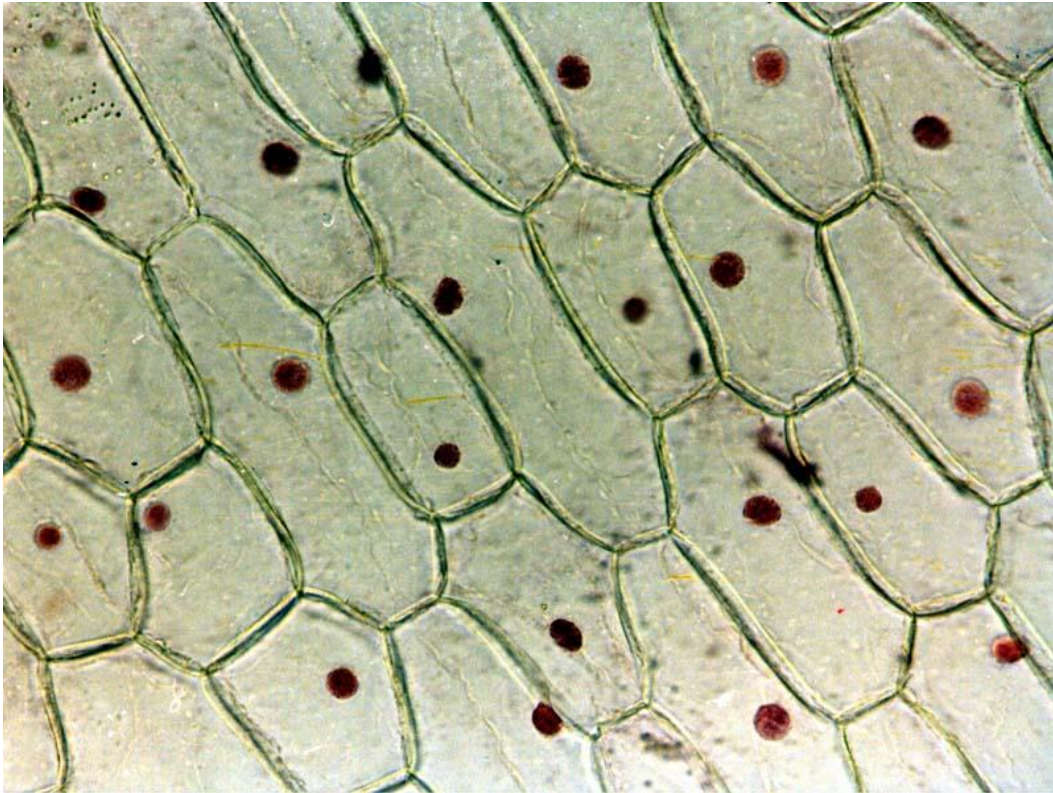
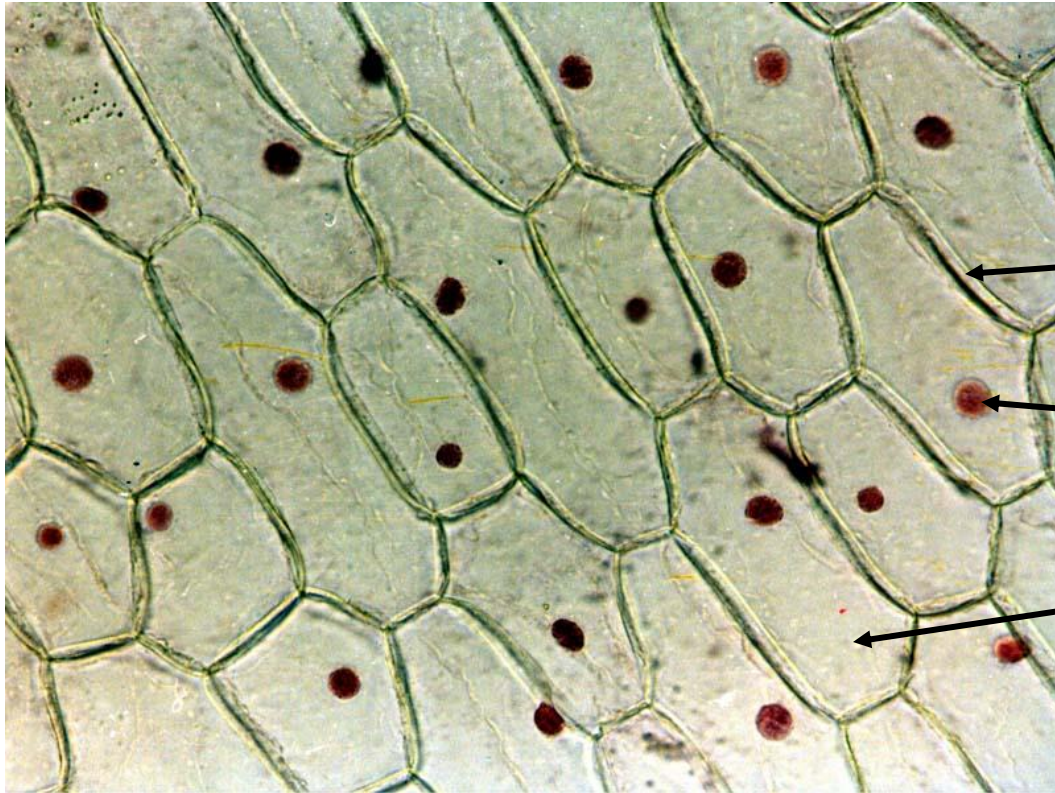


