

# CHAPTER 14 COORDINATION AND RESPONSE

## CHAPTER 14.1 Neurons

A neuron is a nerve cell that is the basic building block of the nervous system. Neurons are similar to other cells in the human body in a number of ways, but there is one key difference between neurons and other cells. Neurons are specialized to transmit information throughout the body.

These highly specialized nerve cells are responsible for communicating information in both chemical and electrical forms. There are also several different types of neurons responsible for different tasks in the human body.

Sensory neurons carry information from the sensory receptor cells throughout the body to the brain. Motor neurons transmit information from the brain to the gland muscles of the body. Relay neurons are responsible for communicating information between different neurons in the body.

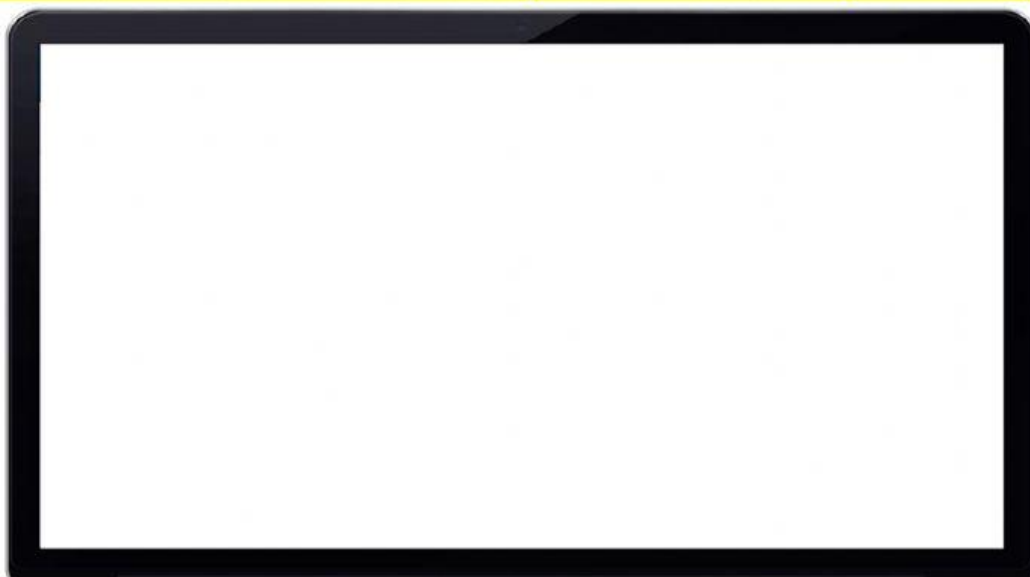
*Neuron adalah sel saraf yang merupakan blok binaan asas sistem saraf. Neuron adalah serupa dengan sel-sel lain dalam tubuh manusia dalam beberapa cara, tetapi terdapat satu perbezaan utama antara neuron dan sel-sel lain. Neuron adalah khusus untuk menghantar maklumat ke seluruh badan.*

*Sel saraf yang sangat khusus ini bertanggungjawab untuk menyampaikan maklumat dalam bentuk kimia dan elektrik. Terdapat juga beberapa jenis neuron yang bertanggungjawab untuk tugas yang berbeza dalam tubuh manusia.*

*Neuron sensori membawa maklumat dari sel reseptor deria dari seluruh badan ke otak. Neuron motor menghantar maklumat dari otak ke kalenjar dan otot-otot badan. Neuron relay bertanggungjawab untuk menyampaikan maklumat dari neuron yang berbeza di dalam badan.*

[source: <https://www.verywellmind.com/what-is-a-neuron-2794890>]

*Let's watch a video: The Nervous System: The Neuron (Nerve Cell)*



1. To understand the neurone, we need to be able to identify the type of neurones along with their unique structure.

(a) Neurones share the same basic structure of any animal cells. This include:  
(select the correct answer)

chloroplast  
cell wall  
nucleus  
vacuole  
cytoplasm  
cell membrane

(b) To carry out their function, the neurone structure requires special adaptations.  
(match the correct answer)

