

Experiment HH-2: The Electrocardiogram and Heart Sounds

Background

Blood enters the arterial system from the ventricles of the heart in a pulsatile manner. However, when blood is leaving the arterial system through the capillaries, it flows in a continuous manner. Between contractions, when the heart is relaxed and blood is not being pumped into the arterial system, there is still enough pressure in the arterial system to move blood along the arteries. The pressure in the arterial system exists because the elasticity of the arteries allow them to distend and recoil and function as a pressure reservoir.

When the ventricles contract, the pressure of the blood inside the ventricles increases to close the atrioventricular valves. Further contraction increases the ventricular pressure until it exceeds the arterial pressure. At this point, when the arterial pressure is at its lowest point during the cardiac cycle (called diastolic pressure) the semilunar valves are forced open, and blood flows into the artery. Blood entering the arterial system inflates the arteries a little and increases blood pressure to a maximum, which is the systolic pressure.

In this lab you will record the ECG from a subject and listen to the characteristic “lub-dub” heart sounds. The “lub” sound occurs during the early phase of ventricular contraction and is produced by closing of the atrioventricular valves, which prevents blood flow into the atria. When the ventricles relax, the blood pressure drops below what is in the artery and the semilunar valves close, producing the “dub” sound.