

3.2 Nerve cells are called neurons



Neurons are cells in our body that enable us to pass messages quickly. A change or stimuli is detected by the receptor and an electrical message is passed along the neuron to the synaptic terminal. Chemical neurotransmitters pass the message across the gap to the next neuron. A myelin sheath protects parts of the neuron and prevents the message from becoming lost.

Nerves

The basic unit of the nervous system is a nerve cell, or **neuron**. Scientists believe that we may have up to 100 billion neurons in our bodies, connected in paths called nerves.

Neurons have many highly specialised features. Each neuron has a large **cell body** that connects to a long thin **axon**, which is also called a nerve fibre. An axon carries the nerve impulse away from the cell body. The axons connecting your spinal cord to your foot can be up to 1 metre long.

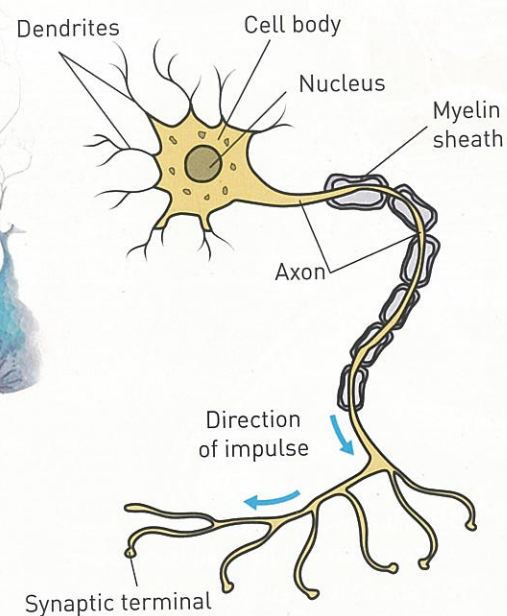


Figure 3.13 A typical neuron

At the end of the axon is a small bulb called the synaptic terminal. Here, messages are passed to the next neuron.

Nerves work just like electrical wires and require insulation in the same way. The axons are covered by a fatty layer called the **myelin sheath**. The myelin sheath helps to speed up a nerve impulse along an axon by controlling its path. People with multiple sclerosis have damaged myelin sheaths. This means that the nerve impulse is disrupted, blocked or able to escape along the length of the axon. This causes movement and sensory problems.

Dendrites are nerve endings that branch out of the cell body. These highly sensitive, thin branches receive information and form contacts with the axons of other neurons, allowing nerve impulses to be transmitted.

Dendrites bring information to the cell body and axons take information away from the cell body. Information from one neuron flows to another neuron across a **synapse**. The synapse is a small gap separating neurons. When the message reaches the end of the neuron, chemicals called **neurotransmitters** drift out of the synaptic terminal of an axon and across the gap to the dendrite of the next neuron. In this way, electrical messages are passed around the body.

There are three specialised types of neuron, all with different jobs.

- > **Sensory neurons** (or afferent neurons) are sensitive to various stimuli, collecting information from either the body's internal environment or the outside world. Sensory



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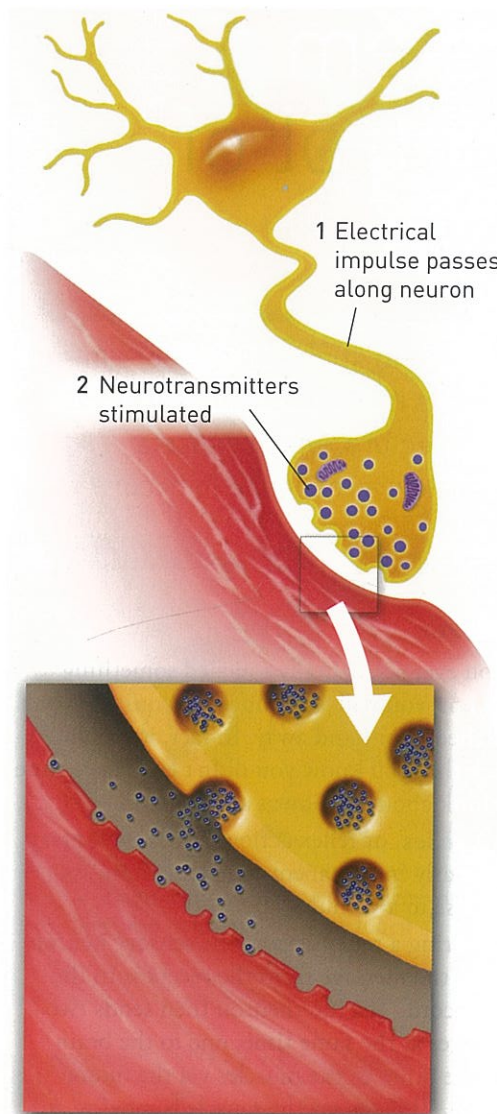