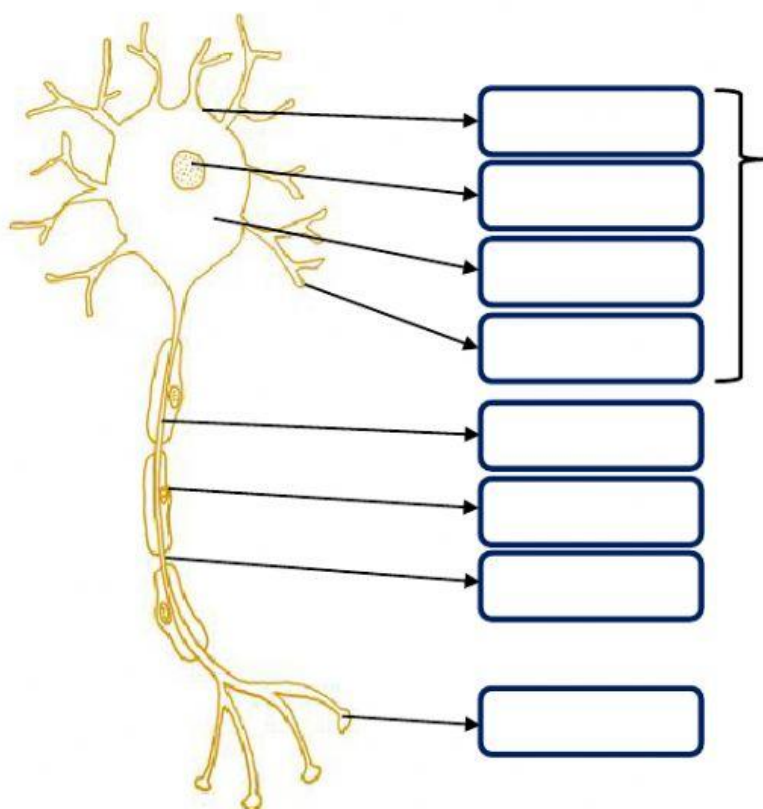
myelin sheath

axon

dendrite

- \_\_\_\_\_ - long and thin cytoplasmic fibre to transmit nerve impulses
- \_\_\_\_\_ - short cytoplasmic fibre to pick up nerve impulse from other neurones.
- \_\_\_\_\_ - layer of fat and protein that wrapped and insulates the axon to transmit impulse faster

(c) Below is a picture of a neurone. Match the correct answer.



dendrite

nucleus

cytoplasm

node of Ranvier

nerve ending

myelin sheath

axon

cell membrane

cell body

(d) Each type of neurones has different function in order to transmit the nerve impulses.

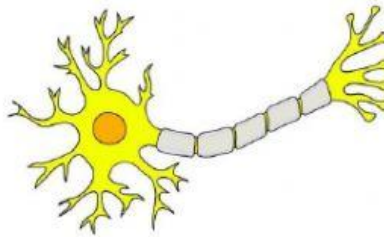
Each neurone carry impulse from a source (receptor/other neurone) to the target (effector/other neurone).

Match the neurone with its correct function.

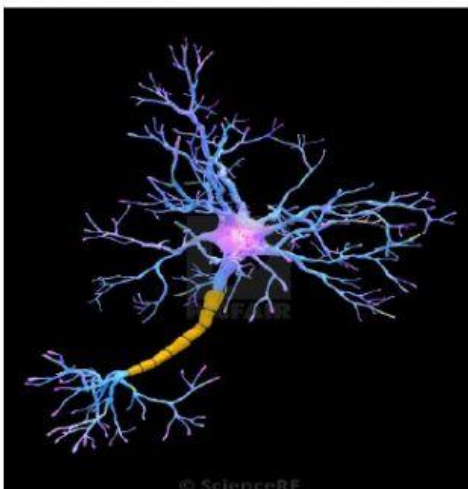
|                 |   |                                                    |
|-----------------|---|----------------------------------------------------|
| sensory neurone | ★ | ★ transmit nerve impulse to effector               |
| relay neurone   | ★ | ★ transmit nerve impulse from two different neuron |
| motor neurone   | ★ | ★ transmit nerve impulse from receptor             |

(e) Answer the following question.

