A Tour of The Circulatory System

By Bryce Tappan

Function of the Cardiovascular System

The cardiovascular system regulates the body through the flow of nutrients in the blood. These regulations include body temperature, pH levels, and fighting against diseases.

Structure & Function

Arteries- Arteries must have the strongest walls of tissue because they carry blood away from the heart; they are subject to the full force the pumping heart, and therefore must be more durable and elastic than veins and capillaries.

http://www.phschool.com/science/biology_place/biocoach/cardio2/structure.html#map

Structure & Function

-Capillaries are the smallest blood vessels. Capillaries main function is to transport gases, such as oxygen and CO2. They have the thinner walls than veins or arteries. As a result of their thin walls, gases can diffuse through very easily. Their structure fits their function.

http://www.teachpe.com/anatomy/capillaries.php

Structure & Function

- Veins- The purpose of veins is to transport blood throughout the body. As a result of their long distance away from the heart, most veins have low blood pressure and thin walls. This allows for the veins to swell and for a greater volume of blood to be transported at once.
- http://www.phschool.com/science/biology_place/biocoach/cardio2/structure.html#map

Flow of Blood in the Heart

- Blood full of oxygen enters the left atrium of the heart from the pulmonary veins.
- The blood then travels through the left atrioventricular valve and it enters the left ventricle.
- After the left ventricle, the blood is forced into an artery called the aorta. The left atrioventricular valve then closes and prevents blood from re-entering the left atrium.
- From the aorta, blood is pushed away from the heart through arteries.
- The blood eventually returns to the heart through veins that enter the right side of the heart: The superior vena cava and inferior vena cava bring deoxygenated blood into the right atrium of the heart.
- Blood flows from the right atrium to the right ventricle via the right atrioventricular valve.
- Blood then goes to the lungs by way of the semilunar pulmonary valve and the pulmonary artery. In the lungs, the blood is filled with oxygen again and the process starts over.
- http://www.sumanasinc.com/webcontent/animations/content/human_heart.html

Composition of Blood

Human blood is composed of over 4,000 “ingredients,” although the major components are red and white blood cells, platelets, and plasma.

-Red Blood Cells (erythrocytes) are cells that make up close to half of human blood. Red blood cells transfer oxygen throughout the body and dispose of CO2.

-White Blood Cells (leukocytes) are only about 1% of the blood’s volume. They are the basis of our immune system in that they attack foreign cells, bacteria and other harmful intruders. They also help dispose of dead red blood cells.

- Plasma is a water-ish substance that makes up over half of the blood’s composition. It is the liquid that carries cells through the blood. It also helps remove waste products of the blood in the body. Plasma plays a part in blood clotting and in the transportation of nutrients throughout the body.
- Platelets are pieces of cells that help clot the blood in injuries, and they have special chemicals that help them stick to ventricular walls in order to encourage clotting.
- http://anthro.palomar.edu/blood/blood_components.htm

Structure & Function

Erythrocytes main function is to supply all of the body with oxygen from the lungs, and to eliminate CO2. The fact that the red blood cells have indentations on both sides gives them a larger surface area for cell membrane, and so more oxygen is allowed to diffuse into the cell. Therefore, red blood cells' structure is perfect for their function.

http://jamespendleton.suite101.com/erythrocyte-life-cycle-functions-and-pathology-a84625

Open & Closed Circulatory Systems

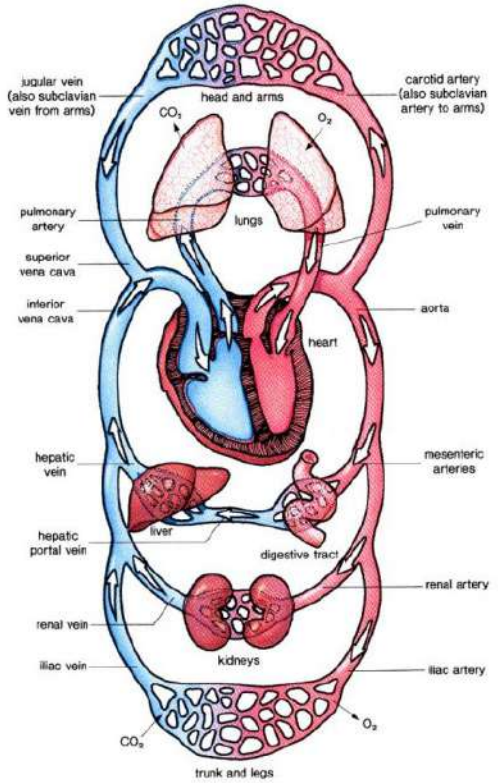
Closed Systems- Vertebrates have closed circulatory systems, meaning that their blood is always contained in a vessel or vein, and it does not usually pass through the body cavities.