Figure 3.14 Electrical messages are converted to chemical messages (neurotransmitters) to cross a synapse.

neurons send the information they have collected to the central nervous system for processing.

- > **Motor neurons** (or efferent neurons) carry messages from the central nervous system to muscle cells throughout the body, which then carry out the response.
- > **Interneurons** (or connector neurons) link sensory and motor neurons, as well as other interneurons. Interneurons are the most common neuron in your body. They only make connections with other neurons.

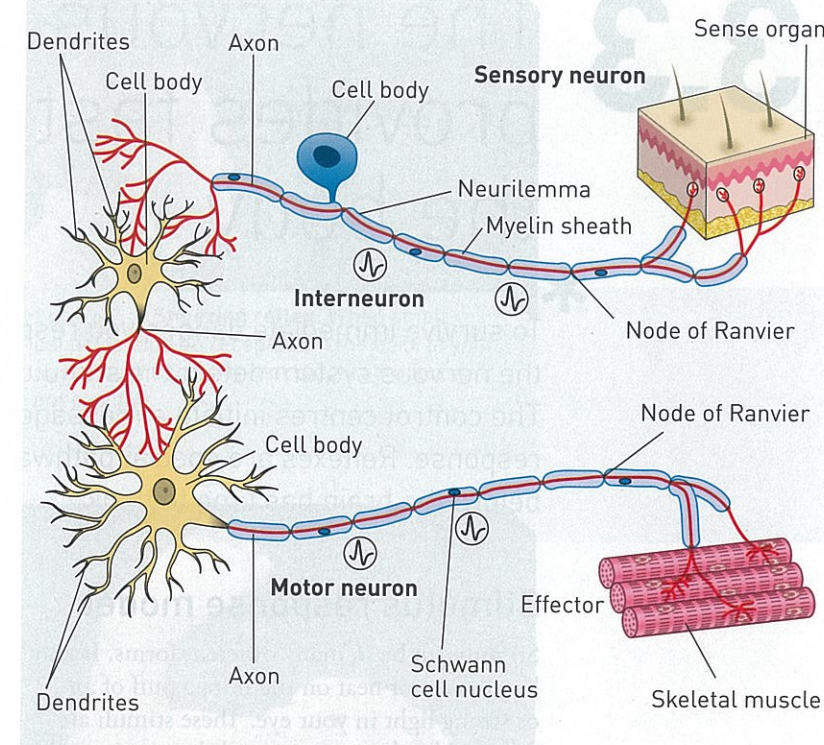


Figure 3.15 Messages get passed from the sensory neuron to interneurons. The interneuron passes the message to the motor neuron. This causes the muscles to respond to stimuli.

Check your learning 3.2

Remember and understand

- 1 With a partner, think of a way to remember the difference between sensory neurons, motor neurons and interneurons. Be creative! Share your memory trick with the class.
- 2 Name and describe the features of a neuron that enable it to carry messages.
- 3 Where are sensory neurons that detect:
 - a smells?
 - b tastes?
 - c sounds?
 - d touch?
 - e sights?
- 4 What is the role of the myelin sheath?

Apply and analyse

- 5 Using a diagram, explain the problems that may result from damage to the myelin sheath.