation