

Cardiovascular System

I. Structures of the heart

A. Pericardium: sack that surrounds the heart

1. Pericardial Cavity: serous fluid-filled space between the heart and the pericardium

B. Heart Wall

1. Epicardium: outer layer, tough C.T.
2. Myocardium: middle layer, thick cardiac muscle layer
3. Endocardium: inner layer, smooth epithelium

C. Heart Chambers and valves

1. Atrium: upper chambers
 - a) thin-walled
 - b) receive blood out of heart into arteries
2. Ventricles: lower chambers
 - a) thick-walled
 - b) pump blood out of heart into arteries
3. Atrioventricular valves:
 - a) prevent blood from going back into the atria
 - b) right AV valve = Tricuspid
 - c) left AV valve = Bicuspid (Mitral)
 - d) Chordae Tendinae: little tendons that attach valve flaps to the Papillary Muscles on the inside of the ventricles (they prevent the valve flaps from being pushed back into the atria)
4. Semilunar Valves:
 - a) prevent blood from going back from the arteries into the ventricles
 - b) R semilunar valve = Pulmonary Valve
 - c) L semilunar valve = Aortic Valve

D. Blood flow through the body: see diagram

E. Blood supply to the heart:

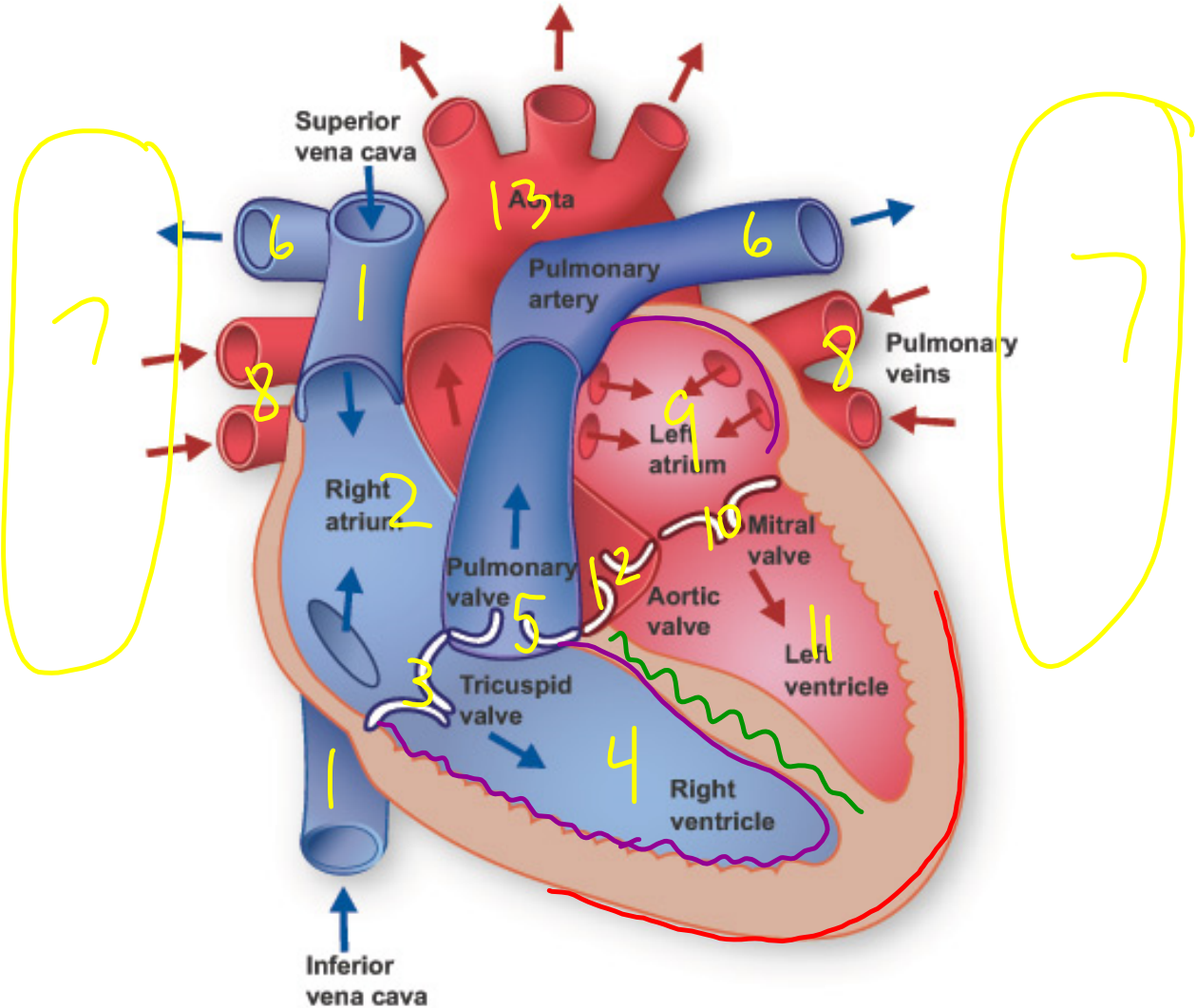
1. Myocardium cells need a constant supply of oxygen
2. Coronary Arteries supply blood to the heart; branch off of the aorta close to the aortic valve
3. Cardiac Veins return blood to the right atrium