Open Systems- Arthropods and mollusks have open circulatory systems. The blood vessels help pump the blood through the body. Blood collects in open sinuses and envelops the internal organs with blood. Other vessels can attain blood from these sinuses and then have it pumped through the blood vessels for the continuation of the cycle.

Circulatory Systems of Mammals and Birds

The heart is divided into left and right ventricles in mammals and birds. The pulmonary and systemic circulations are independent of each other, and oxygenated blood does not mix with deoxygenated blood. Oxygenated blood travels to the left ventricle of the heart and arteries pump it away for use throughout the body. Deoxygenated blood enters the right ventricle and is pumped then to the pulmonary capillaries to be oxygenated. http://www.britannica.com/EBchecked/topic/360838/mammal/51717/Circulatory-system

http://www.elateafrica.org/elate/biology/transportanimals/transportinanimalsintro.html

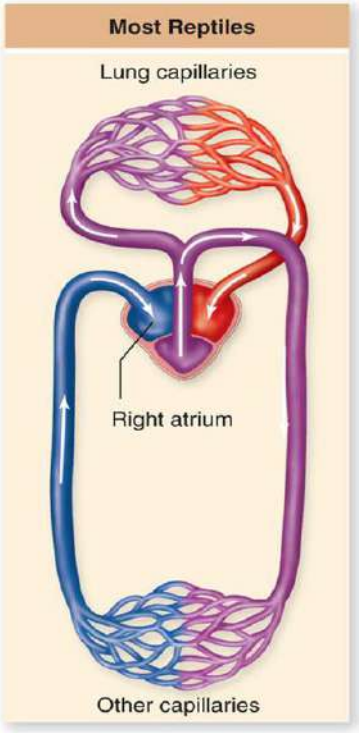


Circulatory Systems of Reptiles

Most reptiles have 3-chambered hearts, including two atria and a ventricle. Some mixing of oxygenated blood and deoxygenated blood occurs in reptiles. The ventricle receives deoxygenated blood and pumps it to the lungs for oxygen. The blood then enters the left atrium and passes once again through the ventricle to be pumped into the body for use.

http://www.webspawner.com/users/petcentralreptiles/

http://www.baileybio.com/plogger/?level=picture&id=1457

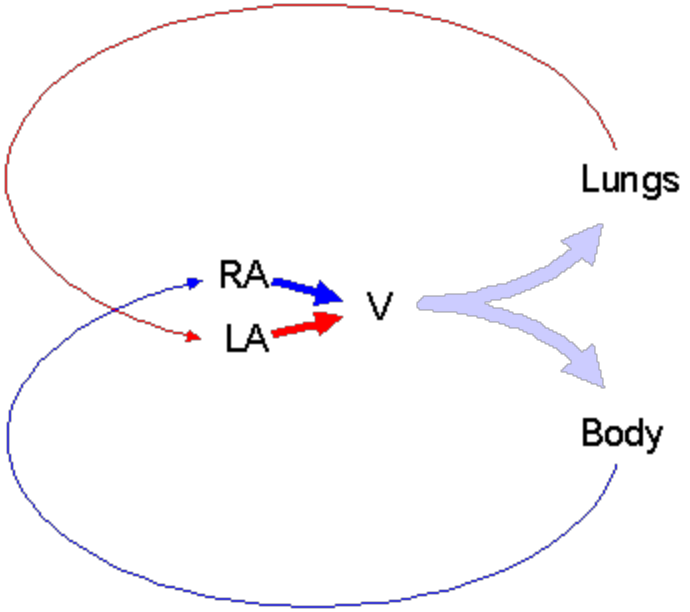


Circulatory Systems of Amphibians

Like reptiles, Amphibians have two atria and a ventricle: a 3 chambered heart.

