Cardiovascular Physiology (EX 6)

# Activity 1: Investigating the Refractory Period of Cardiac Muscle

1. Explain why the larger waves seen on the oscilloscope represent ventricular contraction.
2. Explain why the amplitude of the wave did not change when you increased the frequency of the stimulation. (Hint: Relate your response to the refractory period of the cardiac action potential.) How well did the results compare with your prediction?
3. Why is it only possible to induce an extrasystole during relaxation?
4. Explain why wave summation and tetanus are not possible in cardiac muscle tissue. How well did the results compare with your prediction?

# Activity 2: Examining the Effect of Vagus Nerve Stimulation

1. Explain the effect that extreme vagus nerve stimulation had on the heart. How well did the results compare with your prediction?
2. Explain two ways that the heart can overcome excessive vagal stimulation.
3. Describe how the sympathetic and parasympathetic nervous systems work together to regulate heart rate.
4. What do you think would happen to the heart rate if the vagus nerve was cut?

# Activity 3: Examining the Effect of Temperature on Heart Rate

1. Explain the effect that decreasing the temperature had on the frog heart. How do you think the human heart would respond? How well did the results compare with your prediction?
2. Describe why Ringer’s solution is required to maintain heart contractions.
3. Explain the effect that increasing the temperature had on the frog heart. How do you think the human heart would respond? How well did the results compare with your prediction?

# Activity 4: Examining the Effects of Chemical Modifiers on Heart Rate

1. Describe the effect that pilocarpine had on the heart and why it had this effect. How well did the results compare with your prediction?
2. Atropine is an acetylcholine antagonist. Does atropine inhibit or enhance the effects of acetylcholine? Describe your results and how they correlate with how the drug works. How well did the results compare with your prediction?
3. Describe the benefits of administering digitalis.
4. Distinguish between cholinergic and adrenergic chemical modifiers. Include examples of each in your discussion.

# Activity 5: Examining the Effects of Various Ions on Heart Rate

1. Describe the effect that increasing the calcium ions had on the heart. How well did the results compare with your prediction?
2. Describe the effect that increasing the potassium ions initially had on the heart in this activity. Relate this to the resting membrane potential of the cardiac muscle cell. How well did the results compare with your prediction?
3. Describe how calcium channel blockers are used to treat patients and why.