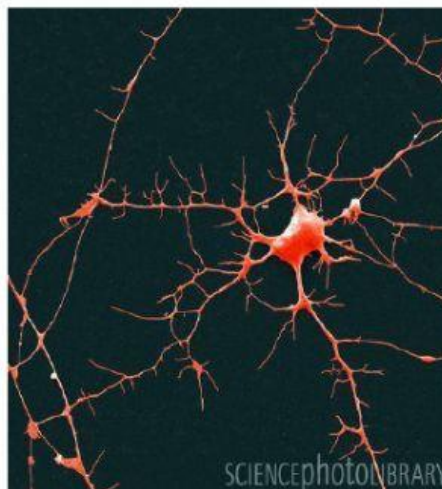
In a neurone cell, impulses travel from **dendrite** **nerve ending** to **dendrite** **nerve ending** . (choose the correct answer)



Some pictures of the neurones! (seen under electron microscope)



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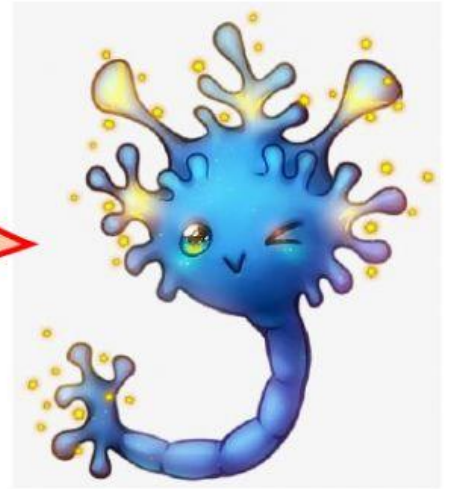


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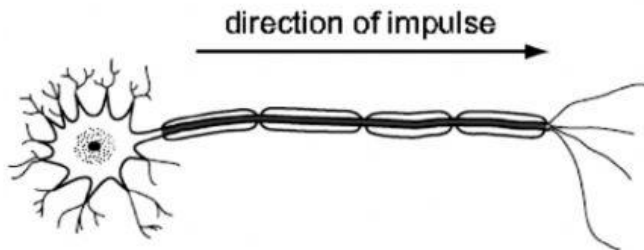


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To test your understanding on neurones, please answer all the following questions. Choose the correct answer. Let's hope that you can score all!



- 1 The diagram shows a neurone carrying an impulse.



Which row describes the type of neurone and the direction of impulse?

|   | Type of neurone | Direction of impulse      |
|---|-----------------|---------------------------|
| A | Motor           | Towards the spinal cord   |
| B | Motor           | Away from the spinal cord |
| C | Sensory         | Towards the spinal cord   |
| D | Sensory         | Away from the spinal cord |