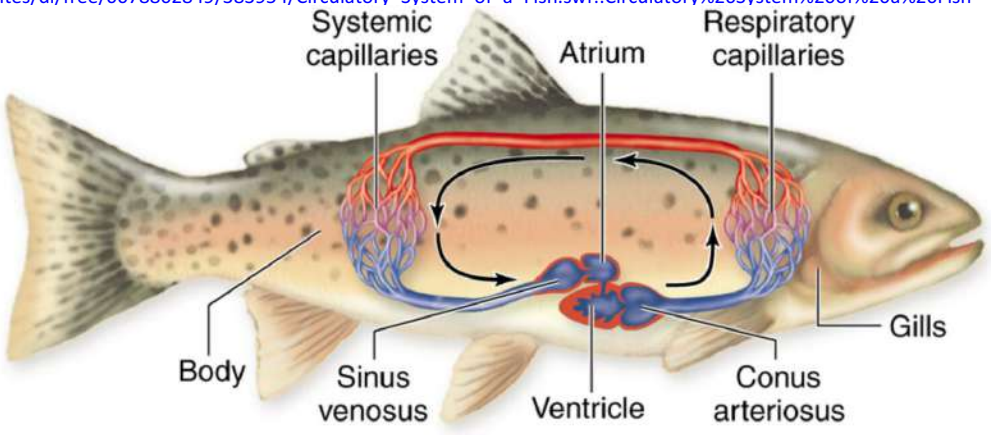
Deoxygenated blood enters the right atrium where it is pumped to the lungs, and then into the left atrium. Unlike reptiles, amphibians do not have any mechanism to separate oxygenated and deoxygenated blood in the ventricle. Both atriums lead to the same ventricle where mixing of blood occurs.

http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/bio%20102/bio%20102%20lectures/circulatory%20system/circulat.htm



Circulatory Systems of Fish

Fish have a “closed loop” circulatory system in which the blood travels in a simple circuit. Fish have hearts with 2 chambers. Deoxygenated blood flows in one direction to the first chamber. Then the blood is pumped from the second chamber into the capillaries of the gills. Here, oxygen is taken in and CO2 disposed. The oxygenated blood then travels through the body and back to the heart. http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078802849/383954/Circulatory_System_of_a_Fish.swf::Circulatory%20System%20of%20a%20Fish



Circulatory System Disorders

a) Arteriosclerosis happens when fats and lipids accumulate in the arteries, which restricts blood flow.

b) Symptoms can include strokes, heart attacks, and high blood pressure.

c) Arteriosclerosis is very common among Americans, especially people of old age, due to their unhealthy lifestyles.

d) Treatment and prevention for arteriosclerosis include proper dieting, exercise, and rest. Also, some drugs have the ability to lower blood pressure and strengthen the heart. If needed, surgery can be performed to remove buildup of lipids.

http://library.thinkquest.org/28807/data/circ3.htm

Circulatory System Disorders

a) Tuberculosis is a disease in the lungs caused by the bacteria *Mycobacterium tuberculosis*.

b) Symptoms include fever, weight loss, coughing up blood, and lesions in the tissue called tubercles. TB can be fatal

c) The World Health Organization (WHO) has estimated that 2 billion people have latent TB and that globally, in 2009, the disease killed 1.7 million people. It a seriously prevalent disease in the world. Some strains of TB are becoming resistant to drugs. http://emedicine.medscape.com/article/230802-overview

d) There are several drugs that can be used to combat TB such as isoniazid, rifampicin, pyrazinamide, and ethambutol. However, as I mentioned before, strains of TB are becoming resistant to drugs, so treatment is becoming more difficult. http://en.wikipedia.org/wiki/Tuberculosis_treatment#Drugs