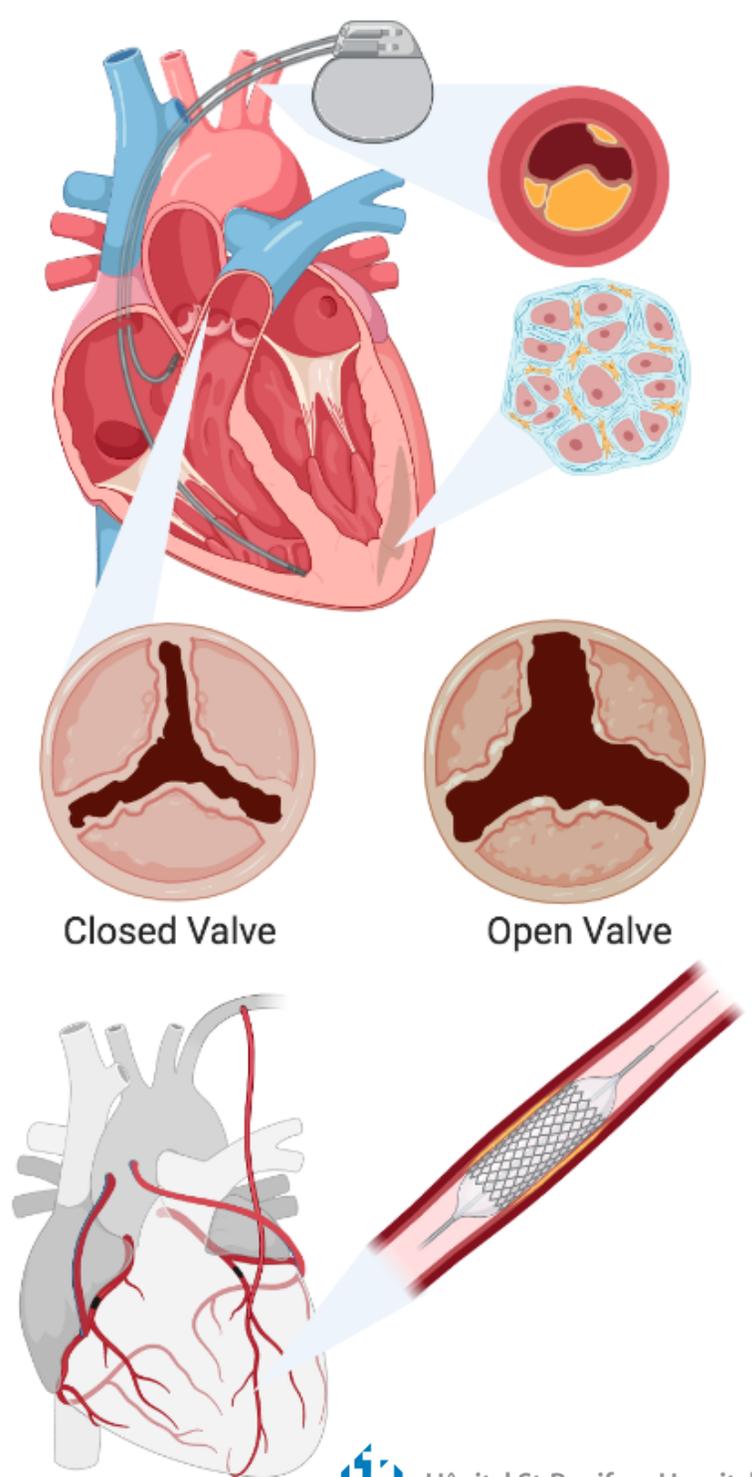
