How Many Cells Do You Recognise?



Palisade cell



Title: Specialised cells

Learning objectives:

- 1. Identify specialised cells
- 2. Describe what a specialised cell is
- 3. Explain how cells are specialised

Specialised Cells

Not every cell in an organism is identical.

However, they all begin as the same, and we call these cells **stem** cells.

But depending on where they are in the organism and the job they are going to perform, they become **differentiated.** The cells become specialised to carry out their role. This makes the cells more efficient at carrying out their specific jobs.



Specialised Cells

In animal cells, this differentiation typically occurs early on in a cell's life, whereas many plant cells retain the ability to differentiate their whole life.

In mature animals (fully grown ones), cell division is usually reserved for repair and replacement. New cells develop specific sub-cellular structures, which enable them to carry out a particular function within a certain part of the body. These are called **specialised cells**.

On the next slide are some examples of specialised cells.

Use the information over the next few slides to complete this table

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Specialised Cells Muscle Cell



What do I look like?

These cells are long and can contract quickly. They contain lots of mitochondria to produce the energy required for movement

What makes me special?

The muscle cells have bands of protein and are arranged in fibres to help them run along the length of the muscle. Without muscle cells we would not be able to move

Specialised Cells Nerve Cell (Neurone)



How do I look?

Very thin and thread-like with lots of nerve endings (dendrites) at either end.

What makes me special?

I transmit electrical impulses around the body, and I am very connected to other nerve cells (we work as a team) sending messages to the brain, so the body responds in a particular way. I make up part of the nervous system working closely with central nervous system (CNS). Some of us known as receptors respond to stimuli and some of us are effectors (bringing about a response).

Specialised Cells Palisade Cell



Where can you find me?

You can find me near the top of any leaf.

How do I look?

I'm easily recognisable because I am long, thin and packed full of chloroplasts.

What makes me special?

I love the sun! My chloroplasts, which are full of a pigment called chlorophyll, enjoy photosynthesising. Photosynthesis is the process of plants converting carbon dioxide and water into glucose and oxygen.

Specialised Cells Phloem



Where can you find me?

Phloem cells are found inside plants

What do I look like?

We are very long and join end to end and have only very few subcellular structures. I have pores in the end walls to allow cell sap to flow.

What makes me special?

It is my responsibility to transport food (mainly dissolved sugars) around the plant and therefore I need to make hollow tubes. The sugar can either be stored or used for growth. Transport in the phloem tubes can go in either direction, this is called translocation.

Specialised Cells Root Hair Cell



Where can you find me?

You will find me attached to plant roots.

How do I look?

I am long and thin with a large surface area.

What makes me special?

I am long and thin and have a large surface area to help with the absorption of water and minerals. Minerals ensure the healthy growth of plants. I am not a typical plant cell because I do not have chloroplasts. I don't need chloroplasts because I am found underground and without light I cannot photosynthesise.

Specialised Cells Sperm Cell



Where can you find me?

A tricky question! I am made in the testes and will be found in semen.

What do I look like?

I'm often described as a microscopic tadpole. I am long and thin and have a tail.

What makes me special?

I can swim with the help of my tail and this helps me find egg cells. My function is to fertilise egg cells. I have a special coating that helps me get into the egg cell and I contain half the genetic information.

Specialised Cells Xylem Cells





Where can you find me?

Xylem cells are found inside plants.

What do I look like?

I am a dead cell that joins together end to end with other dead cells. I have no end walls and I am hollow in the middle, collectively we make up xylem tubes.

What makes me special?

I carry water and mineral ions from the roots to the leaves and stem. This movement of water through the xylem and out of the leaves is known as the transpiration stream. I am strengthened by a material called lignin.















Need to be able to contract for movement, contain lots of mitochondria

Contains lots of chloroplasts for photosynthesis

Found on the roots of plants, contain no chloroplasts.

Responsible for the transport of dissolved sugars around a plant

Elongated and transmit messages

Fertilises the egg and contains half the genetic information

Responsible for the transport of water and mineral ions round plants

Now you have learnt about specialised cells, can you match each diagram to the correct box?

You don't need to write them down, just think about it and then check your answer!



Now you have learnt about specialised cells, can you match each diagram to the correct box?

You don't need to write them down, just think about it and then check your answer!

Design your own specialised cell

- 1. What is the job of your cell?
- 2. What features does it have that help it do its job?
- 3. What other cell structures does it have?

CHALLENGE: Explain whether your cell is a prokaryote or eukaryote?