Cells ...

- Cell structure in **plants**
- Cell structure in **animals**
- **Cell structure and function**



These are onion cells as seen under the microscope at x100. They have been stained with **iodine** to help certain parts of the cell to show up.



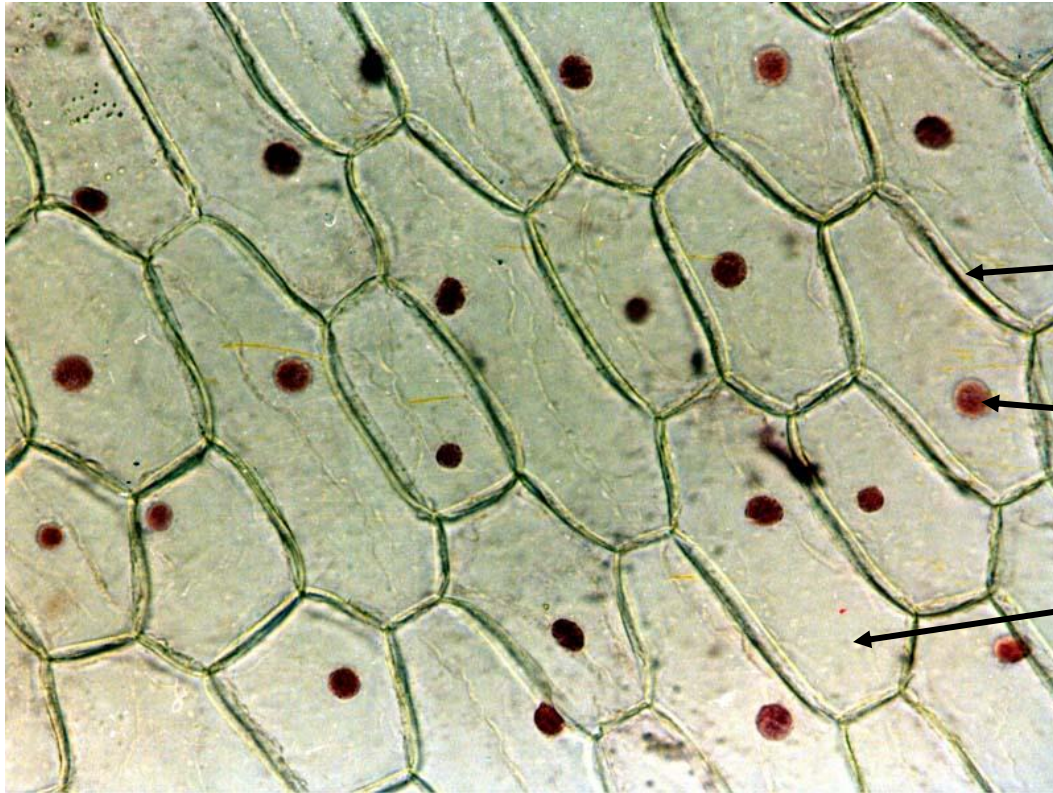
Parts -

Cell wall

nucleus

vacuole

The **cell wall** is a thick, dark line around the cells. It is fairly rigid and helps the cell keep its regular shape.