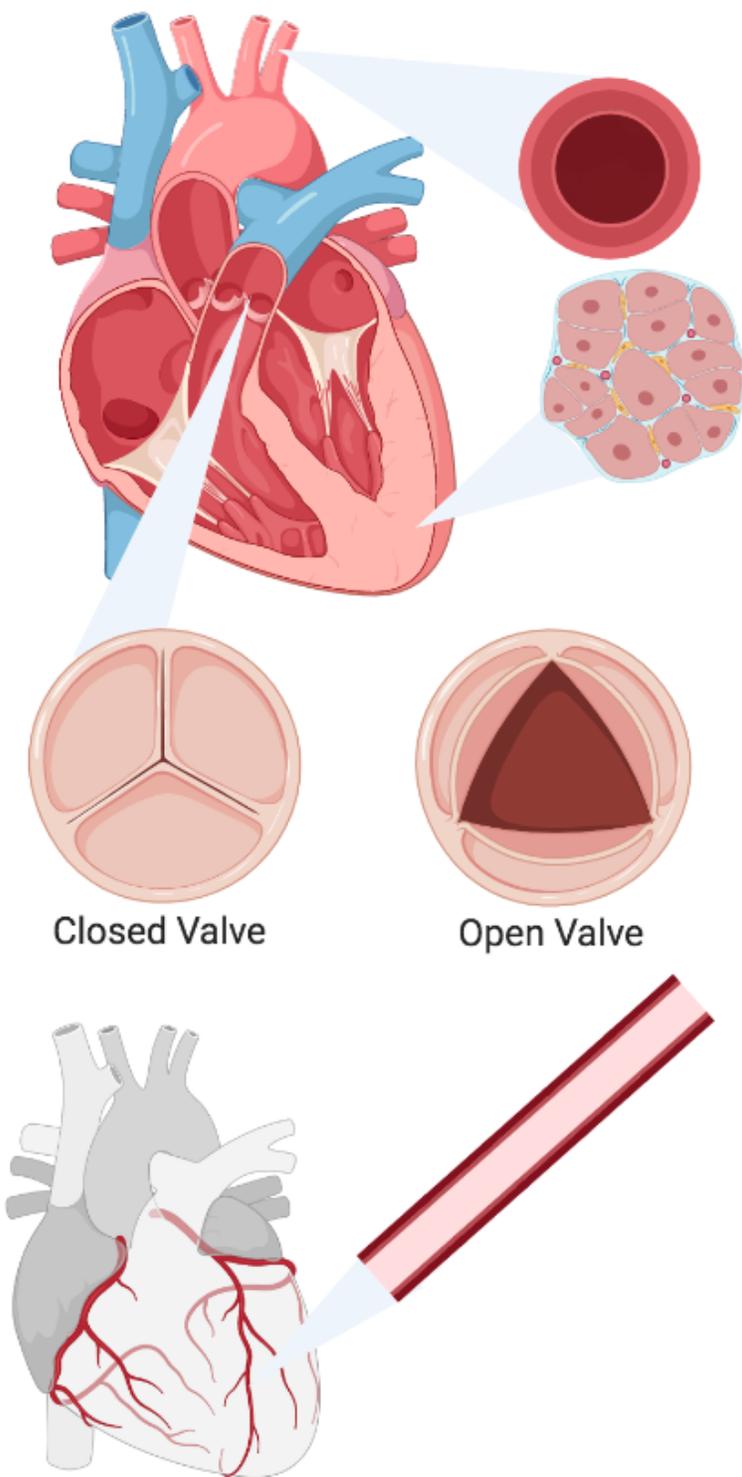


