Lab Report

PAPERS.

The Nervous System Lab Report

Name

Institutional Affiliation

Course Number

Professor's Name

Date

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Introduction

The nervous system develops as an interconnected network of cells. The largest neural organ is the vertebrate brain, but even simple animals have a nerve network. An important concept related to the nervous system is self-awareness. The nervous system monitors and controls virtually every organ structure through positive and negative response loops. The Central Nervous System includes the brain and the spinal cord. The peripheral nerve system links the Central nervous system to different body components and comprises piles of neurons (Birren, Woods, and Williams, 2018). Not all creatures have remarkably differentiated nervous systems. Those with easy schemes tend to be smaller, moving, vast, and immobile. Huge, moving creatures have highly evolved nervous systems: Developing nervous systems must have been an essential adaptation in body size and mobility development.

Majorly, the system is categorized into two. The first part comprises the central nervous system, or the CNS, which includes the brain and the spinal cord. The second part comprises the PNS or the peripheral nervous system, which comprises nerves and ganglia. The brain sends information through the spinal cord to the peripheral nerves of the body that control different muscles and organs (Kozloski, 2019). On the other hand, neurons are special cells in the system that relay information to cells in other nerves, muscles, or glands. Giant and moving creatures have significantly evolved their nervous system. The evolution of the nervous system must have been an important adaptation to the evolution of size and mobility. The nervous system is distinctive to animals and is essential for information recognition and interpretation, making decisions, and regulating body function and movement (Kozloski, 2019). The nervous system is composed of neurons and glial cells. Neurons are the primary functional cells, but glia play various auxiliary roles.

Objective

This lab will explore the anatomy and physiology of the nervous system. The exercises will study cellular structure, function, and simple neural networks inside the body.

Materials and Methods

To explore the nervous system, combined microscopic analysis and physiological exercises will be used. Gloves, microscopes, a brain sample, and a meter stick are needed for this lab.

In the first exercise, reflexes resulting from interconnected neuron networks controlling given functions will be used to examine the physiological functions at a basic level. The experiment will focus on measuring the neural network speed in connecting the visual and somatic motor systems; A meter stick will be used in this exercise. The task will be performed with a fellow student, and each student will do the task three times. Vertically hold the meter stick, with one end above the student's hand, which is open. The student should hold their hand open, and the thumb should be two or three inches apart from the other fingers. The stick should be held to start at zero, with the top side of the student's hand and the stick markings counting upwards. Without giving any warning, drop the stick. When the student closes their hand to catch it, note the distance it dropped by the figures at the top of the student's hands holding the stick.

In the second exercise, the brain specimen will be used to examine, note the listed structures, and recognize the main anatomical sections of the brain. Before starting the experiment, make sure to wear gloves. Identify the cerebrum part of the brain, next to the brain stem, with folded gray and white matter visible to the naked eye. Try to identify and name the different lobes, including the olfactory bulbs, optic nerves, frontal and temporal lobes, ventricles, and the meninges.

Identify the myoneural junction, the synaptic link between the motor neuron and the skeletal muscle cell. Using a microscope, try to get a better view of these structures. Pay some attention to the spinal cord, which is revealed by the central gray matter and white matter. The central canal comprises ependymal gl

Results

Student	**Trial 1(cm)**	**Trial 2(cm)**	**Trial 3(cm)**	**Average(cm)**
A	15	14	14.5	14.5
B	14	14.5	15	14.5

In the second exercise, the structures comprise several axons, skeletal muscle cells, and synapses. Big motor neuron cell bodies are positioned in the ventral gray matter, and their axons originate from the ventral motor root of a spinal nerve. Sensory neuron cell bodies are in the dorsal root ganglia, and their axons create the spinal nerve's dorsal sensory root.

Discussion and Conclusion

In the first exercise, due to the acceleration due to gravity, which is 9.8m/sec2, the speed of the students' reflexes can be calculated using the formula

$$time(sec) = \frac{\sqrt{2 \times distance(cm.)}}{980(\frac{cm}{sec2})}.$$

After comparing the average distances for the two students, the results indicated that the minimum amount of time a neuron requires to receive and send a signal is 120 meters per second.

In the second exercise, different properties of the nervous system are visible. The neurons mostly have cell bodies, axons, and dendrites. The nucleus and cytoplasm are components of the cell body. Axons extend from the cell bodies and usually give rise to small branches before ending at nerve endings. Dendrites receive messages from other neurons, extending from the cell body of a neuron. Synapses are the points of interaction between neurons. The most common type of synapse is the chemical synapse, which signals the exocytosis of neurotransmitter chemicals through an action potential (Birren, Woods, and Williams, 2018). Between cells are some direct membrane junctions called electrical synapses, allowing continuations of action potentials. The dendrites are enclosed with synapses made by the ends of axons from other neurons.

The nervous system's complex behavior is given by its structural complexity at the macro and micro levels. As a complex biological organ, the nervous system enables many humans and other animals to function in a coordinated fashion (Kottmeier et al., 2020). Studying neural activities is vital to understanding the relationship between the brain and behaviors. This can be achieved by examining reflexes resulting from interconnected neuron networks controlling given functions.

The nervous system is involved in sensation, or, in other words, receiving info about the environment and creating responses to the information, which are commonly known as motor responses. This whole system can be separated into sections responsible for sensation or according to different sensory and motor functions or responses (Kottmeier et al., 2020). However, another function should be included. Sensory input is combined with different emotional states, sensations, and memories. Some parts of the nervous system are termed association areas. The integration process combines sensory perceptions and advanced cognitive functions, including emotion and memories, to yield a response.

The sensation is one of the main functions of the nervous system, which is the reception of information about the surroundings to get input about what is happening. The sensory duty of the nervous system is to register the existence of a variation from homeostasis or a given event in the surroundings (Cantile & Youssef, 2016). The ordinary senses are taste, sight, touch, smell, and hearing. Chemical substances stimulate taste and smell, while sight and hearing are stimulated by light and sound. On the other hand, touch is a physical stimulus that cooperates with the skin. Notably, there are more senses than those mentioned (Cantile & Youssef, 2016). Additional sensory stimuli could be from within the body, such as the concentration of given ions in the blood. The nervous system responds depending on the stimuli received by sensory structures. For instance, the response would be muscle movement, such as withdrawing a foot from a hot spoon. The nervous system may make the three muscle tissue types contract. For instance, the skeletal muscle contracts to move the skeleton, and the cardiac muscle is influenced during exercise as the heart rate increases.

References

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