

Biology 12 - The Heart & Circulatory System

1. Arterioles	small branches of arteries
2. arterial duct	connects pulmonary artery to aorta in fetal system to shuttle blood from pulmonary circuit
3. atria	top chambers of heart, collect blood from body or lungs, pump to ventricles
4. atrioventricular node	AV node: causes ventricles to contract after receiving signal from SA node
5. Capillaries	microscopic blood vessels with walls one cell wall thick, across which gas exchange occurs
6. cholesterol	lipid necessary for normal cell function but can build up in arteries causing atherosclerosis
7. diastole	relaxation of heart muscle
8. diastolic blood pressure	pressure of blood in an artery when ventricles of heart in diastole
9. heart attack	myocardial infarction: blood supply to part of heart muscle cut off (usually due to clogged coronary artery)
10. hypertension	high blood pressure. Prevalent disease in industrialized nations, associated with atherosclerosis
11. hypotension	low blood pressure
12. intrinsic heartbeat	the heart's own built-in mechanism for initiating a regular heartbeat, due to SA node
13. lacteal	inside villi, this is where fats enter the lymphatic system
14. Lymph	tissue fluid that has entered the lymphatic system
15. Lymph nodes	specialized regions along lymph veins where lymph filtered, white blood cells made
16. lymphocytes	type of white blood cell produced in lymphatic system that makes antibodies
17. nodal tissue	specialized tissue that has properties of nerve and muscle tissue: AV and SA nodes
18. oval opening	in fetus, this opening connects the atria and diverts blood from pulmonary circuit.
19. pacemaker node	SA node
20. placenta	membranes and blood vessels across which mother and fetus exchange nutrients
21. pulmonary circulation	circulation of blood through lungs
22. septum	divides the two halves of the heart
23. sinoatrial node	pacemaker node, special nodal tissue that initiates contraction of atria every 0.85 seconds
24. spleen	lymphatic organ where blood cells mature and are stored
25. stroke	part of brain dies due to oxygen starvation because of clogged artery
26. systemic circulation	circulation of blood from left ventricle through tissues of body and back to right atrium
27. systole	contraction of heart muscle
28. systolic blood pressure	pressure of blood in an artery when ventricles contract
29. thoracic duct	major trunk of lymphatic system, drains lower portions of body
30. thymus gland	an organ that lies in the neck and thoracic area and is absolutely necessary to the development of immunity
31. umbilical arteries	carry blood from fetal heart to tissues and placenta
32. venous duct	connects umbilical vein to vena cava
33. ventricles	larger lower 2 chambers of heart that pump blood to lungs and rest of body
34. Venules	small branches of veins that connect to capillary beds

1. The major systemic artery in the body is the **AORTA**.
2. The systemic system begins with the **LEFT VENTRICLE** of the heart and ends with the **RIGHT ATRIUM** of the heart.
3. Contraction of the heart is called **SYSTOLE**; just following contraction, blood pressure is at it **HIGHEST**.
4. The SA node is often called the **PACEMAKER**.
5. The first wave in an electrocardiogram occurs during the contraction of the **ATRIA**; the second occurs during the contraction of the **VENTRICLES**.
6. A vein is a blood vessel that takes blood to the **HEART**.
7. Movement of blood in the veins is aided by **SKELETAL** muscle contraction.
8. Capillaries are tiny vessels with very **THIN** walls, facilitating the exchange of molecules.
9. The lymph vessels begin in the tissues and eventually join the **SUBCLAVIAN** veins.
10. Two dietary components that may contribute to the medical condition *hypertension* are **SALT** and **CHOLESTEROL**.
11. A stroke occurs when **BRAIN** cells are denied oxygen.
12. Label the parts of the circulatory system in this diagram:

1. superior vena cava	2. aorta	3. SA node
4. right atrium	5. av node	6. inferior vena cava
7. tricuspid valve	8. right ventricle	9. pulmonary artery
10. left pulmonary vein	11. left atrium	12. left ventricle