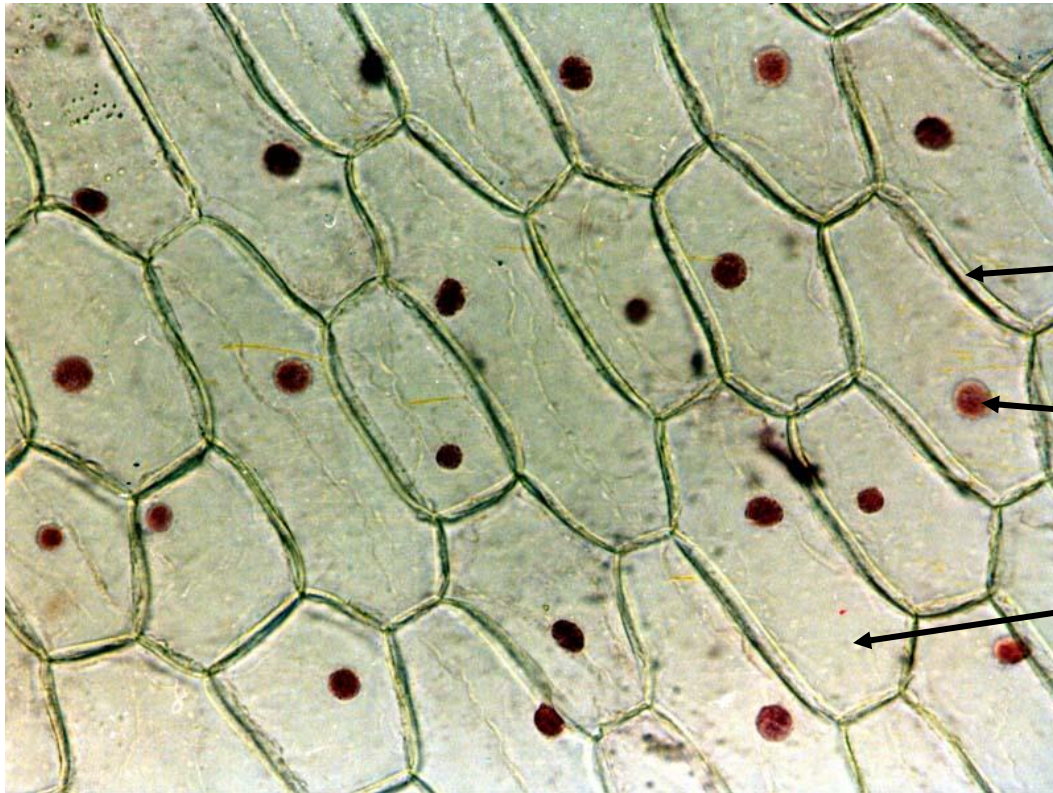
Parts -

Cell wall

nucleus

vacuole

The nucleus is a dark 'blob' inside each cell. Each cell has one, and only one nucleus. Its job is to **control** the cells activities and to store the **genetic** or inherited information.



