

GROUP NO: 2

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## 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:

- a. perfusion (the circulation of a liquid through the cardiac compartments) with a solution under a certain pressure;
- b. the solution used for perfusion must provide the energetic substrate necessary to the cardiac activity;
- c. 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 ( $\text{Ca}^{2+}$ ,  $\text{K}^{+}$ ) and chemical mediators (epinephrine and acetylcholine).

## METHODOLOGY

The graphical recording consists of:

1. recording the cardiogram while the isolated heart is being perfused with Ringer's solution
2. recording the cardiogram while perfusing the isolated heart with calcium ion free solution (accomplished by using an ammonium oxalate solution)
3. recording the cardiogram while perfusing the isolated heart with a calcium chloride solution
4. Recording the cardiogram while perfusing the isolated heart with potassium chloride solution
5. Recording the cardiogram while perfusing the isolated heart with epinephrine
6. 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?

We just observed that the heart was in normal rate and when the Ringer's solution was put or perfused with cardiogram of the heart, the heart continues to beat.

The effect of the Ringer's solution in the myocardial activity was not really have effect on heart.

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?

Cardiogram becomes slow and it's decreasing it's graph. The calcium ion - free solution was the caused by decreasing the cardiogram. Calcium ion can make the cardiac muscle more weaker and make it slow, to cause a slow heart rate.

3. What did you observe after perfusing the heart with calcium chloride solution? What can you say about the effect of calcium chloride solution?

The effect of the calcium chloride solution, was to increase the heart rate and becomes too fast. The cardiogram increase for just a second and start to fall , and then it back to it's normal graph. This solution makes the heart to beat faster.

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?

The reaction that happen when the potassium chloride was put on the heart, the heart rate decreased in just a short period of time. It make also the heart beat slower and weaker, then just like in other solutions, it's slowly back to normal heart rate.

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

The Epinephrine caused the heart rate increased. it makes the heart more faster and stronger beat.

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

The effect of acetylcholine is to decrease the heart rate. It is not the other solutions that drastically increasing or decreasing heart rate. Acetylcholine helps us to maintain the normal heart rate and help us to relax and while at were rest.

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7. Which solutions increased the heart rate and which slowed it down?  
Epinephrine and calcium chloride were the solutions that increased the heart rate, while the Acetylcholine and calcium ion were the solutions that decreased the heart rate.
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