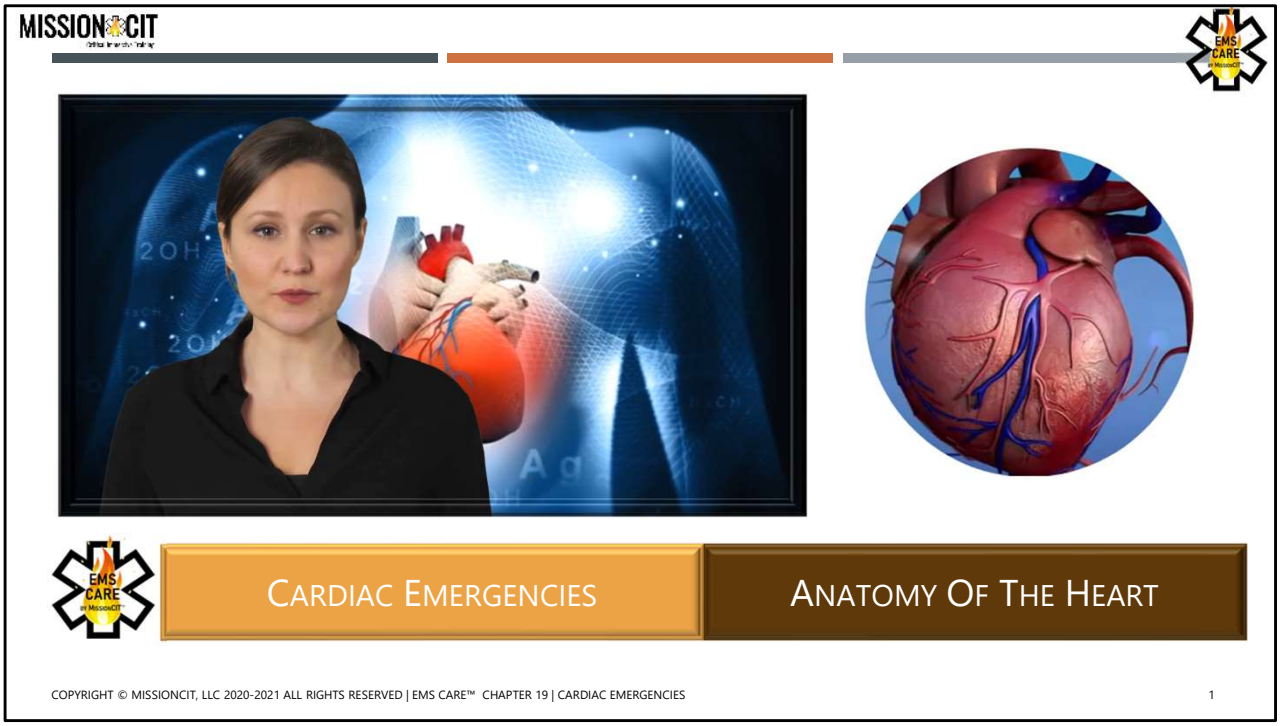


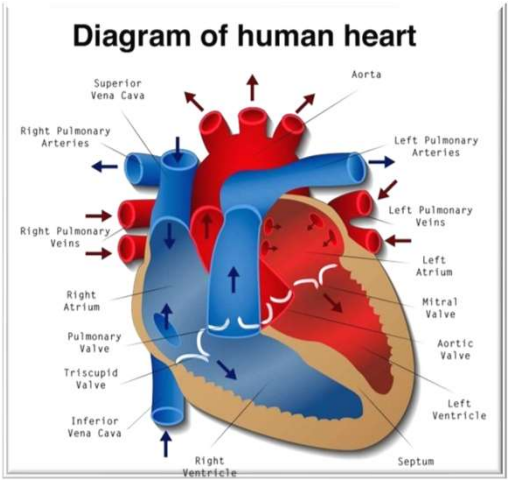
We begin our lessons with the anatomy of the heart. We will review basic anatomy, the electrical conduction system, arteries and veins, and discuss blood pressure.

Be sure to check out the 3d models in the pop-up and explore the heart's inner workings.

Good Studying

Basic Anatomy

- Responsible for pumping blood throughout the body
- Consists of 4 chambers – 2 atria and 2 ventricles
- Connects to a system of blood vessels that includes arteries and veins
- 4 valves prevent the backward flow of blood
- Electrical system to pump blood



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The heart is a vital organ, responsible for pumping blood to all parts of the body.