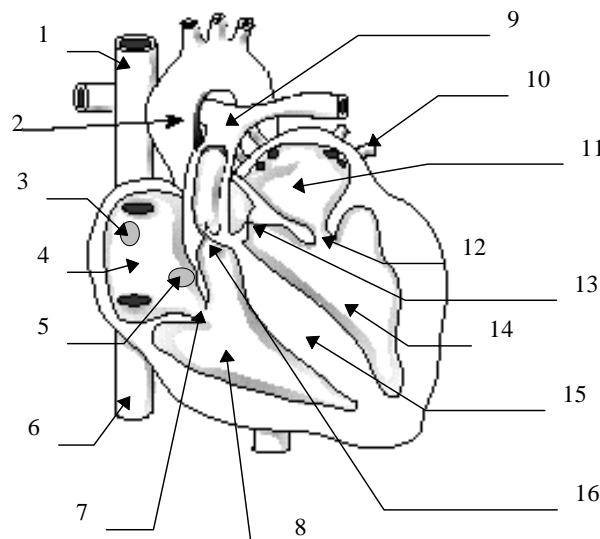
13. aortic semilunar valve	14. left ventricle	15. septum
16. pulmonary semilunar valve		

13. Match the structures in the key to the statements below:

Key: **ARTERY** **VEIN** **CAPILLARY**

- i. has the thickest walls: **ARTERY**
- ii. has valves: **VEIN**
- iii. has the greatest total cross-sectional area: **CAPILLARY**
- iv. takes blood away from the heart: **ARTERY**
- v. takes blood to the heart: **VEIN**
- vi. exchanges carbon dioxide and oxygen with tissues: **CAPILLARY**

14. The path of blood through the heart. Starting with vena cava, list the structures in order through which blood flows. Use the parts in the column on the left.



Structures (Alphabetical listing)	Correct Order
1. aorta	1. vena cava
2. bicuspid valve	2. right atrium
3. left atrium	3. tricuspid valve
4. left ventricle	4. right ventricle
5. lungs	5. pulmonary semilunar valve
6. pulmonary artery	6. pulmonary artery
7. pulmonary semilunar valve	7. lungs
8. pulmonary veins	8. pulmonary veins
9. right atrium	9. left atrium
10. right ventricle	10. bicuspid valve
11. semilunar valve	11. left ventricle
12. tricuspid valve	12. semilunar valve
13. vena cava	13. aorta

15. The heart beats about **70** times a minute. What actually happens is that the **SINOATRIAL** node initiates the contraction of the **ATRIA** (chambers). The nervous stimulus is picked up by the **ATRIOVENTRICULAR** node, and this initiates the contraction of the **VENTRICLES** (chambers). When the chambers are not actually contracting, they are relaxing. Contraction is termed **SYSTOLE**, and resting is termed **DIASTOLE**.

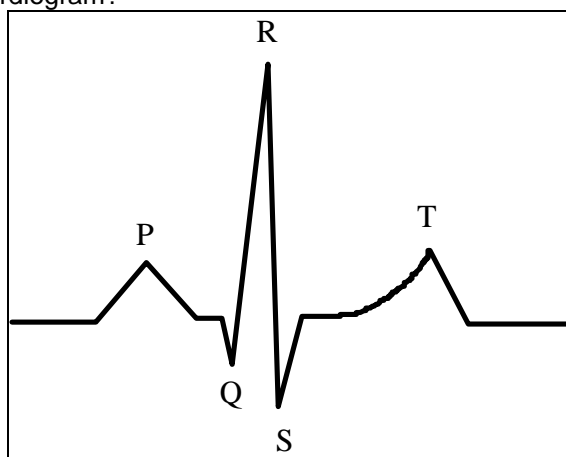
16. When the atria contracts, this forces the blood through the **ATRIOVENTRICULAR** valves into the **VENTRICLES**. The closing of these valves is the lub sound. Next the ventricles contract and force the blood into the arteries. Now the **SEMILUNAR** valves close, and this is the DUPP sound. A heart murmur is caused by **LEAKY VALVES**.

