

Ch. 12 Lecture 1

- I. Functions and Components of the Circulatory System
 - a. Two systems:
 - i. Systemic
 - ii. Pulmonary
 - b. Transportation
 - i. We transport O₂/CO₂.
 - ii. Nutrient Transport
 - iii. Waste products from metabolism
 - c. Regulation
 - i. Hormones
 - ii. Temperature
 - 1. Regulation of blood flow to the skin (dilation/constriction)
 - d. Protection
 - i. Blood Clotting (protection)
 - ii. Immune system functions (We won't get into detail in this)
- II. Components
 - a. Cardiovascular System
 - i. Blood Vessels
 - 1. Away: Arteries, oxygenated
 - 2. Towards Heart: Veins
 - 3. Arteries->arterioles->capillaries ->venules ->veins
 - ii. Heart: 4 chambered pump
 - b. Lymphatic System
 - i. Fluid for interstitial space
 - ii. Helps protect from foreign invaders

iii. Lymphatic vessels, lymphoid tissues, lymphatic organs

III. Composition of the Blood

a. Plasma: Fluid Part

i. Full of proteins

1. Primary is Albumin

- a. Creates osmotic/oncotic pressure
- b. Helps keep most water from going into interstitial space
- c. Maintains Blood Volume

2. Globulins

- a. Carry lipids and fat soluble vitamins
- b. Gamma Globulins: ANTIBODIES

3. Fibrinogen

- a. Helps in clotting after it transforms to fibrin

b. "Buffy Coat"

c. Formed Elements

i. Mostly red blood Cells

1. Erythrocytes

- a. Primary function is transport of O₂ and CO₂(30%)
- b. No Nuclei or mitochondria, only cells in body that don't use Oxygen
- c. Only live 120 days
- d. Contain hemoglobin which binds the oxygen/ some CO₂ and also acts as a pH buffer by binding Hydrogen ions
- e. Transferrin: Recycles iron from dead erythrocytes

2. Leukocytes

- a. Do have Nuclei and mitochondria
- b. Granular: Neutrophils, eosinophils, basophils

c. Aggranular: Monocytes and lymphocytes

3. Platelets

a. Smallest

b. No Nuclei

c. Short Life span (5-9 days)

d. Clot blood using fibrinogen

4. Don't worry about that big chart, just basic functions of each type of cell

d. Cell Formation

i. Hematopoiesis

1. Leukopoiesis: White blood cell formation

a. Red bone marrow and lymphoid tissues

b. Regulated by cytokines

2. Erythropoiesis: RBCs

a. Erythropoietin

i. Regulated by Kidneys

ii. When O₂ levels are low, erythropoietin production is increased

iii. Major component of athletic blood doping (AKA Epo)

b. Hepcidin

i. Secreted by the liver, regulation of iron metabolism

c. Don't need to know the diagram ☐

e. Blood Typing

i. Antigens are on the surface of RBC

1. Helps immune system recognize self cells

ii. Antibodies secreted by lymphocytes in response to foreign cells