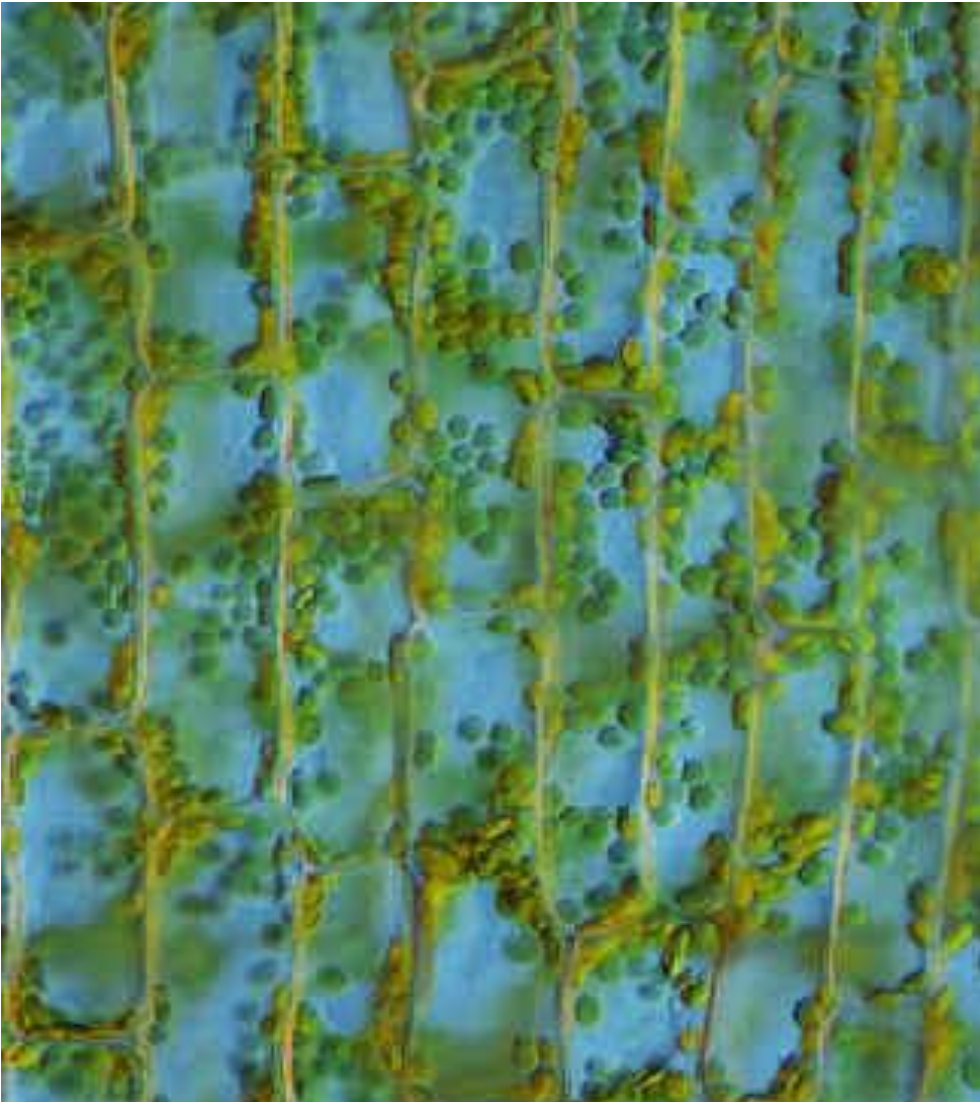
Parts -

Cell wall

nucleus

vacuole

The **vacuole** does not show up, even with stain. It is a large, **water-filled** sack in the centre of the cell. It takes up most of the cell and often forces the nucleus out to the side.

