Department of Aesthetic and Laser Techniques
Medical Physiology lec5: blood physiology
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Lecture4: Medical Physiology

Blood physiology

BY

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- Blood is a special type of fluid connective tissue that is composed of 8% of the body mass.
- Its properties are:
- Color: bright red in artery & dark red in veins.
- Ph: slightly alkaline Ph(7.35-7.45).
- Viscosity: 3-4 times more viscos than water.
- Volume: about 5-6 liter.

- **Blood Consist of:**

A. Cellular Elements (45%) that includes:

1) Red Blood Cells (Erythrocyte).
2) White Blood Cells (Leukocyte).
3) Platelets (Thrombocyte).

B. Non-cellular elements that include:

- **Plasma (55%)**

Functions of Blood

1. Transport O2 from lungs to body cells and CO2 from body cells to lungs.
2. Transport Nutrients from GIT to body cells.
3. Regulate body temperature and Ph.
4. Platelets and proteins help to repair damaged blood vessels.
5. WBC protect against disease by phagocytosis.

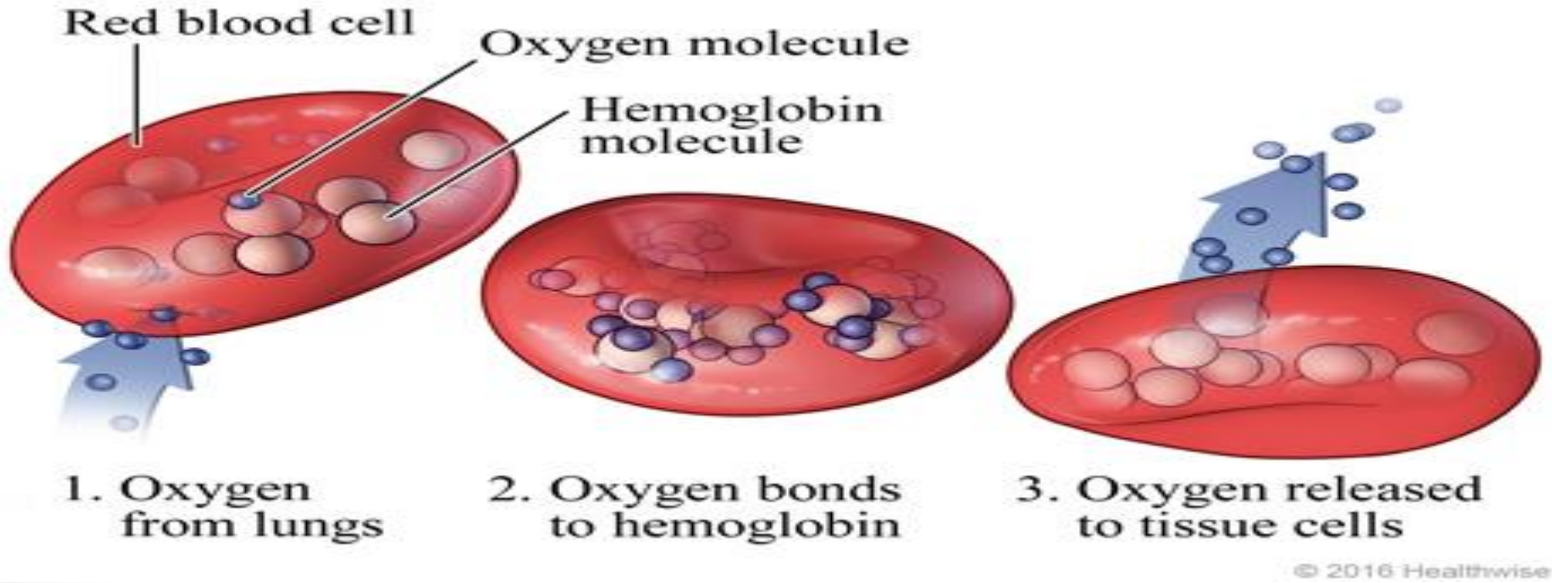
Plasma & Serum

- Plasma is the liquid part of blood made up of 93% water, 7% proteins, and other solutes like glucose , fatty acid…
- **Plasma is all the components of blood, minus the cells.**
- The plasma proteins are albumin, globulins, clotting proteins (prothrombin & fibrinogen)and other proteins (enzymes and hormones).
- **Blood serum** is plasma without clotting proteins (prothrombin and fibrinogen).

Cellular Elements of Blood

- **Erythrocytes (RBCs)**
- The most common type of blood cell ,which are small biconcave disc-shaped cells that arise from the bone marrow and they do not have a nucleus or mitochondria.
- Its containing hemoglobin(Hb) molecules which is iron containing biomolecule that can bind oxygen and it responsible for the red color of blood.
- The whole blood of men contains about 15 gm/dl of Hb , whereas , for women about 14 gm/dl.

- **Function of RBCs :**
- The hemoglobin within the RBCs transport O2 from lung to the tissues and CO2 from tissues to the lung.



Anemia

- Anemia means deficiency of hemoglobin in the blood, which can be caused by either few red blood cells or little hemoglobin in the cells.
- **Types of Anemia**:

a) Iron deficiency anemia.

b) Megaloblastic Anemia that includes:

1. Folic Acid Deficiency Anemia(low intake of folic acid which is necessary for DNA formation and maturation of RBCs.
2. B12 Deficiency Anemia (B12 is necessary for DNA formation of RBCs)

C. Membrane Defects anemia as in hereditary spherocytosis.

D. Hemolytic anemia e.g :autoimmune Hemolytic anemia,

E. Hemoglobinopathies e.g Thalassemia and sickle cell anemia.

F. Aplastic Anemia (bone marrow failure).

G. Blood Loss Anemia after rapid hemorrhage.

➢ Effect of Anemia on Circulation:

1. Decrease the viscosity of blood.
2. Increase the amount of work needed by the heart.
3. During exercise, the oxygenation of the tissues will be reduced.

THANKS