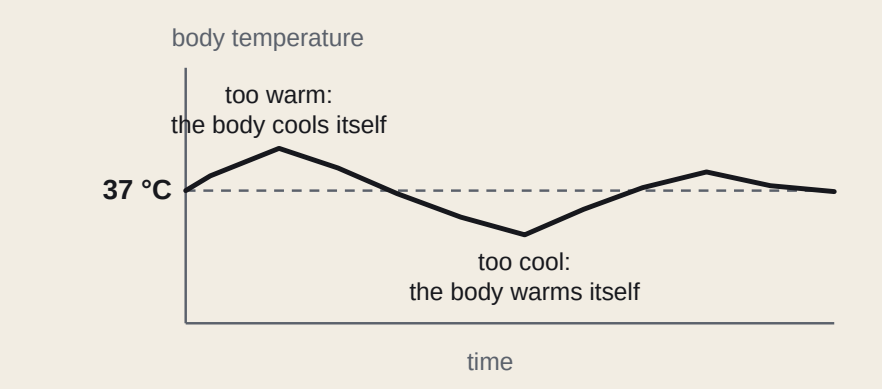
A1 · Homeostasis, neurons and the reflex arc · Completed notes

Goals: Say what homeostasis is, and name the two systems that carry the body's messages. Name the parts of a neuron and the direction a nerve impulse travels. Explain what the myelin sheath is and how it makes a nerve impulse travel faster. Tell sensory neurons, interneurons and motor neurons apart, and say what a nerve is. Trace a reflex arc through its five parts.

These are the completed notes. The blanks are filled in and each question is worked.

Slide 1 of 6 · Keeping the body steady

This is the first lesson of Biology 30. Your body works only when conditions inside it stay steady. Unit A is about the two systems that keep them steady.



Key ideas

Keeping conditions inside the body steady is called **homeostasis**.

Two systems keep homeostasis: the **nervous system** and the **endocrine system**.

The endocrine system sends chemical messengers called **hormones**.

Example

Your body temperature stays near 37 °C on a cold day. Name the idea this shows.

1. The temperature inside the body stays steady.
2. Keeping inside conditions steady is homeostasis.

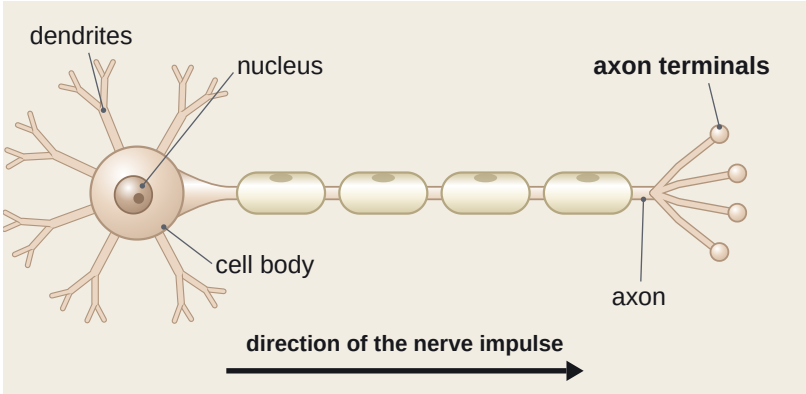
Try it

Name the two systems that keep homeostasis.

1. One sends messages along nerves: the nervous system.
2. One sends hormones in the blood: the endocrine system.

Slide 2 of 6 · The parts of a neuron

On the last slide, the nervous system sent its messages along nerve cells. Now we look at one nerve cell and name its parts.



Key ideas

A **neuron** is a nerve cell. It carries a **nerve impulse**.

The **dendrites** carry nerve impulses toward the cell body.

The **axon** carries nerve impulses away from the cell body.

The axon ends in **axon terminals**.

Example

A nerve impulse is in a dendrite. Name the next two parts it passes, in order.

1. Dendrites carry it toward the cell body.
2. The axon then carries it away.
3. Order: cell body, then axon.

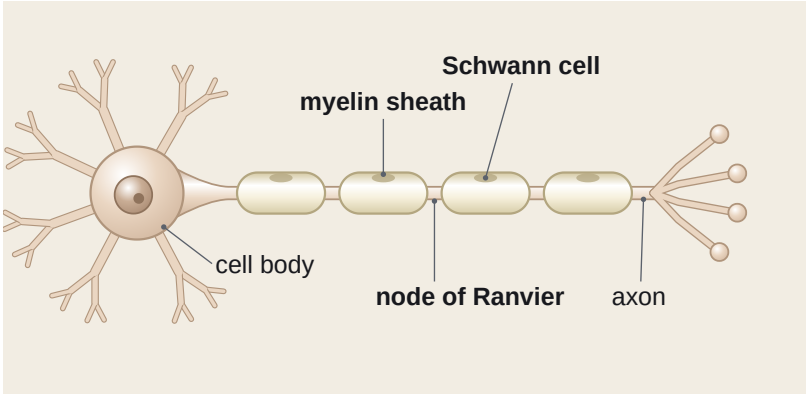
Try it

State the job of the axon.

1. The axon carries nerve impulses away from the cell body.
2. It ends in axon terminals.

Slide 3 of 6 · The myelin sheath

On the last slide, the axon carried nerve impulses away from the cell body. Many axons have a covering that makes the nerve impulse travel faster.



Key ideas

Many axons are wrapped in a **myelin sheath**.

The sheath is made by **Schwann cells**.

A gap between two segments of the sheath is a **node of Ranvier**.

A nerve impulse **jumps** from node to node, so it travels faster.

