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Name: \_\_\_\_\_

## Cardiovascular III: Pharmacology

### LAB REPORT / QUESTIONS

Experimental Procedure	Heart Rate	Force	EXPLANATION
Normal			
Epinephrine			
Acetylcholine			
Caffeine			
Pilocarpine			
Atropine			
Calcium (CaCl <sub>2</sub> )			
Nicotine			
Potassium (KCl)			
Defibrillation			
Ligature			

## Questions for Exercise

1. Use the summary sheet above to describe the expected effects on the cardiac rate (chronotropic effects) and contractility (inotropic effects) in general terms (i.e. increases, decreases, stays the same) for each exercise. You MUST also be able to explain the mechanism in each instance.
2. Define the following terms:
  - a. Cholinergic
  - b. Adrenergic
  - c. Mimetic
  - d. Agonistic
  - e. Lytic
  - f. Antagonistic
3. What is a sympathomimetic drug (describe this type of drug and provide an example)? What are its effects on the heart?
4. What is a parasympathomimetic drug (describe this type of drug and provide an example)? What are its effects on the heart?
5. What is a parasympatholytic drug (describe this type of drug and provide an example)? What are its effects on the heart?
6. Describe the mechanisms utilized by epinephrine which result in the increase in cardiac rate.
7. Explain why acetylcholine has differential effects on cardiac tissue, depending upon the mode of application. (What neurons is ACh binding to?)

8. Explain the effects of nicotine on cardiac tissue. How does it compare to the effects of acetylcholine? Explain. (What neurons is nicotine binding to?)
  
9. Explain how pilocarpine works. Describe the mechanism of action of pilocarpine.
  
10. Explain how atropine is able to counteract the effects of pilocarpine?
  
11. Explain how application of calcium functions to produce increased cardiac contraction strength (positive inotropic affects)?
  
12. Explain the mechanism of action of Caffeine. Does Caffeine stimulate heart rate or potentiate the effect of sympathetic stimulation? Explain.
  
13. What are the effects of hyperkalemia on the heart? Describe the effect not the mechanism of action.

14. Since the resting membrane potential of all cells is determined in large part by the concentration gradient of potassium across the membrane, elevations in extra-cellular potassium concentration cause a decrease in the resting potential. In hyperkalemia (high plasma potassium), the strength of myocardial contraction is reduced and the cells become more electrically excitable.
- Explain why hyperkalemia could result in weakened contractility?
  - Explain why hyperkalemia results in a tissue hypersensitivity leading to possible production of ectopic pacemakers?
15. Explain the cause of fibrillation (i.e. explain circus rhythms) and how applying a large electric shock (defibrillation) can potentially restore a normal rhythm.
16. Define heart block and describe the differences between the three degrees of heart block.
17. What is Starling's law of the Heart? Explain how stretching the heart increases contractility.