Physical Description of the Human Heart

This document is intended for students in a high school or entrance level college biology course that plan to pursue a degree in a related field and would like further explanation than what is presented in class.

Introduction

This document italicizes words that can be seen in the pictures for better understanding. The human heart is a four chambered muscle that pumps blood through the body. There are three main sections used to describe the heart: exterior components, interior components, and electrical components.

Exterior components

The overall shape of a heart can be thought of as a pear. On the exterior of the heart there are arteries and veins that branch off to deliver blood to and from the body. Most of these are split so they can reach all parts of the body. Reference Figure 1 to understand where each component of the heart is located. The veins directly associated with the heart are the superior and inferior vena cava (the veins that carry deoxygenated blood from the body to the heart) and the pulmonary vein (delivers oxygenated blood from the lungs to the heart); it is split into the right and left pulmonary veins. The directly associated arteries are the aorta, pulmonary, and coronary arteries. The aorta is the main
artery that delivers oxygenated blood to the body; it is shown as branching upwards toward the head and neck but it also goes down in order to deliver oxygenated to the abdomen and legs. The pulmonary artery is the artery that delivers deoxygenated blood from the heart to the lungs; it is split into the left and right pulmonary artery. The coronary artery is the artery that delivers oxygenated blood to the heart; it is split into three more specific arteries: right coronary, left coronary, and left anterior descending artery. A rule to remember is that arteries carry blood away from the heart, and veins carry blood to the heart; the exception to this rule is the coronary artery (which carries blood to the heart).

**Interior components**

The interior of the heart consists of valves, chambers, and blood vessels; this is not including the electrical components, which will be discussed later. Reference Figure 2 to see where each component is located. The four chambers of the heart are the left and right *atria*, and the left and right *ventricles*. The main blood vessels involved with the interior of the heart are the *pulmonary artery*, *pulmonary vein*, *superior vena cava*, and *inferior vena cava*. The four valves are the *tricuspid valve*, *mitral valve*, *aortic valve*, and *pulmonary valve*. As discussed previously, the superior and inferior vena cava bring blood into the heart by way of the right atrium. The right atrium is the chamber that contracts after filling in order to push blood into the right ventricle. At the same time, the left atrium is filled with blood from the pulmonary...
veins, and it contracts to push blood into the left ventricle. The ventricles are the chambers that cause the most force in order to pump blood around the body. The right ventricle contracts to force blood past the pulmonary valve and into the pulmonary artery. At the same time, the left ventricle contracts to force blood past the aortic valve and into the aorta.

**Electrical components**

The electrical components of the heart consist of nodes, bundles, and fibers, as seen in Figure 3. A node is tissue that generates electrical signals when it contracts. The SA node is the node that makes the atria contract. When blood fills the atria, this tissue is stretched, causing an electrical signal that tells the atria to contract. This node is also called the pacemaker of the heart because artificial pacemakers mimic the SA node. The AV node is the node that carries the signal from the SA node to the AV bundle. In this context, a bundle is tissue that splits into branches in order to propagate a signal. Without the AV node, the electrical signal would be confined to the atria. The AV node splits into AV bundle branches until it reaches the bottom of the heart, where they become the Purkinje fibers. Fibers are tissue that split into numerous and small branches, like a bundle that would keep splitting. The electrical signal is carried to the Purkinje fibers and these fibers send a signal that tells the ventricles to contract. As displayed in the diagram, the fibers wrap around both ventricles, which allows for total muscle contraction in order to cause a great enough force for blood to travel around the body.
Conclusion

The human heart consists of three types of components. All of these components work together in order to have a fully functioning heart. After reading this document, you should be able to understand how this layout of the heart is effective in delivering blood to the body. This is a very important concept to understand when dealing with human physiology since it is a necessary organ in the body.
Works Cited
