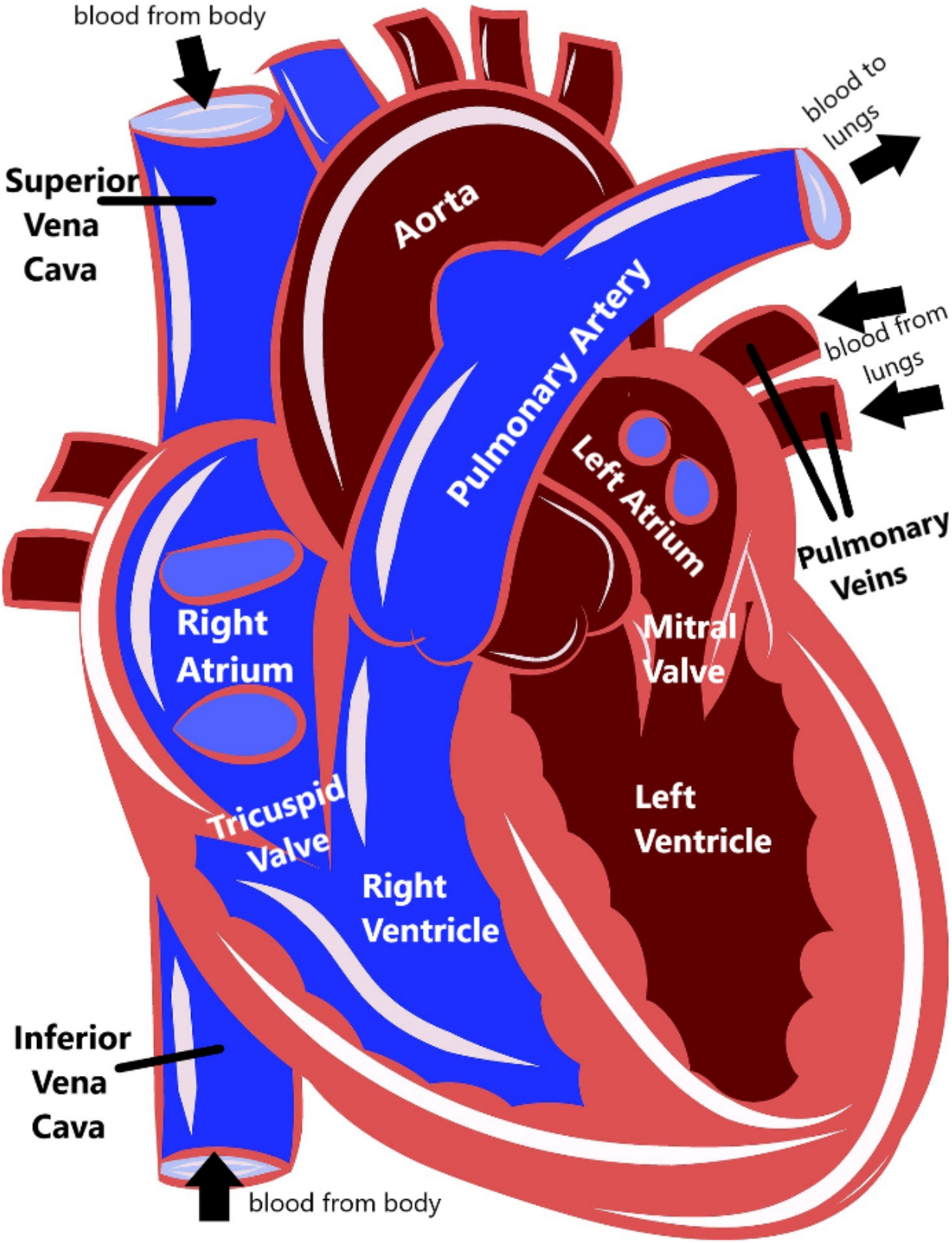
The Heart: What's the deal?

The heart is one of the more complex and vital organs in our body, responsible for pumping blood that carries oxygen all throughout our bodies via the blood vessels. To better understand health conditions that can affect our heart, it is important to first have an understanding of how the heart is supposed to work.


blood from body
Superior Vena Cava
Aorta
blood to lungs
Pulmonary Artery
blood from lungs
Left Atrium
Pulmonary Veins
Right Atrium
Mitral Valve
Tricuspid Valve
Left Ventricle
Right Ventricle
Inferior Vena Cava
blood from body

As you can see, the heart is divided into four main chambers: the left atrium and right atrium at the top, and the left ventricle and right ventricle at the bottom. The blue on the diagram is blood that has already delivered oxygen to the body (deoxygenated blood) and is coming back to the heart to get more. The deoxygenated blood comes into the right atrium via two structures called the superior vena cava and the inferior vena cava. Then the right atrium pumps the blood through the tricuspid valve into the right ventricle. The right ventricle then pumps the blood out of the pulmonary artery to the lungs. When the blood gets to the lungs, it gathers up more oxygen and then is pumped through the pulmonary veins into the left atrium. The left atrium pumps blood through the mitral valve into the left ventricle. Then, the left ventricle pumps blood out the aorta, which delivers it back out to the body. This is how our blood can circulate and repeatedly carry oxygen to all the different organs and tissues in our body.

The heart also has an electrical system that sends out signals that trigger the heart muscles to contract, which controls our heart rate and our heart rhythm. The electrical signal starts at the top of the heart called the sinoatrial node, which functions as kind of a natural pacemaker, and that signal travels down the heart, stimulating the atria and then the ventricles to contract, which produces our heart beat.

Cardiovascular disease

Cardiovascular disease is a term that can be used to describe a group of health conditions that affect the heart and/or blood vessels. There are many different things that can contribute to our cardiovascular system not functioning how it should, including age, environment, and lifestyle factors such as diet and exercise. There are certain types of cardiovascular disease that can be more strongly genetic, or hereditary, and can appear to run in families.

Conditions that directly affect the heart are generally broken up into two main categories: arrhythmias (which affect the electrical system in the heart), and cardiomyopathies (which affect the structure and muscle of the heart). Some heart conditions affect both the rhythm and the structure of the heart, so may fit into both the arrhythmia and cardiomyopathy categories. Conditions that affect the cardiovascular system as a whole can lead to a buildup of cholesterol in the body, or an increased chance for blood vessels to rupture. Other conditions may include those that affect the formation and overall structure of the heart and/or blood vessels, called congenital heart defects.

It can be difficult to determine if someone has an increased hereditary risk for cardiovascular disease, so meeting with a provider who is experienced with cardiovascular

genetics is important to get the most up-to-date and accurate information. Below are some cardiovascular conditions that may be more likely to be hereditary:

Arrhythmias (affect the electrical system in the heart)

- Arrhythmogenic right ventricular cardiomyopathy (ARVC)
- Brugada syndrome
- Catecholaminergic polymorphic ventricular tachycardia
- Long QT syndrome

Cardiomyopathies (affect the structure and muscle of the heart)

- Familial dilated cardiomyopathy
- Familial hypertrophic cardiomyopathy
- Left ventricular noncompaction
- Arrhythmogenic right ventricular cardiomyopathy

Cardiovascular (affect the heart and blood vessels)

- Familial hypercholesterolemia
- Familial thoracic aortic aneurysm and dissection (including Marfan syndrome, Loeys-Dietz syndrome, and Ehlers-Danlos, vascular type)

Click here to learn more about scheduling a genetic counseling appointment for questions about pediatric or adult genetic conditions.