Example

Explain why a nerve impulse travels faster on an axon with a myelin sheath.

1. The sheath covers the axon in segments, with gaps called nodes of Ranvier.
2. The nerve impulse jumps from node to node.
3. Jumping is faster than travelling along every part of the axon.

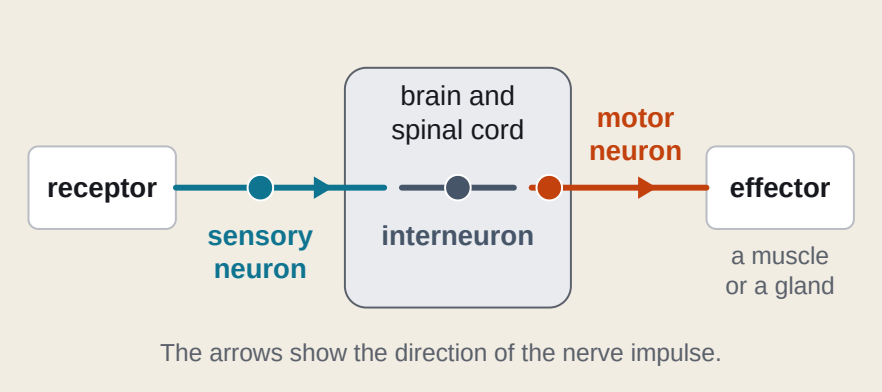
Try it

Name the cells that make the myelin sheath, and name the gaps in it.

1. Schwann cells make the myelin sheath.
2. The gaps are nodes of Ranvier.

Slide 4 of 6 · Three kinds of neuron, and nerves

You now know the parts of one neuron. Neurons do different jobs. They are sorted into three kinds by where they carry nerve impulses.



The arrows show the direction of the nerve impulse.

Key ideas

A **sensory neuron** carries nerve impulses from a receptor to the central nervous system.

An **interneuron** links neurons inside the brain and spinal cord.

A **motor neuron** carries nerve impulses to an **effector**, such as a muscle.

A **nerve** is a bundle of many axons.

Example

Name the kind of neuron that carries a nerve impulse from the skin to the spinal cord.

1. The skin holds the receptor.
2. A neuron that leads from a receptor to the spinal cord is a sensory neuron.

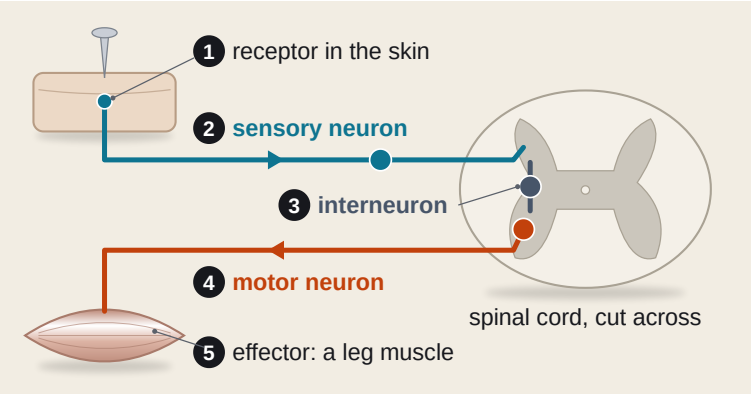
Try it

Name the kind of neuron that makes a muscle contract.

1. A muscle is an effector.
2. A neuron that leads to an effector is a motor neuron.

Slide 5 of 6 · The reflex arc

On the last slide you met the three kinds of neuron. Now you see all three work together in the fastest response your body has.



Key ideas

A **stimulus** is a change that starts a response.

A **reflex** is a fast response that you do not choose.

The path a reflex takes is a **reflex arc**.

A reflex is fast because the message does not wait for the **brain**.

Example

You touch a pin and your hand pulls away before you feel pain. Explain why the response is so fast.

1. The response is a reflex.
2. The reflex arc goes through the spinal cord.
3. The message does not wait for the brain.

Try it

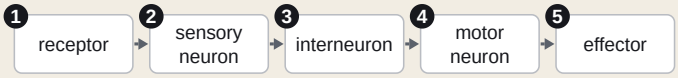
List the five parts of a reflex arc, in order.

1. Receptor, sensory neuron, interneuron.
2. Then motor neuron and effector.

Slide 6 of 6 · Method: how to trace a reflex arc

You just followed one reflex through five parts. Every reflex arc has the same five parts. Here they are as steps you can use on any reflex.

1. **Name** the receptor that detects the stimulus.
2. **Follow** the sensory neuron to the spinal cord.
3. **Cross** the interneuron inside the spinal cord.
4. **Follow** the motor neuron out of the spinal cord.
5. **Say** what the effector does.



Check: receptor, sensory, interneuron, motor, effector.

Used again in: lessons A5 and A6

Key ideas

Step 1: find the **stimulus** and the **receptor**.

Steps 2 to 4: follow the sensory neuron, the interneuron and the **motor neuron**.

Step 5: name the **effector** and what it does.

Example

Use the five steps to trace the reflex when a hand touches a hot stove.

1. The stimulus is heat. A receptor in the skin detects it.
2. A sensory neuron carries the nerve impulse to the spinal cord.
3. An interneuron passes it to a motor neuron.
4. The effector is an arm muscle. It contracts and pulls the hand away.

Try it

Use the five steps to trace the reflex when a doctor taps below your knee.

1. The stimulus is the tap. A receptor in the leg muscle detects it.
2. A sensory neuron carries the nerve impulse to the spinal cord.
3. A motor neuron carries it back to the leg muscle.
4. The effector is the leg muscle. It contracts and the leg kicks.