

GROUP NO: 3

GROUP MEMBERS: Chenna Carol G. Rodrin

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?

I observed that it causes the stimulation of heart to function normally. And that it keeps the heart to beat normally.

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?

It causes the slow decrease of cardiac activity and this event happened for about 2-4 seconds.

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

I observed that perfusing the heart with calcium chloride solution causes the heart to beat fast and to perform fast cardiac activity.

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?

Based on what i observed, perfusing heart with potassium chloride solution will also have the same result as when you applied the heart with calcium ion-free solution. It decreases the heart beat.

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, it causes the slowly increasing of heart rate.

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

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I observe that acetylcholine causes the heart to slowly decrease its heart rate and that it also had the same effect as when you applied potassium chloride solution and calcium ion-free solution but less intense.

7. Which solutions increased the heart rate and which slowed it down?

Calcium ion-free solution, Potassium chloride, Epinephrine and Acetylcholine are solutions that slowed down the heart rate. Meanwhile, only Calcium chloride solution causes the increase of heart rate.