The heart is about the size of a fist and is located in the center of the chest

It consists of four chambers, two atria, and two ventricles.

The atria receive the blood coming back to the heart, and the ventricles are responsible for pumping blood out of the heart.

These atria and ventricles, connect to a system of blood

vessels, that includes arteries and veins.

Out of these, arteries are responsible, for carrying blood from the heart to the body tissues, and the veins, are responsible for taking blood back to the heart.

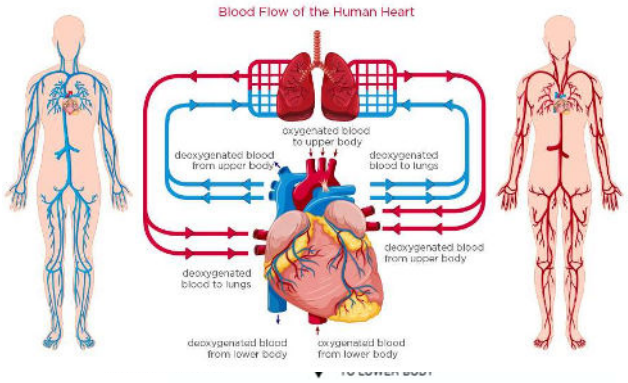
The heart also comprises four valves, that prevent the backward flow of blood.

There is an electrical system inside the heart, that acts as a natural pacemaker.

It conducts electricity, and is responsible for stimulating the heart to contract, so the blood gets pumped out of it.

How the heart works

- The right atrium receives oxygen-poor blood. Pumps it to right ventricle
- The right ventricle pumps it to the lungs
- The left atrium receives oxygen-rich blood from lungs
- Sends it to the left ventricle that pumps it to the body



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Moving on, let us see, how a heart pumps oxygen-rich blood, to the different parts of the body.

The right atrium receives oxygen-poor blood from the body, and pumps it into the right ventricle, through the tricuspid valve.

Next, the right ventricle pumps the oxygen-poor blood, to the lungs through the pulmonary valve.

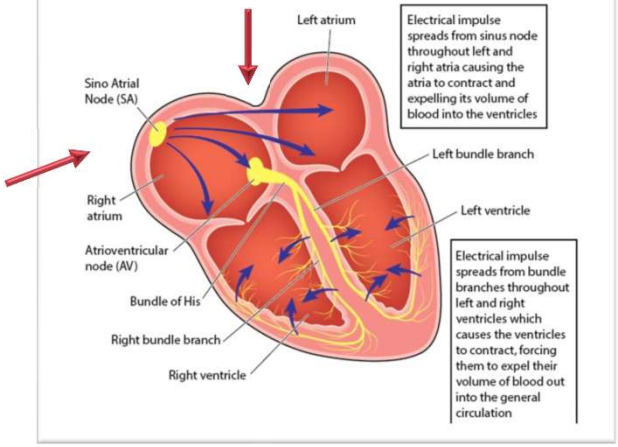
Now, the left atrium receives the oxygen-rich blood from the lungs, and pumps it to the left ventricle, through the mitral valve.

Finally, the left ventricle, pumps the oxygen-rich blood through the aortic valve, out to the rest of the body.

All these four chambers work together, to continuously pump blood to the different parts of the body.

Electrical Conduction System

- Responsible for stimulating the heartbeat
- Starts at sinus node and travels to the atrioventricular node
- From here, to both the ventricles through conduction pathways
- Each stimulation causes ventricles to empty blood
- Every contraction is one heartbeat
- Ranges from 60 to 100 per minute



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The electrical conduction system, is responsible for stimulating the heart to beat.

An electrical stimulus starts at the sinus node, located in the right atria of the heart.

From here, the impulses travel through the atrioventricular node, where they slow down a bit, before proceeding through conduction pathways, to the ventricles.

Here, the pathway divides into right and left pathways,

to stimulate the right and left ventricles.

Every pulse, pumps blood out of the ventricles.

Each contraction of the ventricle, represents one heartbeat.

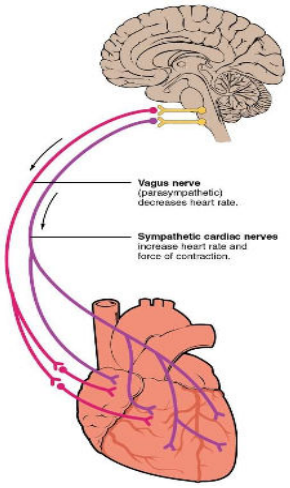
in adults, it ranges from 60 to 100 beats per minute, depending on a person’s age.

