

Neurophysiology lab report

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Anatomy & Physiology Lab Report

Exercise 3 Activities 1-4, 8

A. Objective

I.

Activity 1-4: Eliciting a Nerve Impulse

- Investigate what kinds of stimuli stimulate action potential.

II. Activity 8: Nerve Conduction Velocity

- Determine and compare the conduction velocities of different types of nerves.

B. Introduction

I. Activity 1-4: Eliciting a Nerve Impulse

- In this experiment, we will be investigating what stimulates action potential on the nerve being tested on the oscillator.

The factors that helped determine action potential are voltage, single stimulus, Hydrochloric acid, sodium chloride, the glass rod, and heat.

II. Activity 8: Nerve Conduction Velocity

- In this activity, we will be investigating action potential like in activities 1-4, and the nerve conduction velocity. We will test an earthworm nerve, frog nerve, and two rat nerves on the oscillator. The factors that helped determine action potential were the Bio-amplifier, stimulator, ethanol, and voltage.

C. Materials

- PhysioEx CD-Rom, computer, lab manual.

D. Methods

I. Activity

1 Eliciting (Generating) a Nerve Impulse . Set Voltage at 1.

0V.

2. Click Single stimulus on the oscilloscope. Do you see any kind of response on the oscilloscope screen? (Red flat line appears on screen.)

- If no response, or a flat line occurs, it indicates there is no action potential.

Click the clear button, and increase the voltage and click single stimulus until you see a trace that indicates action potential.

- Threshold Voltage= 3. 0 Action Potential: Yes.

3. Print graph if desired.

4.

Increase voltage by 0. 5V and click single stimulus.

- Is there a difference between the two tracings? (The 3. 5V tracing is a little bit higher than the 3. V tracing.)
- What reason can you give for the change? (The second tracing had a higher threshold voltage.

)

- Record Data

5. Continue to increase voltage by 0.5V and click single stimulus until you find max voltage.

- Maximal Voltage = 10.0V
- Record data

Activity 2 Mechanical Stimulation

1. Clear the oscilloscope.

2. Drag the glass rod over the nerve, and release it to indicate the rod is touching the nerve.

- What do you see on the oscilloscope? (An action potential trace.)
- How does this tracing compare? (It has action potential, but different voltage from previous tracings.)

Activity 3 Thermal Stimulation

Click on the glass rod and drag it to the heater. Click the heat button.

When the rod turns red, indicating its been heated, click and drag it over the nerve. What happens? (The action potential of the tracing looks like it increases.)

- How does this trace compare to the unheated glass rod? (Action potential is higher.)
- Explanation? (The heated glass rod affects the nerve more than the cool glass rod.)

Activity 4 Chemical Stimulation

1. Click and drag the sodium chloride bottle over to the nerve to dispense drops.

Does this generate action potential? (No action potential takes place.)

2. Look at activity 1 and use voltage and click single stimulus. Is there anything different? (No difference.)

- Record data

- NaCl: Action Potential-Yes

3.

Clean nerve chamber, and clear the oscilloscope.

4. Click and drag HCl to nerve chamber

- Action Potential- Yes
- Different form threshold stimulus? No.

5. Clean nerve chamber.

6.

Print data.

- What kinds of stimuli can elicit an action potential? Voltage > or = 3. 0V, NaCl, HCl

Activity 8 Measuring Nerve Conduction Velocity

- See lab manual.

E. Results

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- Experiment: Eliciting a Nerve Impulse A

activities 1-4 Voltage Glass Bar NaCl HCl Heat Action Potential 3.

0

V-----Yes . 5 V-----Yes 10. 0 V-----Yes ----Yes----Yes
 -----Yes---Yes

Experiment: Nerve Conduction Velocity Activity 8 Nerve Type Time
 (msec) Distance (mm) Conduction Velocity Worm 5. 00s 43mm 8. 60 m/sec
 Frog 1. 56s 43mm 27.

56 m/sec Rat 12. 58s 43mm 16. 67 m/sec Rat 21. 00s 43mm 43 m/sec

F. Discussion

- In this experiment I investigated, the neurophysiology of different types of nerves.

In activities 1-4, I found what stimulates the nerve through different types of methods.

We used mechanical, thermal, and chemical stimulation on the nerve to find an action potential on the given nerve.

In activity 8, we measured the nerve conduction velocity of different types of nerves. The nerves we tested were the earthworm, frog, and two rat nerves. The worm had the slowest conduction velocity, followed by the first rat, then the frog, and the fastest one was the second rat. My conclusions about this experiment are that given enough voltage, or a chemical, mechanical, or thermal stimulation action potential can be found in a nerve.

Other factors that play a role in finding an action potential were natural substances such as NaCl, HCl, and ethanol.