17. Of what significance is each of the following in an electrocardiogram?

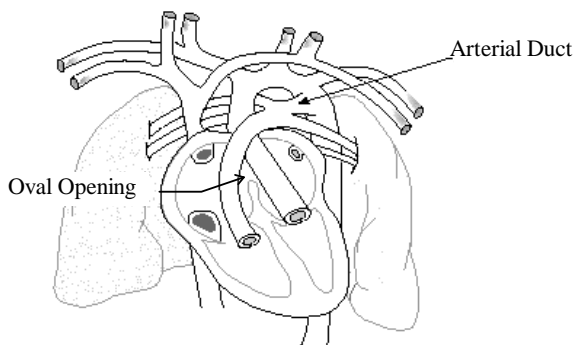
- i. P wave: **ATRIA SYSTOLE**
- ii. QRS wave: **VENTRICULAR SYSTOLE**
- iii. T wave: **VENTRICULAR RECOVERY**

18. Using the diagram of the circulatory system in your text that shows the major blood vessels, trace the path of blood from:

- i. the left ventricle to the legs: **LEFT VENTRICLE, AORTA, ILIAC ARTERIES, LEGS**
- ii. the legs to the right atrium: **ILIAC VEINS, VENA CAVA, RIGHT ATRIUM**
- iii. the aorta to the liver: **AORTA, COELIACMESENTERIC ARTERY, INTESTINE, HEPATIC PORTAL VEIN, LIVER**
- iv. the liver to the vena cava: **LIVER, HEPATIC VEIN, VENA CAVA**



19. a) Label the indicated parts of the fetal heart at right:
 b. List the four structural differences between the fetal circulatory system and the adult, as well as the function of each difference.



Structure A	
Function	
Structure B	
Function	
Structure C	
Function	
Structure D	
Function	

20. There are only two types of lymph vessels, the lymph **CAPILLARIES** and the lymph **VEINS**.

21. Mix and match the correct term for each description on the left.

- | | | | |
|--------------|--|----------|--------------------------|
| O ___ | 1. largest artery | A | valves |
| F ___ | 2. returns tissue fluid to the circulatory system | B | thrombus |
| A ___ | 3. prevent blood from flowing in the wrong direction | C | systolic blood pressure |
| E ___ | 4. vessel transporting blood through kidneys | D | stroke |
| G ___ | 5. vessel transporting blood through legs | E | renal |
| K ___ | 6. localized swelling due to excess tissue fluid | F | lymphatic system |
| M ___ | 7. supply blood to the heart | G | iliac |
| C ___ | 8. the highest arterial pressure | H | hypertension |
| L ___ | 9. the lowest arterial pressure | I | heart attack |
| H ___ | 10. condition of high blood pressure | J | embolism |
| N ___ | 11. "hardening of the arteries" | K | edema |
| B ___ | 12. a stationary clot along an arterial wall | L | diastolic blood pressure |
| K ___ | 13. a dislodged, moving thrombus | M | coronary arteries |
| D ___ | 14. when a portion of the brain dies due to a lack of oxygen | N | atherosclerosis |
| P ___ | 15. chest pain (including pain in the left arm) | O | aorta |
| I ___ | 16. occurs when circulation to part of the heart is blocked | P | angina pectoris |

22. How is a lymph capillary like a blood capillary? a) they both contain blood b) they both contain valves c) they both have thin walls d) they are both connected to the vena cava **C**
23. If you press a finger down on a prominent vein, say, on the back of your hand and then slide the finger distally to a new pressure point closer to the fingers, would you expect the section of vein you just moved along to refill with blood? Suppose you had moved the finger proximally toward the upper arm?
In the first case, blood would have to flow backward in the vein to refill the section you emptied; however, the valves in the vein prevent backflow, and the vein should remain empty or refill only slowly. In the second case, the emptied section of vein would be quickly refilled by blood traveling toward the heart.
24. Explain how the blood that right now is arriving at your fingertips will get back to your heart. What will drive its movement? *It will move from capillary beds to small venules, then to larger venules and then through radial veins, brachial vein, subclavian vein, superior vena cavae, and finally back to your right atrium. Skeletal muscle contractions alongside of veins power the movement of blood back to the heart.*