

The Circulatory System

Class Notes

I. Introduction to the Circulatory System:

_____ is full of chemical energy that the body needs.

Food Molecules → Energy

Aerobic _____: The complete breakdown of food providing energy for all activities in the cell

<p>We not only feed our body.</p> <p>We feed every cell in our body.</p>
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*Food Molecules + Oxygen → Carbon Dioxide + H₂O +
Energy Released

*Simple Sugars, Amino Acids, Glycerol and Fatty Acids

Oxygen is needed for all living cells.

_____ supplies food and **oxygen** to every cell in the body and removes wastes such as _____.

You need some sort of transport system to efficiently deliver food and oxygen and take away wastes:

The Circulatory System

The major components of the Circulatory System are:

- 1)
 - 2)
 - 3)
-

II. The Human Heart

4 Main Compartments:

Atria (one atrium): Two at the top

Ventricles: The lower two

The Heart is made of_____.

Circulation: the pumping of blood to all parts of the body

_____ Carry blood to the heart

_____ Carry blood away from the heart

Double Circulatory System: blood passes through the heart twice, through two circuits.

- 1) Blood flow is from the heart to the _____
 - 2) Blood flow is from the heart to the rest of the body
-

The Oxygenation/Deoxygenation of Blood

1. The heart pumps blood from the _____ventricle to the lungs. In the lungs, it gains oxygen and loses carbon dioxide. This is called_____.
2. The oxygenated blood from the lungs flows into the vein that returns blood to the _____atrium of the heart. The blood is pumped into the left_____.
3. The heart then pumps blood at high pressure from the left ventricle through the _____to the rest of the body. As the blood flows through all the other organs, it loses some _____and gains some carbon dioxide.

Glucose, amino acids, and other food substances also pass from the blood to the cells. Water, urea and other wastes pass into the blood.

4. Blood that has lost some oxygen, _____ blood, leaves the organs, drains into _____ and returns to the _____ atrium of the heart.
- I. The four main blood vessels of the heart.
- a. The Vena Cava: carries _____ blood from the organs to the heart
 - b. The Pulmonary Vein: carries _____ blood from the lungs to the heart
 - c. The Pulmonary Artery: carries _____ blood from the heart to the lungs
 - d. The Aorta: carries _____ blood from the heart to the organs above and below the heart
- II. The Heart Cycle
- a. The heart rate is the number of times our heart beats in one minute
 - b. It is typically 70 beats/minute and _____ during exercise
- III. What happens in an individual heart beat?
- a. The two _____ are filled with blood
 - b. The two atria contract at the same time, forcing blood into the _____
 - c. The ventricles fill with blood
 - d. The two ventricles contract at the same time, forcing blood out of the heart
- IV. The heart is composed of muscle
- a. Heart beats are actually _____ contractions of the heart
 - b. The Right and left atria are _____ walled since they do not pump blood any great distance (only into the ventricles)
 - c. The Right and left ventricles are _____ walled because they pump blood great distances and at high pressure.
 - d. The _____ Ventricle has a thinner wall than the Left Ventricle because it only has to pump blood to the lungs.
 - e. The _____ Ventricle has to pump blood to the rest of the body.

The Circulatory System Homework

Review:

Veins: Carry blood _____ from the heart.

Arteries: Carry blood _____ the heart.

You are responsible for locating the following four main blood vessels.

1.) _____

2.) _____

3.) _____

4.) _____

Can you locate them on a diagram of the heart?

What is the difference between oxygenated blood and deoxygenated blood?

What is the Heart Cycle?

What happens in a heart beat? What are the three main steps?
(You can also explain them in four steps)

Why is the wall of the Left Ventricle thicker than that of the Right Ventricle?

Why are the walls of the Right Atrium and Left Atrium thin verses thick?

1.

a. Blood Vessels

- i. 60,000 miles of blood vessels in the human body (96,560 km)
- ii. 1900 gallons of blood per day (7200 liters)
- iii. Cycle of blood flow: arteries – capillaries – veins

b. _____

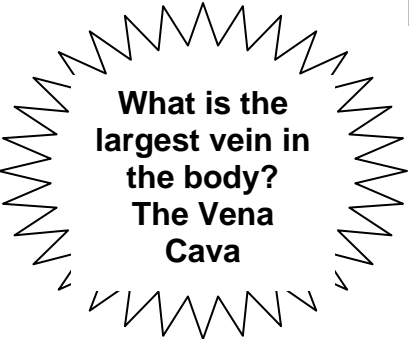
- i. Carry oxygen rich blood to the heart (with the exception of the pulmonary vein, which carries oxygen rich blood from the lungs to the heart)
- ii. Very thin, wide walls
- iii. Very low pressure
- iv. Blood moves with the contraction of muscles; moves faster in exercise due to rapid contraction of muscles
- v. Carries CO₂ and waste (exception: pulmonary vein)
- vi. Valves: keep blood flowing in one direction

c. _____

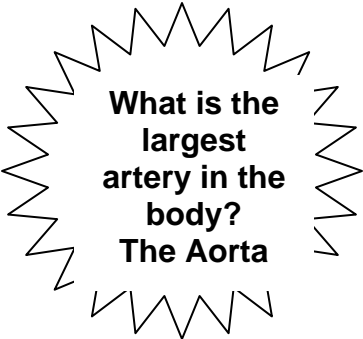
- i. Flexible due to high pressure
- ii. Thick walls protect against high pressure
- iii. Get smaller as they move away from the heart

d. _____

- i. Connect arteries to veins
- ii. Carry blood to every cell in the body (trillions of cells!)
- iii. Supply oxygen and nutrients to cells and remove wastes



**What is the
largest vein in
the body?
The Vena
Cava**



**What is the
largest
artery in the
body?
The Aorta**

- I. Pulse: measure of the heart rate
 - a. Blood comes out of the heart in surges
 - b. Arteries expand
 - c. Pressure point: place where an artery is near the surface of the skin and the pulse can be felt
- II. Blood Pressure

- a. Blood flow: the chambers of the heart work hard to keep blood moving through the circulatory system
 - i. Relaxation and expansion of the heart chambers allows blood to flow into the heart
 - ii. Contraction, the tightening and inward pulling of the heart chambers which pumps blood out of the heart
- b. Blood Pressure defined: the force of your blood pushing against the walls of the arteries
 - i. Strong when heart contracts, weak when heart relaxes
 - ii. Strong in arteries; Weak in veins
- c. _____ Pressure: pressure when your heart contracts (beats)
- d. _____ Pressure: pressure when your heart relaxes (this is between beats)
- e. Blood pressure is reported as:

Systolic
Diastolic

**Normal blood pressure = 120/80
or “120 over 80”**

- f. What does it mean when a person has very high blood pressure?
 - i. The heart is working extra hard to push blood through your arteries
 - ii. You are at high risk of developing heart problems