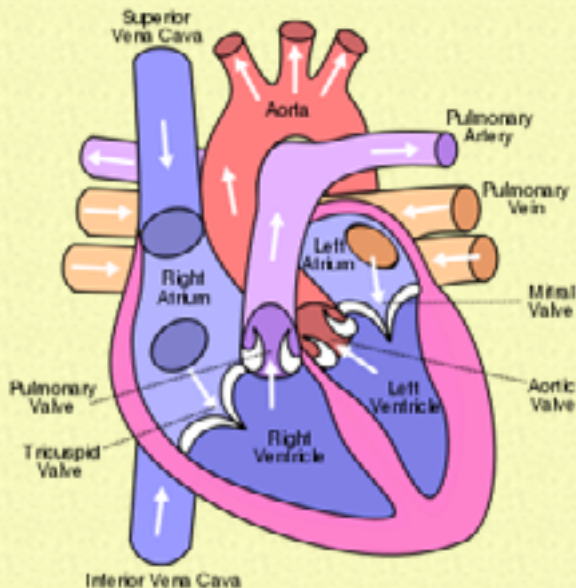


Introduction

The circulatory system is the system of the human body that is responsible for delivering oxygen, nutrients, and disease-fighting cells to the body's organs and tissues. Parts of the circulatory system include the cardiovascular system, which consists of the heart, lungs, blood vessels, and blood, as well as the lymphatic system, made up of the lymph vessels, nodes, and lymph itself. The cardiovascular system brings oxygen and glucose to the body's tissues via the blood and distributes white blood cells, which defend against disease. The lymphatic system produces and transports additional immune cells. The cardiovascular system is known as a closed system, meaning that the blood it carries is re-circulated, while the lymphatic system is open, meaning that the lymph, the clear fluid within, is able to exit its complex of vessels and enter the cardiovascular system.



Did You Know...

It takes about 60 seconds for a drop of blood to travel from your heart down to your toes and back again.

References

1. wiseGEEK. "What Are the Parts of the Circulatory System?" 2012. <http://www.wisegeek.com/what-are-the-parts-of-the-circulatory-system.htm> (accessed 9 Feb 2013).
2. "Common Circulatory Ailments, Their Symptoms and Treatments." 2011. <http://health-conditions.knoji.com/common-circulatory-ailments-their-symptoms-and-treatments/> (accessed 9 Feb 2013).
3. "How to Properly Take Care of Your Circulatory System." 2011. <http://health-conditions.knoji.com/how-to-properly-take-care-of-your-circulatory-system/> (accessed 9 Feb 2013).
4. Coronel, Carmelita et al. *Exploring and Protecting Our World*. Quezon City: Vibal Publishing House, Inc., 2010.
5. Healthmad. "Parts of The Heart and Their Functions." 2012. <http://healthmad.com/conditions-and-diseases/parts-of-the-heart-and-their-functions/> (accessed 9 Feb 2013).
6. Bailey, Regina. "Blood Vessels." n.d. http://biology.about.com/od/humananatomybiology/ss/blood_vessels.htm (accessed 9 Feb 2013).
7. American Society of Hematology. "Blood Basics." 2003. <http://www.hematology.org/patients/blood-basics/S222.aspx> (accessed 9 Feb 2013).

A PRIMER ON The Circulatory System

Group 6
II-Diocese of Kabankalan

MEMBERS

Brian Guadalupe
Gabriel Natividad
Jewel Gabaton
Jeremiah Peñafiel

Parts and Functions

Heart

It is a hollow muscular organ that beats rhythmically to enable blood to circulate throughout the body continuously.

The interior of the heart has a left side and right side separated by a thick, muscular wall called *septum*. Each side has an upper chamber called *atrium* and a lower chamber called *ventricle*. The atria are smaller than the ventricles, and their walls are thinner. Their job is to hold the blood before it goes down the ventricles. The ventricles are bigger and have thicker muscular walls. Their job is to pump blood. The right ventricle pumps blood to the lungs, while the left ventricle pumps blood to all parts of the body. For this reason, the left ventricle has a thicker muscular wall.

Blood moves through the heart in just one direction. This is made possible by one-way valves found between the atria and ventricles and the blood vessels attached to them. The valve between the left atrium and the left ventricle is the *bicuspid valve* or *mitral valve*, while the one between the right atrium and the right ventricle is the *tricuspid valve*. The valve between the left ventricle and the aorta is the *aortic semilunar valve*, and the one between the right ventricle and the pulmonary artery is the *pulmonary semilunar valve*. All the heart valves prevent blood from flowing backwards.

Blood Vessels

These are intricate networks of hollow tubes that transport blood throughout the entire body. There are three types of blood vessels: capillaries, veins and arteries.

- **Arteries** are blood vessels that carry blood away from the heart. The largest artery, the *aorta*, arises from the left part of the heart. It is about 2.5 cm in diameter. From big arteries, blood passes into smaller arteries until they reach the smallest arteries called *arterioles*. They join tinier vessels called *capillaries*.
- **Capillaries** are tiny blood vessels that form a network throughout the body's organs and tissues. The walls of a capillary are very thin, allowing the transfer of oxygen and nutrients from the blood to the cell and waste from the cell to the blood by diffusion.
- **Veins** and *venules* are blood vessels that carry blood back to the heart. The biggest veins are the *superior* and *inferior vena cava* which lead to the right side of the heart.