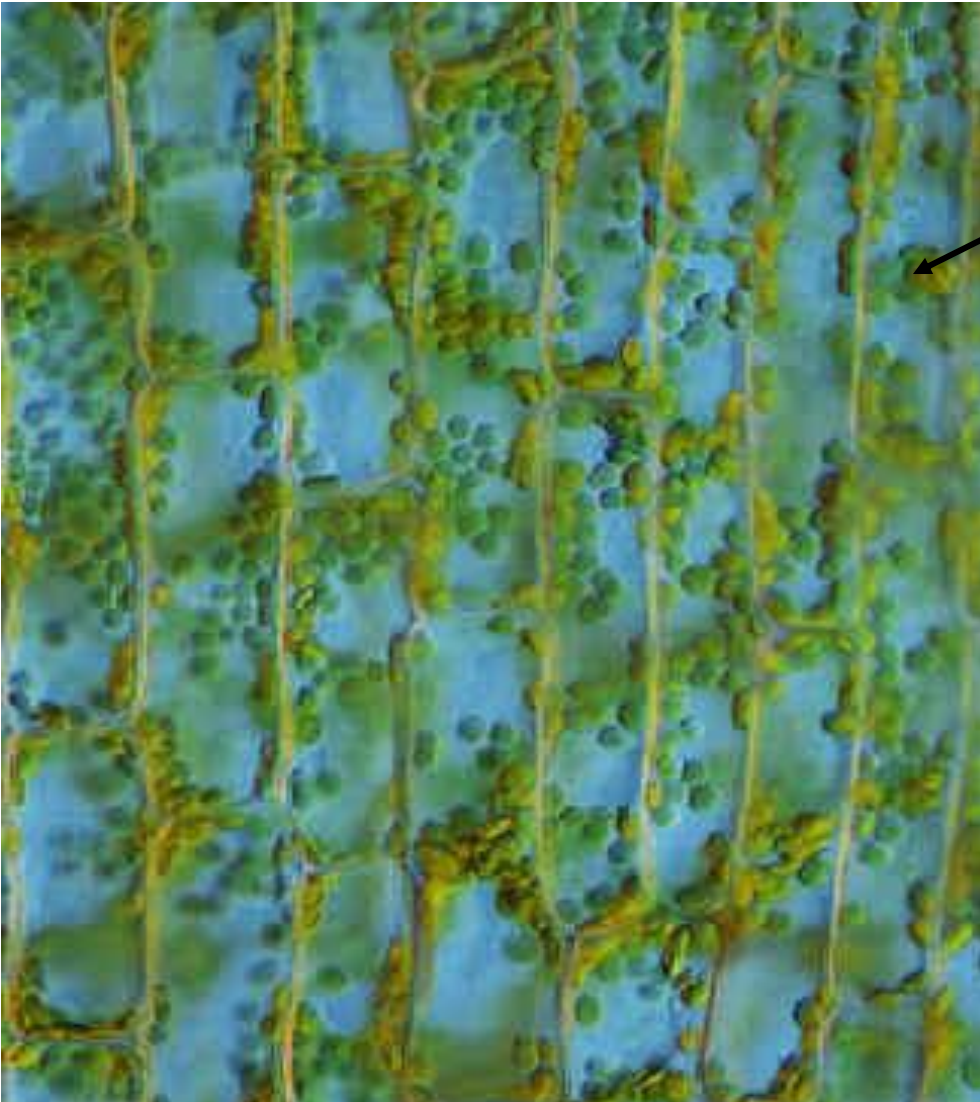


This is a more typical plant cell, from a plant leaf.

The **wall** and **nucleus** do not show up because the cells have not been stained.

The **vacuole** can still be seen as a clear space in the middle of the cell.

There are also a number of green structures.

