

- The SA node sends out an electrical signal to make both atria contract at the same time
 - When the heart is at rest, the SA node sends out signals every 0.8 seconds giving you a heart rate of 72–75 beats/minute
 - It is controlled by nerves from the brain
- Also in the right atrium is another mass of specialized muscle tissue known as the *atrioventricular node (AV node)*
 - The AV node receives the signal from the SA node, delays for approximately 0.1 seconds and then sends out another electrical signal
 - This signal goes to the thick muscular ventricles and results in their contraction
- As we exercise, the heart rate needs to increase above the resting heart rate, because there's an increased demand for oxygen and a need to get rid of the increased levels of carbon dioxide
 - An area of our brainstem, called *medulla*, chemically senses the increase in carbon dioxide
 - The medulla sends a signal through a cranial nerve, called *cardiac nerve*, to the SA node to increase the heart rate to an appropriate level
 - The signal doesn't change the mechanism of how the heart beats, just the timing
 - When the level of carbon dioxide in the bloodstream begins to decrease, another signal is sent from the medulla
 - This time through a different cranial nerve, called *vagus nerve*
 - The heart returns to its myogenic/resting heart rate
- The heart rate can also be influenced by chemicals
 - One of the most common is *adrenaline/epinephrine*
 - Produced by the adrenal glands (part of the kidneys)
 - In periods of stress or excitement
 - It causes the SA node to “fire” more frequently giving a more frequent heartbeat
- The cardiac muscle is branched, making signals travel efficiently throughout the heart

Changes in pressure

- The change in pressure explains the movement of blood through and out of each chamber of the heart