Blood

It is a fluid that is also a type of connective tissue. Two major functions of the blood include transporting substances to and from our cells and providing immunity and protection against infectious agents such as bacteria and viruses. Blood is a component of the cardiovascular system. It is circulated through the body via the heart and blood vessels. Blood is composed of plasma, red blood cells, white blood cells, and platelets.

- **Plasma** is the liquid component of blood which is a mixture of water, sugar, fat, protein, and salts. The main job of the plasma is to transport blood cells throughout your body along with nutrients, waste products, antibodies, clotting proteins, chemical messengers such as hormones, and proteins that help maintain the body's fluid balance.
- **Red blood cells** (*erythrocytes*) are formed in the bone marrow. They contain a special protein called *hemoglobin*, which gives blood the red color. Their function is to carry oxygen from the lungs to the tissues, where it is exchanged for carbon dioxide for excretion. Red

blood cells are the most abundant cell in the blood, accounting for about 40 to 45% of its volume.

- **White blood cells** (*leukocytes*) differ in structure and function from red blood cells. White blood cells are bigger than red blood cells and are of different types. They are much fewer in number than red blood cells, accounting for about 1% of your blood. White blood cells are also formed in the bone marrow. They have two ways of fighting disease germs. First, by enclosing and digesting the germs and, second, by manufacturing antibodies to fight the germs.
- **Platelets** (*thrombocytes*) are not actually cells but rather small fragments of cells. Like red blood cells and white blood cells, they are formed in the bone marrow. Platelets help the blood clotting process by gathering at the site of an injury, sticking to the lining of the injured blood vessel, and forming a platform on which blood coagulation can occur.

Diseases

Atherosclerosis

This is an ailment connected to the arteries. The arteries are blocked by deposits of cholesterol and fat-absorbing cells. When this happens, the blood supply to the different parts of the body is affected. The worst comes when an artery supplying blood to the brain is blocked because it causes stroke and may result to permanent disability or death. Studies show that atherosclerosis is caused by a lot of factors such as cigarette smoking, obesity, high blood pressure, high cholesterol and lack of exercise. The bad part is that the symptoms only become apparent when the arteries are already severely damaged. This ailment can be prevented by avoiding the risk factors.

Anemia

This is not a very serious ailment and could be avoided by eating foods rich in iron. Doctors often prescribe vitamins and foods rich in iron for people who are anemic. Some of the symptoms of the ailment are paleness, shortness of breath, rapid pulse and pounding of the heart.

Leukemia

It is one type of cancer that attacks the blood. This ailment is characterized by abnormal production of white blood cells in the bone marrow. Some of the symptoms of the ailment are frequent bruising, gum bleeding, and tenderness of the bones, high fever and night sweating.

Coronary Heart Disease

It is the narrowing of arteries that supply blood to the heart. When this happens, and the heart does not receive oxygen, the heart becomes infarcted which causes a heart attack. Symptoms may not be experienced during the early stages but when it becomes serious the patient may feel pains in the chest. Sometimes heart attack occurs which means that the ailment is serious. Doctors often prescribe medicines that help improve blood flow. The patient can also be advised to have a bypass surgery or a vein graft so that blood can freely flow to the heart muscle.

Hypertension

This ailment is caused by the narrowing of some arteries that makes it harder for the heart to pump blood. This could be avoided by choosing the right type of food, and avoiding the risk factors like smoking, obesity, alcohol, salty foods and knowing how to manage stress. This ailment is hereditary so it is always good to take precautions when your family has a history of hypertension.

Rheumatic Heart Disease

It is caused by an inflammation of the inner lining or failure of the heart valve to close. This causes a blood leak that produces a heart murmur. The symptoms of the disease are shortness of breath, palpitations

and irregular heartbeat. Bed rest is needed by the patient.

Congenital Heart Disease

This is an inborn ailment. It is a defect in the structure of the heart during the development in the womb because of some factors like the mother getting sick during pregnancy or a kind of infection during pregnancy. Some of the symptoms are shortness of breath and blueness in the nails because of low levels of oxygen in the blood. This could be treated by surgery to fix the heart defect and improve the blood circulation. Rest is also needed.

Proper Care

Balanced Diet

A balanced diet means the right types of food as well as right amount of food that you take in every day. The amount of food each one takes in every day also depends on the age, the sex and the activities that each person does. The kind of food each person takes in should be properly chosen. People should eat a well-balanced diet and avoid too much fatty, sweet and salty food. If you choose your food properly then you will not worry about serious illness of the circulatory system in the future.

Exercise

Exercise is very important for the circulatory system. Every time you exercise, your heart beats faster allowing more supply of blood into your muscles to help take in additional oxygen to burn food and produce more energy to meet the demands of the muscles as they work. The more physical activities you perform daily the healthier you become.

Avoiding Risk Factors

Risk factors are those factors that may cause problems in the circulatory system. If you know the factors and you avoid them then you will be saved from any circulatory problems in the future.

Smoking is one of the risk factors since the nicotine content of tobacco can raise blood pressure while the carbon monoxide from the smoke can cause hardening of the arteries. Another risk factor is drinking alcoholics. Heavy alcoholic drinkers are candidates for coronary heart disease, hypertension and stroke. Tension and worrying too much also affects the proper functioning of the circulatory system. If you care for your heart then you should avoid all these risk factors and make your life a healthier life to live. Prevention of illness will save you a lot of trouble in the future as well as money.

Physical Checkup

Have a physical checkup at least once a year even if you have no symptoms of any illness. Knowing you are in good state of health can give you peace of mind. If a disease is detected during the checkup, then the necessary treatment can be given.