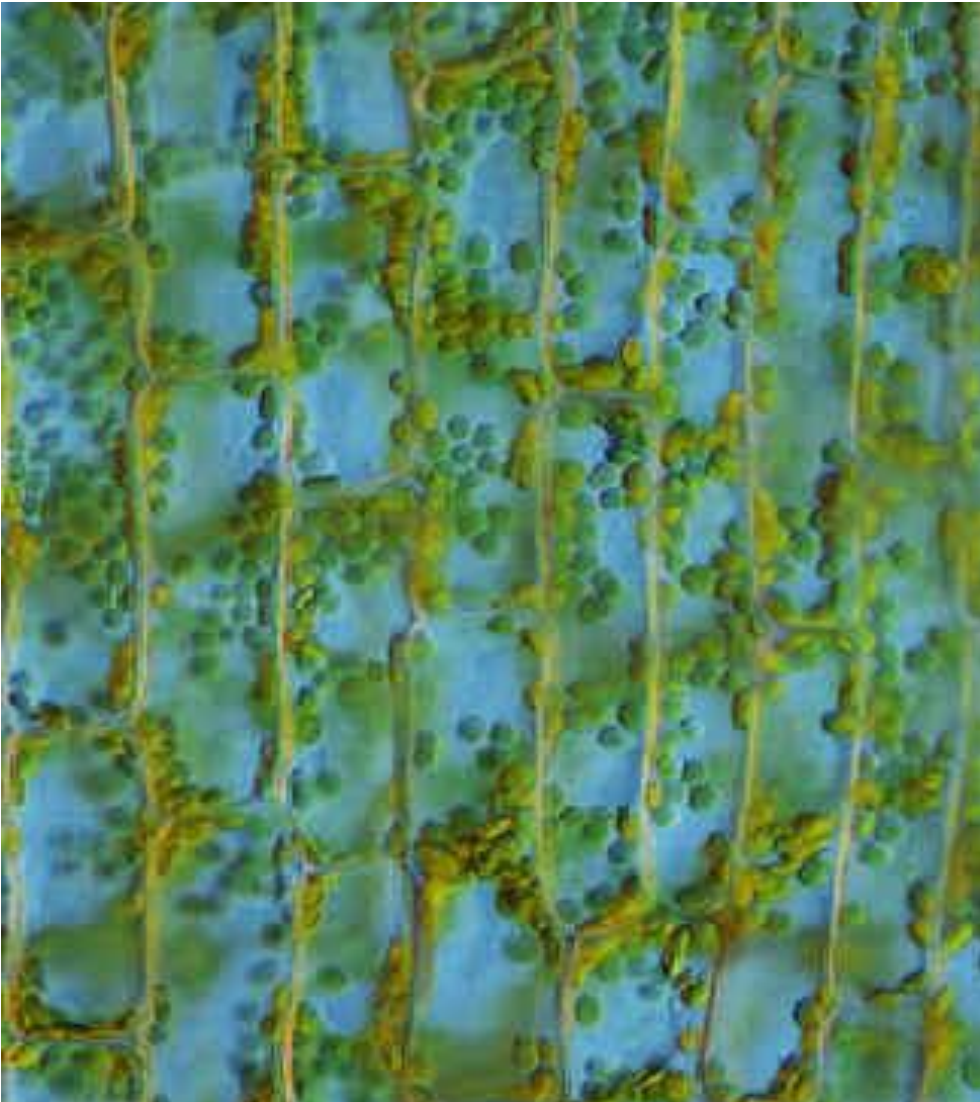


These are **chloroplasts**.

The chloroplasts are filled with a special green chemical (pigment) called **chlorophyll**.

This green pigment helps the cell trap light energy for **photosynthesis**.

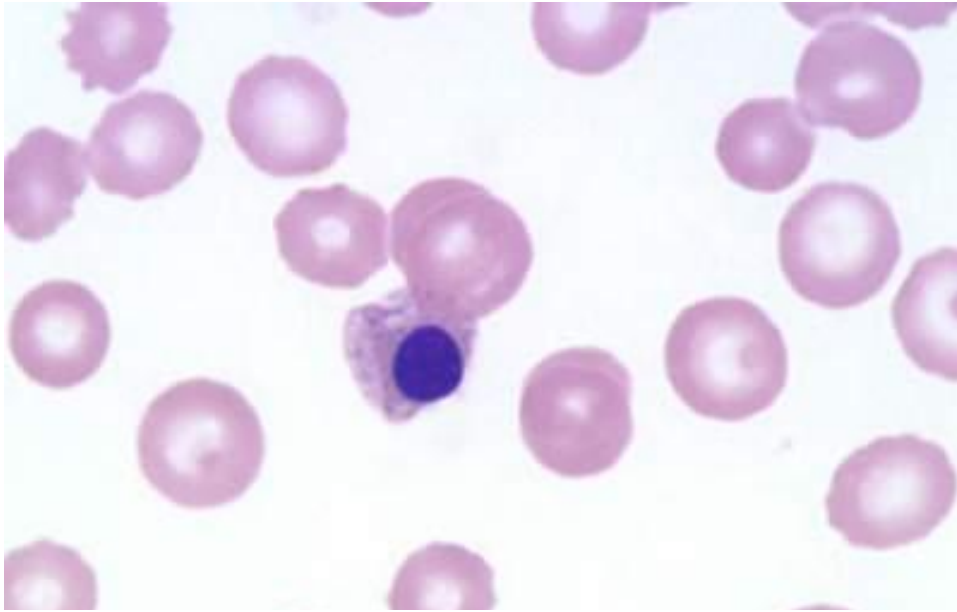
Onion cells are not green. They get no light, so do not need chloroplasts.