# Hearts and Heart Disease

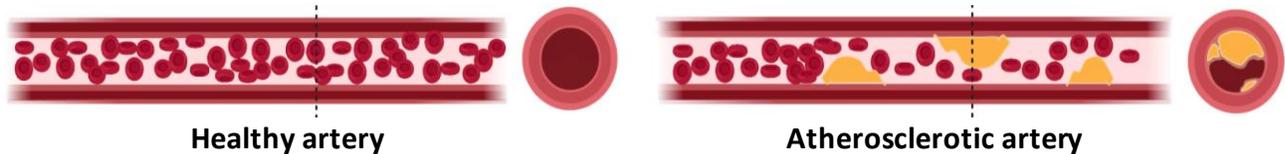
# What's the Big Difference?

What's the big difference between a healthy heart and a diseased heart? Heart disease can be caused by many different problems. Compare the healthy and sick hearts below, spot the 10 differences, then read through the handout to learn some of the common changes that lead to heart disease.



## Atherosclerosis

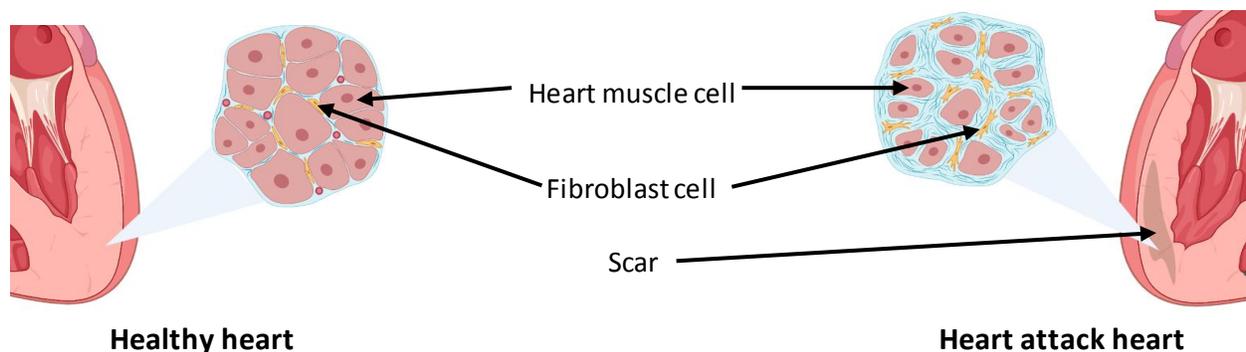
**Arteries** are **thick** and **stretchy** tubes that bring oxygenated blood from our heart to all of the cells in our body. As we age, we can start developing habits that may not be so good for our arteries. Things like smoking and eating a diet high in saturated fats can begin to damage the inner lining of our arteries. This damage allows sticky substances called **plaques or fatty deposits** to build up on the inside of our arteries. Over time as the plaques get bigger and bigger, and our stretchy arteries start to stiffen, it gets really hard for blood cells to travel through our arteries. This is called **atherosclerosis**.



If our arteries become too stiff and completely clogged up from the plaques, our blood cells can clot and get stuck and the cells relying on that blood for oxygen and nutrients begin to die. If this happens in a coronary artery, the ones that deliver blood to heart cells, this can cause a **heart attack**.

## Heart attacks

Our hearts are **big** and **powerful** organs made of lots of muscle cells glued together by super sticky cells called **fibroblasts**. Your heart works really hard to pump blood through arteries to make it to all of the cells in your head to all of the cells in your toes! Although our hearts work really hard to get blood to all of the cells of the body, it also needs blood with lots of yummy **nutrients** and **oxygen** to work properly. We have special arteries called **coronary arteries** that send blood to our heart cells. If those arteries get clogged from smoking or fatty plaques, our heart cells begin to die, which is called a **heart attack**.



The problem with heart attacks is, when heart muscle cells die, they don't grow back. We can't keep walking around with a hole in our hearts where muscle cells used to be! Fibroblasts work very hard and very fast to crawl into the area where you had a heart attack and squirt out sticky glue called **collagen** to repair the damage and we end up with a **scar** on our hearts. But there is a difference between scar on your knee and a scar on your heart. A scar on your knee doesn't keep spreading to take over your entire leg, but a scar on your heart can spread into the healthy muscle tissue that remains. This makes the muscle stiffer, which affects the heart's ability to pump. We call this **cardiac fibrosis**, a condition that can lead to **heart failure**.



## Valve stenosis

The **valves** in our heart have a very important job, they **open and close** like little doors to coordinate the movement of blood through our hearts. When our valves are open, blood moves through the heart in the right direction, and when our valves are closed, this prevents the backflow of blood in the wrong direction. Sometimes fat or calcium can build up on our valves and make them **stiff**, which is called **valve stenosis**. As our valves stiffen, it becomes really hard for our valves to open all of the way to let enough blood through, and they don't close fully, so you can get a backflow of blood moving in the wrong direction. Both of these things make it harder to get blood out to the body, so our hearts have to work extra hard if we have **valve stenosis**.



## Surgical procedures and interventions

Thanks to advances in **research** and **medicine**, doctors are able to treat many of the heart problems people commonly have! Sometimes people's hearts aren't able to beat in a normal rhythm, so to help hearts keep the beat, doctors can implant a device called a **pacemaker**, which sends little electrical signals to the heart to tell it when to beat. Every time the heart receives an electrical signal, it beats!

When our arteries get clogged from smoking and plaque build up, doctors can insert a tiny mesh tube into the artery called a **stent**. This mesh tube gets threaded into your artery until it reaches the blockage, then the mesh tube gets inflated with a tiny balloon until your artery is widened and blood flow is restored! The balloon gets removed but the stent stays in place to keep the artery open.

Another way to help return blood flow to an area blocked by a heart attack is **bypass surgery**. A doctor can take a healthy artery from another part of your body and stitch one end before the blockage and the other end after the blockage to restore blood flow to the area. It's kind of like making a nice detour for the blood instead of making it sit in traffic all day!

