Cardiovascular System

I. Intro.-
- A. Function is the transportation of O_2, CO_2, nutrients, wastes, hormones, etc.
- B. It consists of a pump (heart) and an interconnected loop of arteries, capillaries, and veins.

II. Layers of heart tissue – Heart needs to be stable but also to be able to move freely.
- A. Parietal pericardium
  1. Fibrous protective sac around the heart
  2. Has dense connective tissue that anchors the heart to the diaphragm and the sternum.
- B. Epicardium – smooth outer layer of the heart
  1. Serous fluid lubricates b/w the epicardium and the parietal pericardium and makes it almost frictionless.
  2. Pericarditis – when inflammation occurs b/c there is not enough serous fluid causing painful adhesions that interfere with heart movements.
- C. Myocardium – "muscle heart" – the thickest layer that contains the cardiac muscle that actually contracts.
- D. Endocardium – smooth inside lining of the heart
  1. It is continuous with the inside lining of the connecting blood vessels.

III. Structure of the heart
- A. Heart is a double pump that pumps in unison
  1. The right side pumps blood into the pulmonary circulation
  2. The left side pumps blood into the systemic circulation
- B. Atria – receiving chambers of the heart
  1. Right atrium – receives blood from the body
  2. Left atrium – receives blood from the lungs
- C. Interatrial septum – wall b/w the two atria
  1. fossa ovalis – groove on septum that is a relic of the foramen ovale, a hole in the septum
     - a. foramen ovale, a hole in the septum of the fetus
     - b. allowed blood to cross over to the left side of heart since lungs were not functional
- D. Atrioventricular valves (AV valves)
  1. Right AV valve has 3 flaps (tricuspid valve)
  2. Left AV valve has two flaps (bicuspid valve or mitral valve)
  3. Chordae tendineae – "tendonous cords" or "heart strings"
     - a. AV valves hang limply open when the heart is filling

b. Pressure from filling ventricles push valves shut causing lub sound
c. Chordae tendineae anchor the valves and keeping them from opening into atria.

E. Ventricles – pumping chambers of the heart
1. Left ventricle pumps to the body so much thicker than right which pumps to the lungs

F. Semilunar valves – pulmonary on rt. side, aortic on the left side
1. When ventricles contract, pushes SL valves open
2. Backflow of blood pushes them closed making "dub" sound

G. Valve problems
1. Incompetent valves – Congenital (at birth) or develops later.
a. Allows backflow of blood into atria or ventricles
2. Valvular stenosis – valves become stiff because of repeated endocarditis
a. Backflow of blood heard as heart murmurs.
b. Forces heart to contract more vigorously
c. Weakens heart and leads to heart failure
d. valve replacement done with synthetic valves, chemically treated pig valves, or cryogenically preserved human valves.