Physiology Practical

Cell	Normal Range
RBC	Men : 4.5 – 6.5×10^12/L Women : 3.8 – 5.8×10^12/L
WBC	4 - 11×10^9/L
Platelets	150 - 400×10^9/L

- Erythrocyte Sedimentation Rate (ESR) : is the rate at which packed RBCs (without plasma) settle down in one hour .

  Normal Range is [0 – 7 mm/hour] , > 7 means that there is an inflammation .
  High ESR is triggered by inflammation causes , malignancy , pregnancies .

- Bleeding Time : [2 – 7 minutes]
- Clotting Time : [3 – 10 minutes]

  Hemophilia : is a genetic disorder that impair the body's ability to clot .
  There are two type :
  1- Hemophilia A (deficiency in factor 8)
  2- Hemophilia B (deficiency in factor 9)

  Bleeding Time is increased by using anticoagulants such as (Heparin , Warfarin)

Name	Equation	Normal Range	Unit
MCV (Volume or Cell Size)	PCV×10/RBC	78 - 98	Fl.
MCH (Hemoglobin)	Hgb×10/RBC	27 - 32	pg
MCHC (Hgb Conc.)	Hgb×100/PCV	30 - 35	g/dl.
PCV (Haematocrit)	Given in the Question	Men : 0.40 – 0.45 Women : 0.35 – 0.47	--

Hgb : Hemoglobin

- MCV , MCH , MCHC : Determines the type of anemia .

- If all of these values are normal , but have low Hgb or small amount of RBCs then we have blood loss anemia or aplastic anemia .

  Aplastic Anemia : is a condition where bone marrow does not produce sufficient RBCs and it doesn't cause a decrease in these values .

- If all of these values are decreased then it's an iron deficiency anemia (microcytic hypochromic anemia) .

- If MCV is decreased then it's also microcytic hypochromic anemia . due to iron deficiency .

- If MCV is increased then it's megaloblastic anemia (macrocytic anemia) due to Vit. B12 & Folic acid deficiency .

Blood Groups

- The most common blood group is O , and the rare blood group is AB .

- There are 4 blood groups : A , B , AB , O
  and 2 rhesus blood groups : Positive (+) & Negative (-)

- The Golden Rule : Positive (+) can't give Negative (-) .
  but Negative (-) can give Positive (+)

Leukocytes (WBCs)

Cell Type	Occurrence in blood	Size	Anatomy	Function
Neutrophils	40-70% (62%)	10-16um	nucleus 3-7 lobes, Pale pink cytoplasmic granules , deep purple nucleus	Increases in acute inflammation , first defense line
Eosinophil's	1-4% (2.3%)	12-18um	2 lobes nucleus, coarse red granules	Allergy , parasitic infections
Basophils	0-1% (0.4%)	10-14um	Nucleus hidden by large round bluish granules	Same as mast cells , release histamine from granules
Lymphocytes	20-45% (30%)	Small : 5-8 um Large : 9-15um	Pale blue cytoplasm with round nucleus	Tumor & virus infections
Monocytes	4-8% (5.3%)	15-20um	Kidney shaped nucleus	Turn to tissue macrophages & increase in chronic inflammation

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Questions

- Show you a CBC with a ESR over 25 , what does that mean ?
  There is an inflammation
- In which condition the bleeding time is increased ?
  when taking anticoagulants (heparin , warfarin)
- Show you a CBC and everything is normal , but the clotting time is abnormal , what is the problem ?
  Hemophilia A or B
- Find MCV , MCH , MCHC ?
- Give you a CBC and want you to define which type of anemia ?
- Can a person with a blood group of O+ give blood to a O- patient ?
  NO

- If someone blood group is A+ , which type of blood can he donate ? and which type can he take ?

- Which is the common cell in WBCs ?
  Neutrophils

- Which cell in WBCs have two nucleus ?
  Eosinophil's

- Which cell have the smallest size and which is the biggest ?
  Lymphocytes & Monocytes

- Show you a picture of Eosinophil's
  - Type of cell ?
  - Function ?
  - Features ?

REMBER !

- **Sex of the patient .**
- **Average RBCs for men is 5×10^12**
- **Average RBCs for women is 4.5×10^12**

They may give only the PCV and the sex of the patient and ask you for MCV , MCH , MCHC .

Good Luck :)

Mohanned Al - Essa