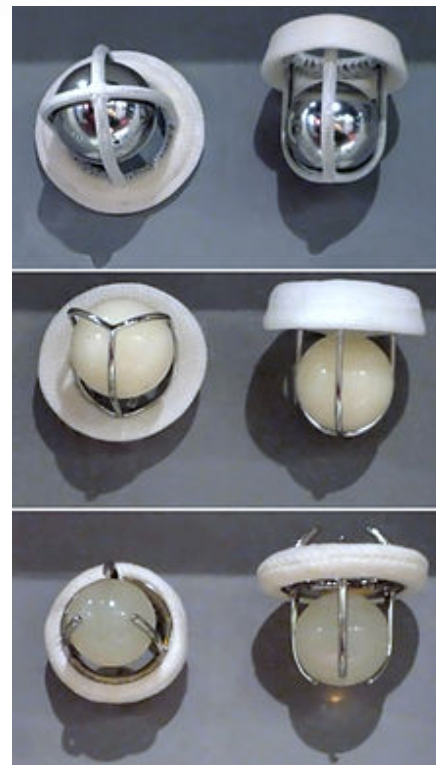
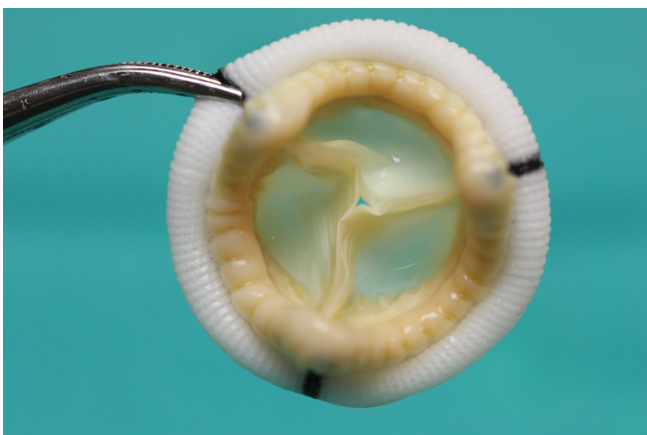
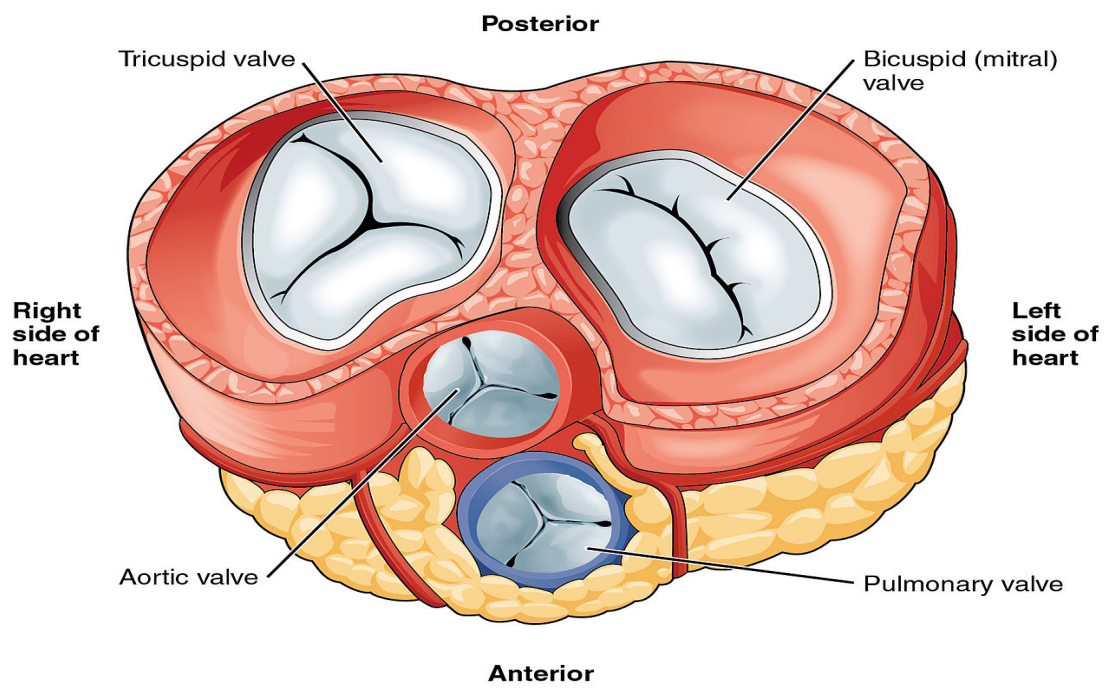
The Function of the Pericardium:
 Protects and anchors the heart
 Prevents overfilling of the heart with blood

