Welcome to this lesson today on the cardiac conduction system. Today we will be discussing how heart contractions occur by certain cells located within the heart. So about 1%, a very small group of the cells within the heart, are part of this cardiac conduction system. So this group of cells are self-exciting. And basically what they do is produce electrical signals, or electrical impulses, that stimulate heart contractions. So these cells that are a part of the cardiac conduction system act like a pacemaker. And they drive our heart contractions. And you know our heart contractions are very important, because our heart contractions are what pump blood throughout our body.

And these cells that are a part of the cardiac conduction system that drive these heart contractions are independent of the nervous system. So this is a really interesting fact, because even if all nerves that were leading to the heart were cut, our heart would still be able to beat. So these cells that are part of the cardiac conduction system are independent of the nervous system.

So we’re going to take a look at our diagram right here and label a few of the important parts that we need to know to understand the cardiac conduction system. So the first part that we’re going to label right here is the sinoatrial node. And then we’re also going to label here is our atrioventricular node. Now these two nodes are made up of these self-exciting heart cells. We have our sinoatrial and our atrioventricular nodes. So these two nodes played a huge role in the cardiac conduction system.

And then connected to those, we have conducting muscle fibers. So they’re connected to these conducting muscle fibers that spread throughout the atria and the ventricles. And I'll explain the importance of these in just a moment. OK, so we’re going to discuss how these structures allow for stimulation of heart contractions. OK, so basically what happens is the sinoatrial nodes, which I have labeled right here, those will produce an excitation wave. And that wave will spread over both of the atria. So our atria are the upper chambers of our heart. We have one here and one here.

OK, so it's going to spread from our left atria to our right atria. And these signals for contraction spread so fast that the cardiac muscle cells will contract together almost as one unit. So as this excitation wave spreads through the atria, it causes these, all of the cells, to contract simultaneously. And so we have our atria then contracting. And when our atria contracts, it allows blood to flow into our ventricles.

OK, so then what happens is that wave will start to slow down as it reaches our atrioventricular node, which is the second node. So it starts to slow down and will move along those conducting muscle fibers, down towards our ventricles. So the slower conduction in the atrioventricular node is important, because it allows for the atria to have time to finish contracting before the ventricles contract. OK, so we have the wave of excitation spreading over the
atria, and the atria contracting, pushing blood down into the ventricles.

While that's happening, the excitation wave is moving back to the atrioventricular node and slowing down. And that moves along those conducting muscle fibers slowly until it gets to the ventricles. And then once the atria are done contracting and the blood has filled out the ventricles, the ventricles can then contract. So that signal will allow those ventricles then to contract and pump the blood either through the pulmonary valve or the aortic valve. OK, so that SA node, or the sinoatrial node, is what generates our normal heartbeat. And it provides the stimulus for these important heart contractions.

So if you've known somebody who's had an artificial pacemaker before, it's because there was some sort of malfunction in their own sinoatrial node. So an artificial pacemaker is then implanted so that they still have the stimulus providing these heart contractions, providing the signals for these heart contractions.

So this lesson has been an overview on the cardiac conduction system.