

# Example of the cardiovascular system and coronary artery disease research paper

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## **The Cardiovascular System**

The cardiovascular system functions as a circuit for blood to be circulated throughout the body. The aim of this is for oxygen to be transported to the cells and carbon dioxide to be transported away from the cells. Also, nutrients, in form of glucose, are also transported to body cells. Hormones and other endocrine gland secretions are also transported round the body from the specific glands to the target sites. Moreover, components of the immune system are also transported. T. Horse (1990)

The cardiovascular system functions with the Heart as the pump that generates the force by which the blood is propelled round the body. The Arteries and veins serve as conduits through which blood passes to all parts of the body. The Arteries carry blood away from the heart and the Veins convey blood back to the heart. Diffusion happens at the level of capillaries which allow gases to diffuse in and out of blood.

The cardiovascular system is organized in such a way that the great vessels which are large and of high elasticity carry blood to and from the heart. They are joined by smaller arteries and veins which most times, have collateral circulation. The capillaries are smaller than arteries and veins and they allow diffusion of nutrients. T. Horse (1990)

A cross section of the vessels shows that there are three major components of the wall of the vessels. They include the tunica external, which is the outermost layer and which functions for anchoring and strength; the Tunica Media which contains smooth muscles and functions for vasodilatation and vasoconstriction; and the tunica intima which is the innermost layer, it has a layer of endothelium and it functions to minimize friction. T. Horse (1990) .

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The heart is made up of two separate pumping systems. These include the systemic circulation and the pulmonary circulation. The systemic circulation is a high pressure system that pumps blood to all parts of the body. The pulmonary circulation is a low pressure pump that helps in circulation of blood to the lungs where the blood is oxygenated and carbon dioxide is eliminated from the body. The pulmonary circuit is the right side of the heart, consisting of the right atrium and right ventricles. The right atrium receives deoxygenated blood from the superior vena cava, the inferior vena cava and the coronary sinus. The right ventricle receives blood from the right atrium through the pulmonary valve. T. Horse (1990)

The systemic circuit is the left side of the heart. It consists of the left atrium and left ventricle. The left atrium receives blood from the pulmonary veins, the blood freshly oxygenated. The blood passes to the left ventricle through the bicuspid valve. The blood is pumped to the rest of the heart through the aorta.

The heart itself receives blood supply from a group of vessels called the coronary arteries and veins. The coronary arteries are direct branches from the first part of the aorta. The blood is returned to the heart through the coronary sinus. T. Horse (1990)

## **Coronary Artery Disease**

Coronary artery disease is the leading cause of mortality and morbidity in the western world. About 700000 Americans die yearly from the complications of coronary artery disease. D. L Kasper et al (2005). Since the heart is supplied by coronary vessels, any form of obstruction to this blood

flow will compromise the function of the part of the heart sub served by the particular coronary vessel. The mechanical obstruction can be due to atheroma, spasm, thrombosis or embolus among other things. V Kumar et al (2005).

There can also be a decrease in the flow of oxygenated blood to the heart due to anemia, carboxyhemoglobinaemia or hypotension which cases a reduction in the perfusion pressure thereby compromising blood supply to the heart. V Kumar et al (2005). Also, there are also some disease conditions that increase cardiac output, including thyrotoxicosis, myocardial hypertrophy. D. L Kasper et al (2005)

Coronary atherosclerosis also causes narrowing of the lumen of the coronary vessels due to the deposition of plaques in the intima of the vessels. It causes progressive narrowing the lumen and can lead to total blockage of the lumen of the vessel. V Kumar et al (2005).

Treatment options for coronary artery disease include the use of exercise, dietary modification, medications and finally surgery. D. L Kasper et al (2005)

Regular exercising is prescribed for preventing coronary an artery disease as this is said to open up the coronary arteries and so improve the blood supply to the heart.

Dietary modification is also helpful. Smoking cessation is advocated and at the same time, consumption of saturated fat is stopped. The individual is advised to instead, take polyunsaturated fat, especially fish oil or cod liver oil. Also, a lot of fruits and vegetables are also advised as they provide antioxidants. D. L Kasper et al (2005)

Medications include Aspirin, which reduces the risk of coronary events in individuals that have coronary artery disease. Also lipid lowering agents should be given if the individual has hypercholesterolemia. Glyceryltrinitrite is also used as it gives symptomatic relief in patients that have coronary events. A group of drugs, called calcium channel blockers can also be used as they cause relaxation of the coronary vessels thereby reducing the oxygen demand of the myocardium. Examples include diltiazem, and verapamil. D. L Kasper et al (2005)

surgeries that can be done include Percutaneous Transluminal coronary angioplasty in which coronary arteries that have been narrowed by arterosclerosis are treated by dilating the obstruction with an inflated balloon. Another surgery that can be done include the use of intra-coronary stents, which are wire meshes inserted into the stenosed part of the coronary artery in order to dilate it. D. L Kasper et al (2005)

A coronary artery bypass can also be done in which an alternate route of blood passage is constructed in order to bypass an area of coronary artery obstruction. D. L Kasper et al (2005)

## **REFERENCES**

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