Circulatory and Respiratory Systems

Chapter 37
Functions of the circulatory system

Transport oxygen, nutrients to cells and waste from the cells

Composed of heart, series of blood vessels, and blood
The Heart

- Myocardium – thick layer of muscle in the wall of the heart
  - Between two layers of connective tissue
- Atrium – upper chamber that receives blood
- Ventricle – lower chamber pumps blood out
Circulation through the body

- **Pulmonary Circulation**
  - Right side of the heart pumps blood from heart to lungs
  - Oxygen poor

- **Systemic circulation**
  - Left side of the heart pumps blood from heart to rest of body
  - Oxygen rich
Circulation through the heart

- Blood flows from atria to the ventricle
- Then ventricle to artery
- Valves keep blood flowing in one direction
Heartbeat

- **Sinoatrial Node** – known as the pacemaker
  - Begins contraction of atria

- **Atrioventricular Node** –
  - Picks up impulse sent by SA node and sends it to ventricles causing them to contract
Blood Vessels

Artery

Vein

Connective tissue

Smooth muscle

Endothelium

Arteriole

Venule

Valve

Endothelium
Continued

- Arteries – Large vessels that carry blood from the heart to the body
  - Carry oxygen rich blood (except Pulmonary Artery)
  - Thick walled
  - Arterioles

- Capillaries – smallest vessels
  - One cell thick, do the work of the circulatory system

- Veins – return blood to the heart
  - Contain valves
Blood Pressure

- **Systolic Pressure**
  - First number
  - Pressure from the arteries when ventricles contract

- **Diastolic Pressure**
  - Second number
  - Pressure from the arteries when ventricles relax

- Typical healthy blood pressure is 120/80
37 - 2 Blood and Lymphatic system

- Blood Plasma – composes 55% of blood
  - 90% water, 10% dissolved gases, nutrients, salts, hormones, enzymes, waste products and plasma proteins

- Plasma Proteins-
  - Albumins and Globulins – transport fatty acids, hormones, and vitamins
  - Fibrinogen – helps clot blood
Blood Cells

Red Blood Cells – 5 million

- Erythrocytes – transport oxygen
  - Hemoglobin – gives blood its red color and carries oxygen
  - Disc shaped
  - Last about 120 days – destroyed by liver and spleen
White Blood Cells outnumbered by RBC 1,000 to 1

- Guard against infection, fight parasites, and attack bacteria
- Engulf, release histones, produce antibodies (lymphocytes)

Platelets – make blood clotting possible in conjunction with plasma proteins
- Cell fragments
Lymphatic system

- A network of vessels and nodes that collect fluid lost by blood (Lymph)
- Help in nutrient absorption
- Moves by osmotic pressure
- Thymus - produce T-cells
- Spleen destroys old blood cells, & contain phagocytes

Superior vena cava

Lymph nodes

Thymus

Thoracic duct

Spleen

Lymph vessels

Lymph nodes
The Respiratory System 37-3

- Function of Respiratory System
  - Exchange oxygen and carbon dioxide between the blood, air and tissue
Structures of the Respiratory System
Gas Exchange

- Occurs between the alveoli and capillaries
Breathing is controlled by the autonomic nervous system – medulla oblongata.