The atria contracts a fraction of a second, before the ventricles contract, so the blood gets emptied into the ventricles.

MISSION CIT

AUTONOMOUS NERVOUS SYSTEM

- Responsible for contraction and the resultant heart rate
- Controls the peripheral resistance of blood vessels
- Consists of
  - ✓ Sympathetic division
  - ✓ Parasympathetic division
- Work together to keep the heart rate in balance





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The autonomic nervous system, is responsible for controlling physiological functions.

It induces the force of contraction of the heart, and its heart rate.

Also, it controls the peripheral resistance of the blood vessels.

The autonomic nervous system has both sympathetic and parasympathetic divisions, that work together to maintain balance.

Typically, the parasympathetic division is responsible, for giving a normal resting heart rate of around 60 beats per minute.

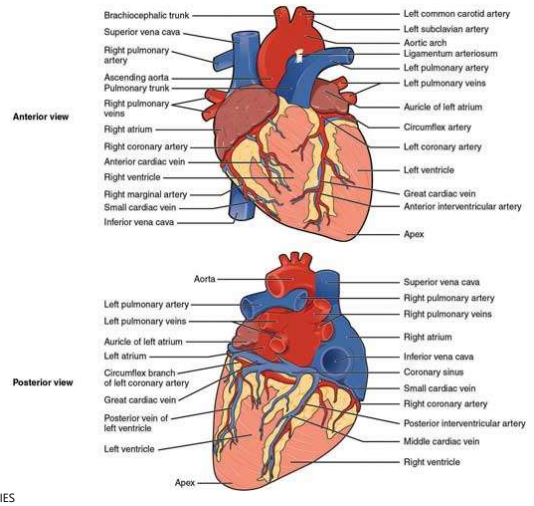
When this parasympathetic outflow reduces, it increases heart rate to over 100bmp.

This is further brought about, by an increase in sympathetic outflow.

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ARTERIES AND VEINS

- Part of the blood system
- Arteries carry oxygen-rich blood to different parts of the body
- Largest artery is aorta
- Veins carry oxygen-poor blood to the heart
- Superior vena cava and inferior vena cava are the largest
- Capillaries connect veins and arteries



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Arteries, and veins, are a part of the blood system, that is responsible for transporting blood, to and from the heart.

The arteries carry oxygen-rich blood, from the heart to different parts of the body. The aorta is the largest artery, and they branch many times, and become smaller as they go farther from the heart.

Veins are the blood vessels, that bring oxygen-poor blood from the different parts of the body, to the heart.

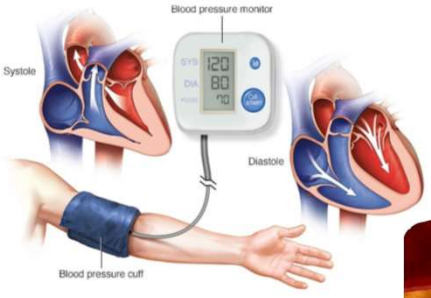
These veins become larger, as they get closer to the heart.

The superior vena cava, is the largest vein that brings blood from the head, and arms while the inferior vena cava, is the vein that brings blood from the abdomen and legs.

There are also small blood vessels called capillaries, that connect the arteries and the veins, to allow oxygen and waste to pass from our body cells.

What is Blood Pressure?

- Flow of blood against the walls of arteries
- Systolic – The Push while heart is beating
- Diastolic – The Push while the heart is at rest
- Systolic is more important for cardio emergencies





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At the simplest level, blood pressure is the flow of blood, against the walls of the heart.

This pressure, arises due to the constant pumping action, of the heart.

So what does blood pressure actually mean?

blood pressure determines how hard, the blood is pushing against the walls of the arteries.

This pressure is recorded in two numbers.

They are the systolic, and diastolic blood pressure.

The systolic blood pressure indicates, how hard the blood is pushing against the artery walls, when the heart beats .

The diastolic pressure, indicates how hard the blood is pushing, when the heart is resting between beats.

Out of the two, systolic blood pressure is more important, from a cardiovascular emergency standpoint.

With this, we come to the end of this lesson.

and in the next one, Justin will take you through the pathophysiology of the heart.