Allows for the heart to work in a relatively friction-free environment



The clear tissue being Lifted up by the scalpel Is the pericardium





II. Actions of the heart: Cardiac Cycle

- A. Diastole: ventricles are relaxed and blood pressure is low
- B. Systole: ventricles are contracting and blood pressure is high

III. Heart Sounds

- A. Lub: ventricle is contracting; AV valves are closing
- B. Dub: ventricle is relaxing; Semilunar valves are closing

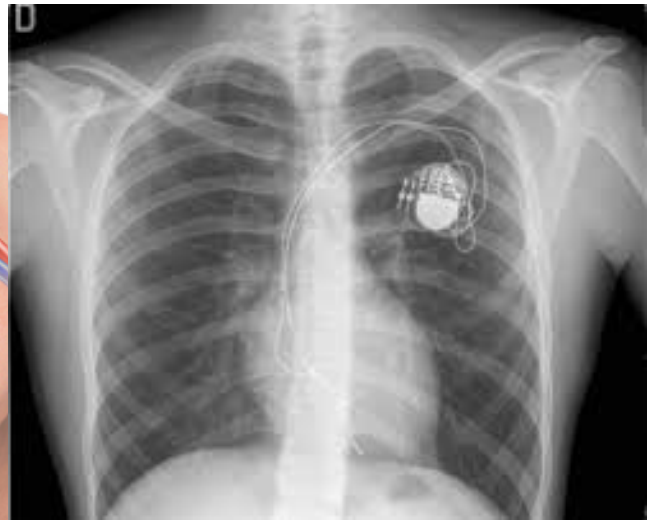
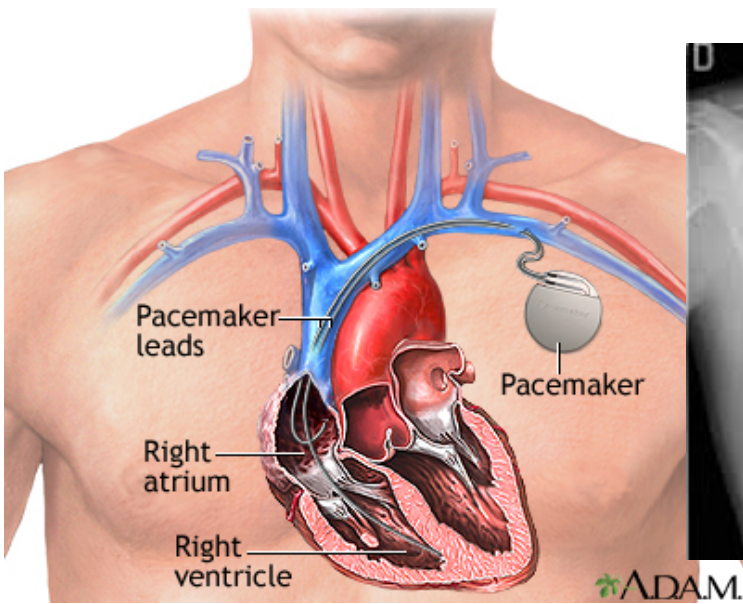
IV. Cardiac Conduction System

