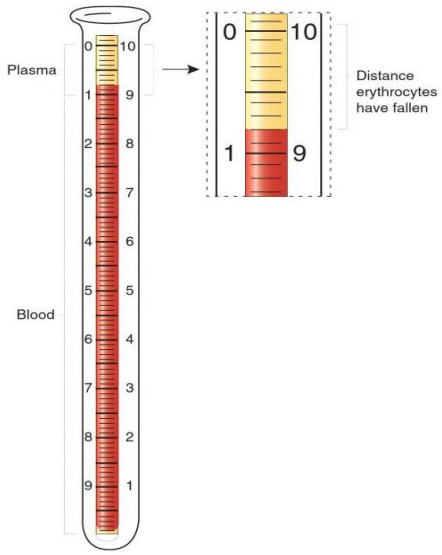
Erythrocyte Sedimentation Rate (ESR)

ESR: Is the distance (in millimeter) that erythrocytes fall per unit of time (usually 1 hour) .if anticoagulant blood is allowed to stand vertically in a tube undisturbed ,the RBCs will gradually fall to the upper portion.



Complete Blood Count (CBC)

Red Blood Cells (RBCs)

- Hematocrit (Hct)
- Hemoglobin (Hgb)
- Mean Corpuscular Volume (MCV)
- Mean Corpuscular Hemoglobin(MCH)
- Mean Corpuscular Hemoglobin
- Concentration (MCHC)
- Red cell distribution width (RDW)
- White Blood Cells (WBCs)
- Platelets
- Mean Platelet Volume (MPV)

RBC

- Transport hemoglobin which carries oxygen from the lung to tissues throughout your body.
- Produced in the bone marrow and stimulated by erythropoietin which is made in the kidneys .

M: 4.20 to 5.80 m/uL

F: 3.80 to 5.20 m/uL

Hemoglobin:

M: 13.0 to 17.5 gm/dL

F: 11.5 to 15.5 gm/dL

Hematocrit : Percentage of the volume of whole blood that is made up of red blood cells. (Hint: Hb x 3)

M: 38 to 54%

F: 34 to 46.5%

MCV = mean corpuscular volume HCT/RBC count= 80-100fL

- small = microcytic
- normal = normocytic
- large = macrocytic

MCH= mean corpuscular hemoglobin Hb/RBC count= 27-34 pg

- decreased = hypochromic
- normal = normochromic
- Increased = hyperchromic

MCHC = mean corpuscular hemoglobin concentration Hb/HCT = 32- 36 gm/dl

RDW = red cell distribution width It is correlates with the degree of anisocytosis or variation in red blood cell width.

Normal range from 10-15%

White Blood Cells (WBC)

WBCs are involved in the immune response

The normal range: 3.5 – 10.5x10^9 K/L

Two types of WBC:

1 - Granulocytes consist of:

- Neutrophils: 50 - 70%
- Eosinophils: 1 - 5%
- Basophils: up to 1%

2 - Agranulocytes consist of:

- Lymphocytes: 20 - 40%
- Monocytes: 1 - 6%

Neutrophilia : an increase in neutrophils

- Bacterial infections
- Tissue destruction (burns)
- Thyrotoxicosis
- Cigarette smoking
- Corticosteroids
- Leukemia

Neutropenia :a decrease in neutrophils

- Decreased bone marrow production
- Medications (ex. dapsone, cephalosporins)
- Post acute infection (HSV, CMV, HIV, EBV)

Eosinophilia: increased eosinophil count

- Parasitic infections
- Allergic conditions and hypersensitivity reaction
- Vasculitis

Eosinopenia

- Sepsis

Lymphocytosis :increased lymphocyte count

- Viral infection(EBV, CMV, HIV, Infectious)
- Leukemia/Lymphoma (CLL)

Lymphopenia : decreased lymphocyte

- Viral infections
- Medication induced
- Autoimmune disorder

Monocytes

Monocytosis

- Pregnancy
- TB
- Syphilis

Monocytopenia

- Acute infection
- Steroids
- Leukemia

Platelets

Platelets/thrombocytes principal function is to prevent bleeding.

The normal range is 150-400 K/UL

Numbers of platelets

Increased (Thrombocytosis)

- Splenectomy
- Inflammation(Reactive)
- Iron deficiency anemia

Decreased (Thrombocytopenia)

- Blood loss
- Splenomegaly
- Medications (antibiotics)
- Viral Infections
- Bone marrow disorder (leukemia)

ABO and Rh Blood Grouping & Typing

Blood Type	Gives	Receives
A+	A+, AB+	A+, A-, O+, O-
O+	O+, A+, B+, AB+	O+, O-
B+	B+, AB+	B+, B-, O+, O-
AB+	AB+	Everyone
A-	A+, A-, AB+, AB-	A-, O-
O-	Everyone	O-
B-	B+, B-, AB+, AB-	B-, O-
AB-	AB+, AB-	AB-, A-, B-, O-

Bleeding time:

is the time interval from oozing of blood after a cut or injury till arrest of bleeding.

The usual time is about 2–6 minutes.

Clotting time:

is the time interval from oozing of blood after a cut or injury till formation of clot.

Normal duration : 3 -8 minutes