

GROUP NO: 1

GROUP MEMBERS: Shaira Rizza C. Lopez

INTRODUCTION

The cardiac automatism is the ability of the cardiac muscle to contract rhythmically and independently without the intervention of the other extracardiac regulating factors. This property provides the heart the ability to contract rhythmically even when all the nervous, vascular and physical connections of the organ with the rest of the body is severed.

The completely isolated heart can continue its activity if the following conditions are assured:

- perfusion (the circulation of a liquid through the cardiac compartments) with a solution under a certain pressure;
- the solution used for perfusion must provide the energetic substrate necessary to the cardiac activity;
- optimal temperature

Under these circumstances the heart will continue its activity independently for a long time.

Principle

Record the mechanical activity of the heart while it is being perfused with isotonic fluid containing various concentrations of ions (Ca^{2+} , K^{+}) and chemical mediators (epinephrine and acetylcholine).

METHODOLOGY

The graphical recording consists of:

- recording the cardiogram while the isolated heart is being perfused with Ringer's solution
- recording the cardiogram while perfusing the isolated heart with calcium ion free solution (accomplished by using an ammonium oxalate solution)
- recording the cardiogram while perfusing the isolated heart with a calcium chloride solution
- Recording the cardiogram while perfusing the isolated heart with potassium chloride solution
- Recording the cardiogram while perfusing the isolated heart with epinephrine
- Recording the cardiogram while perfusing the isolated heart with an acetylcholine

DISCUSSION AND OBSERVATIONS

1. What did you observe in the cardiogram of the heart perfused with Ringer's solution? What can you say about the effect of Ringer's solution on the myocardial activity?
the cardiogram of the heart while it was perfused with ringer's solution is at normal. the ringer solution allows the heart to have a normal cardiac cycle.

2. What did you observe in the cardiogram after perfusing the heart with calcium ion – free solution? What can you say about the effect of this solution on the cardiac muscle?
after perfusing the heart with calcium-ion free solution (ammonium oxalate), the cardiac activity slowly decreased then slowly increased and returned to its normal cardiac cycle. the cardiac contraction amplitude decreased. this solution affects the heart by slowly decreasing the strength of its activity.

3. What did you observe after perfusing the heart with calcium chloride solution? What can you say about the effect of calcium chloride solution?
after perfusing the heart with calcium chloride solution, the heart had an increased contraction amplitude. then after immediate application of another drop of the solution, it caused calcium rigidity where the heart stops during its contraction phase.

4. What did you observe after perfusing the heart with potassium chloride solution? What can you say about the effect of potassium chloride solution on heart muscles?
after perfusing the heart with potassium chloride, there was a decreased contraction amplitude in the heart. too much potassium chloride solution can cause potassic inhibition where the heart stops at diastole when the heart is on its relaxation phase.

5. What did you observe after perfusing the heart with epinephrine? What can you say about the effect of epinephrine?
after perfusing the heart with epinephrine, there was an increase on its amplitude and frequency of contraction. epinephrine affected the heart by increasing its cardiac activity.

6. What did you observe after perfusing the heart with acetylcholine? What can you say about the effect of acetylcholine?

VPHY 50: General Physiology Laboratory Exercises

after perfusing the heart with acetylcholine, the amplitude and frequency of contraction decreased thus decreasing the cardiac activity of the heart.

7. Which solutions increased the heart rate and which slowed it down?
the solutions which increased the heart rate were calcium chloride solution and epinephrine. on the other hand, ammonium oxalate solution, potassium chloride solution and acetylcholine caused the cardiac activity to slow down or decrease.
-
-