- A. Sinoatrial Node (SA-node): the pacemaker
 1. in the back wall of the right atrium
 2. rhythmic & self-excitatory
 3. sends a message to contract to myocardium
- B. Atrioventricular Node (AV node): back up pacemaker
 1. slower than the SA node
 2. takes over if the SA node goes out
- C. Electrocardiogram: records electrical changes during cardiac cycle

EKG

V. Blood Vessels:

- A. Arteries: carry blood away from the heart
 1. thick, strong, and elastic
 2. can take high pressure
 3. arterioles: microscopic arteries
- B. Capillaries:
 1. smallest blood vessel
 2. made up of one layer of cells (endothelium)
 3. where stuff is exchanged with the tissues (ex. nutrients, wastes, gases)
 4. exchange of materials occurs primarily by diffusion
- C. Veins: carry blood back to the heart
 1. thinner than the arteries
 2. many veins have valves to prevent back flow of blood
 3. many veins are embedded in skeletal muscles, contracting the muscle helps to pump blood through the vein
 4. venules: microscopic veins



VI. Blood Pressure : force on blood vessel walls
(arterial pressure)

A. Arterial blood pressure is usually measured

1. systolic : maximum pressure when
ventricles are contracting

2. diastolic : minimum pressure when
ventricles are relaxing

$\frac{120}{80}$ mmHg

B. Pulse : expanding and recoiling of arteries
as blood surges through the arteries

60-80 bpm

VI. Blood

A. Functions

1. Transportation (food, water, gases, wastes,
hormones)

2. Homeostasis (water content, body temperature,
pH)

3. Protection against diseases

B. Composition

1. Erythrocytes : red blood cells

a. carry oxygen & carbon dioxide

b. made in the red bone marrow

c. damaged as they pass through capillaries, so they
are regularly destroyed by the liver

2. Leukocytes : white blood cells

a. eats bacteria & removes allergens

b. makes antibodies

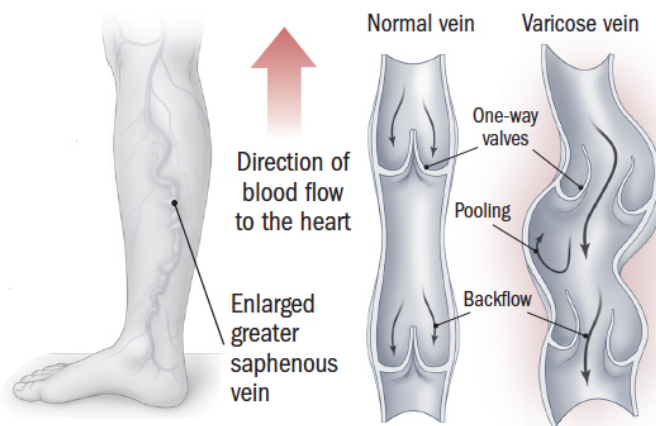
3. Plasma: liquid portion of blood (mostly water)

4. Thrombocytes : platelets

a. form blood clots

1. Vaccines
2. Survive
3. Borrow it

Anatomy of a varicose vein



Normally, blood moves through veins toward the heart by one-way valves, which prevent blood from flowing backward. In a varicose vein, the valves don't close properly, allowing the blood to pool and enlarge the vein, which can lead to painful skin ulcers.