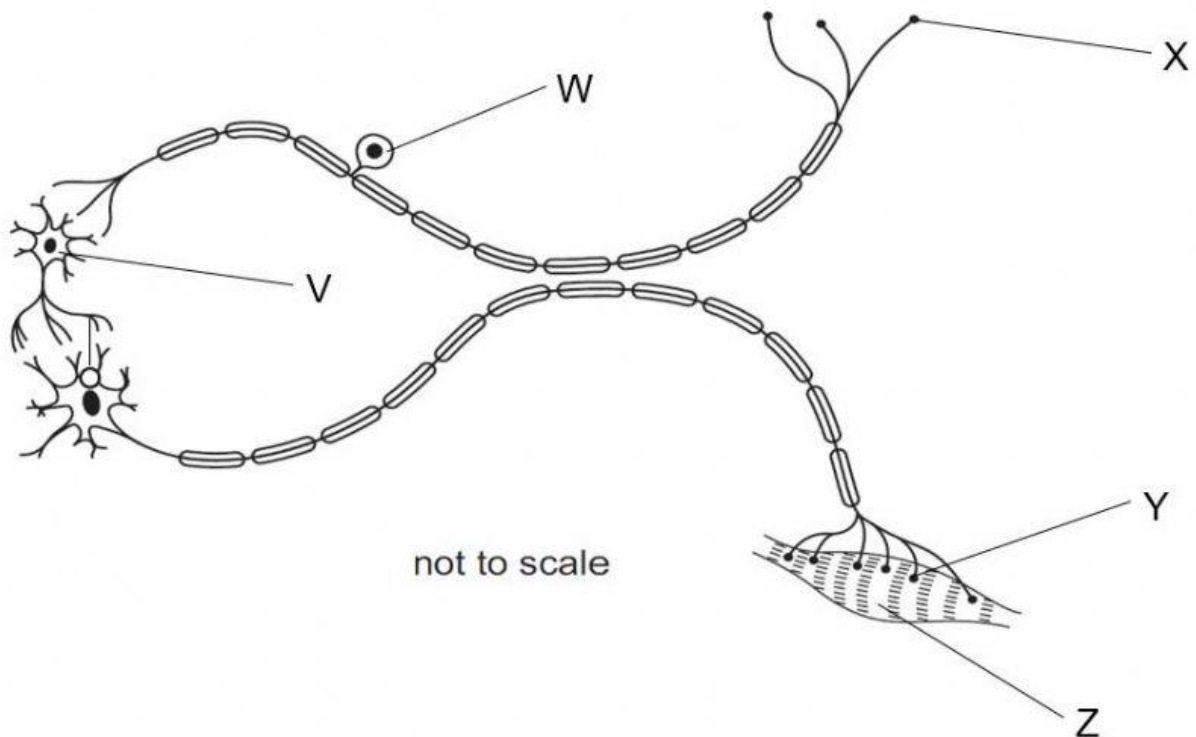
- 2 The diagram shows a cell.



What type of cell is shown?

- A ciliated cell
- B motor neurone
- C relay neurone
- D sensory neurone

3 The diagram shows a reflex arc.



What is V?

- A a relay neurone
- B a sensory neurone
- C a motor neurone
- D a spinal cord

What is Y?

- A receptor
- B axon
- C nerve ending
- D dendrite

What is W?

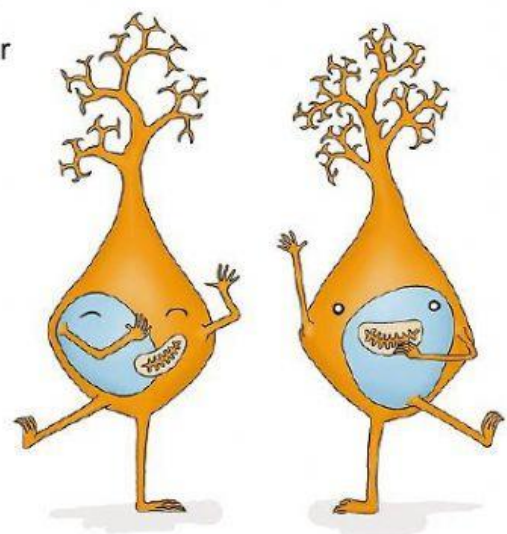
- A cell body
- B axon
- C myelin sheath
- D dendrite

What is Z?

- A a relay neurone
- B a synapse
- C the effector
- D the receptor

What is X?

- A a relay neurone
- B a synapse
- C the effector
- D the receptor



Immature neurons