All About the Heart

Your heart is a muscle. It is slightly larger than your fist and weighs less than a pound. It is located to the left of the middle of your chest. Your heart pumps blood to the lungs and to all parts of your body. The blood provides your body with oxygen and nutrients. It also carries away waste.

Structures of the Heart

Layers:
Your heart muscle has three layers. The thickest layer is called the myocardium. It is surrounded by a fiber-like bag called the pericardium. The inside of the myocardium is lined by a thin layer called the endocardium.

Chambers:
The normal heart has four chambers. A wall divides the heart into a right side and a left side. Each side of the heart is divided into two chambers. The upper chamber is called the atrium and the lower chamber is called the ventricle. These chambers are separated by valves that open and close.

Valves:
The valves allow blood to flow only in one direction. Valves direct the flow of blood through the heart, to the lungs and to the rest of the body.
- **Tricuspid Valve**: between your right atrium and your right ventricle

- **Pulmonic**: between your right ventricle and your lungs

- **Mitral Valve**: between your left atrium and your left ventricle

- **Aortic Valve**: between your left ventricle and the rest of your body

**Blood Vessels:**

Blood vessels carry blood to and away from the heart. Vessels that carry blood from the heart to the body are called **arteries**. Vessels that carry blood from the body back to the heart are called **veins**.

**Function of the Heart**

Your heart acts as a double pump. The right side pumps blood to your lungs, where the blood picks up oxygen and then returns to the left side of the heart. The left ventricle then pumps blood out to your body through the large artery, called the aorta. Oxygen is removed from your blood by the cells so it can be used by your body. The blood then returns to the right side of the heart through your veins. The right side of the heart once again pumps your blood to the lungs where oxygen is picked up. This process occurs with each heartbeat.

Each heart beat has two phases. The resting phase is called **diastole**. During diastole, blood from the atria fills the ventricles. Then the ventricles pump blood to your body or lungs. This pumping phase is called **systole**.
Systole and diastole are shown in your blood pressure numbers. Systole is the top number and diastole, the bottom, as in 120 / 80.

The work of the heart changes with your body's needs. For example, when you exercise, your body needs more blood and oxygen. Your heart pumps harder and faster to deliver more blood to the body. When you sleep, less blood and oxygen is needed and your heart slows down.

Your Heart’s Electrical System

Your heart has a normal conduction or electrical system that stimulates the heart muscle to beat.

Electrical impulses travel in a normal fashion from the upper chambers to the lower chambers over this conduction system. This diagram shows how the impulse travels over the conduction system.

1. Normal heart beats begin at the **SA-node** which acts as the heart's "pacemaker."

2. The electrical impulse spreads across the right and left atria.

3. The impulse travels through the **AV-node** to the **Bundle of HIS**.

4. The Bundle of HIS divides into a **left and a right bundle branch**. The impulse spreads through these bundle branches into the **purkinje fibers** in the ventricles.
Blood Supply of the Heart (Coronary Arteries)

Your heart muscle itself must receive a constant supply of oxygen. Oxygen is carried in the blood through the coronary arteries. Two main coronary arteries, a right and a left, supply the heart muscle with blood. These arteries are located on the surface of the heart. They divide into many smaller branches that go into the heart muscle. All parts of your heart muscle are supplied with oxygen-rich blood through these small arteries.

Here is how these arteries wrap around from the front to the back of the heart:
Collateral Circulation

A narrowed or blocked coronary artery may cause the body to develop or open new blood vessels near the area of heart muscle it normally supplies. The new blood supply is called **collateral circulation**. This often takes several months to years to develop. If enough collateral blood flow forms, angina or chest pain may decrease, a heart attack may be prevented, or healing after a heart attack may be improved.

Summary

- Your heart pumps blood and oxygen to all parts of your body. When you exercise, your body and heart need more blood and oxygen.
- Your heart muscle itself must receive a constant supply of oxygen.
- Your heart has a normal conduction or electrical system that stimulates the heart muscle to beat.
- Your heart has valves that direct the flow of blood through the heart, to the lungs and the rest of your body.

Talk to your doctor or others on your health care team if you have questions. You may request more written information from the Library for Health Information at (614) 293-3707 or email: **health-info@osu.edu**.