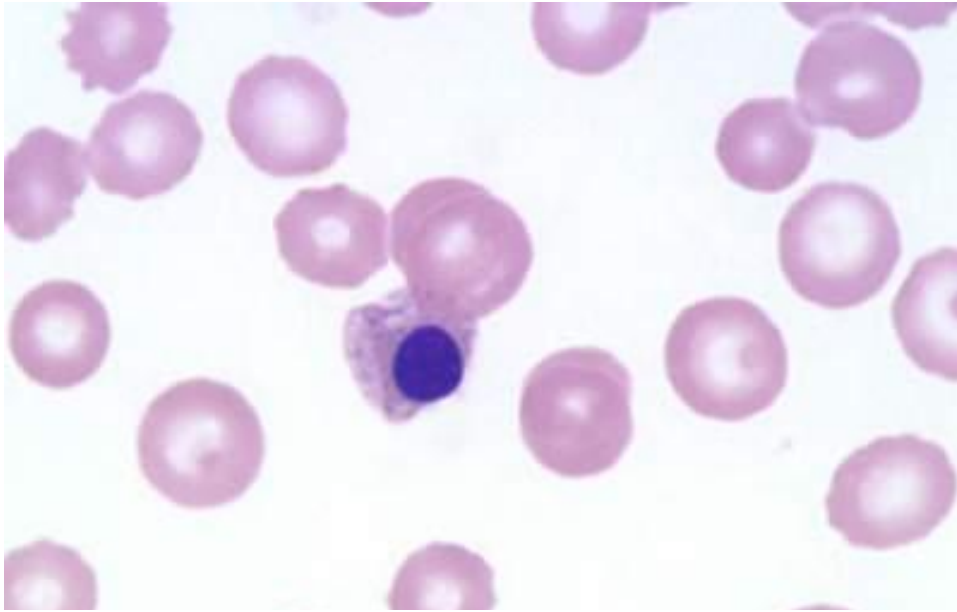
The chloroplasts appear mainly around the outside of the cell because the central vacuole takes up most of the space and pushes them to the outside.

Part 2

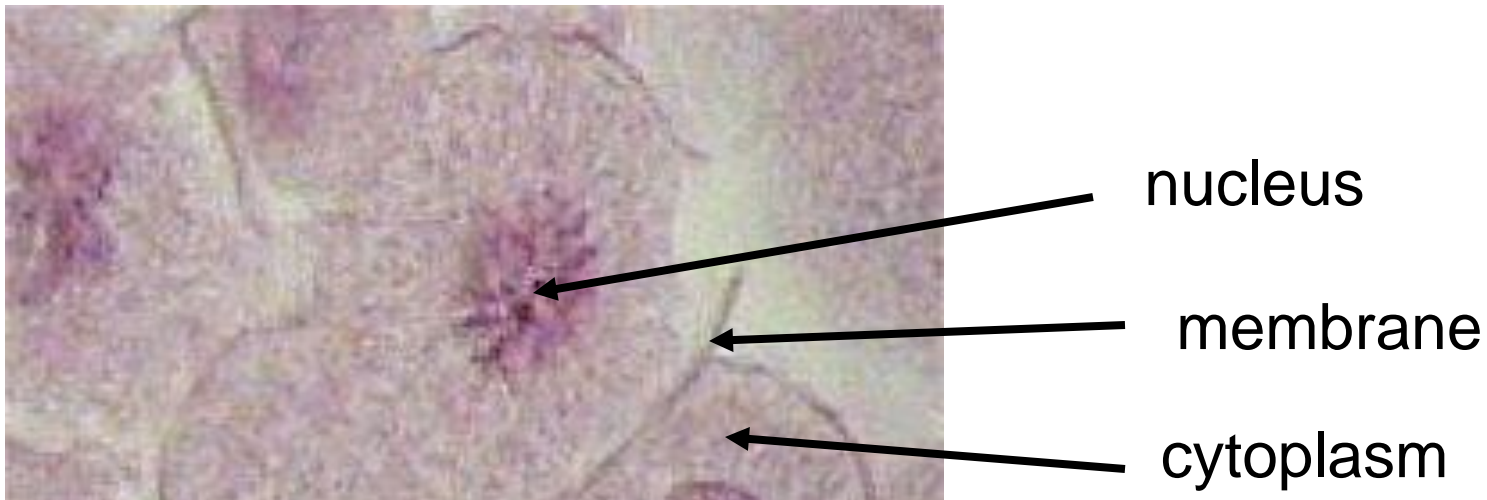
Animal Cells



These are blood cells. These are **animal cells**, not plant cells and their structure is different. The first difference is in scale. These cells are at **x 600** – a much higher magnification than was used with the onion cells. This suggests **animal cells are smaller than plant cells.**



The cells do **not** have an obvious wall around them. Animal cells do not have a cell wall. Their outer covering is their **membrane**, which is much thinner than a wall. Plant cells have a membrane too, but it cannot be seen as it is pushed right up against the inside of the much thicker wall.



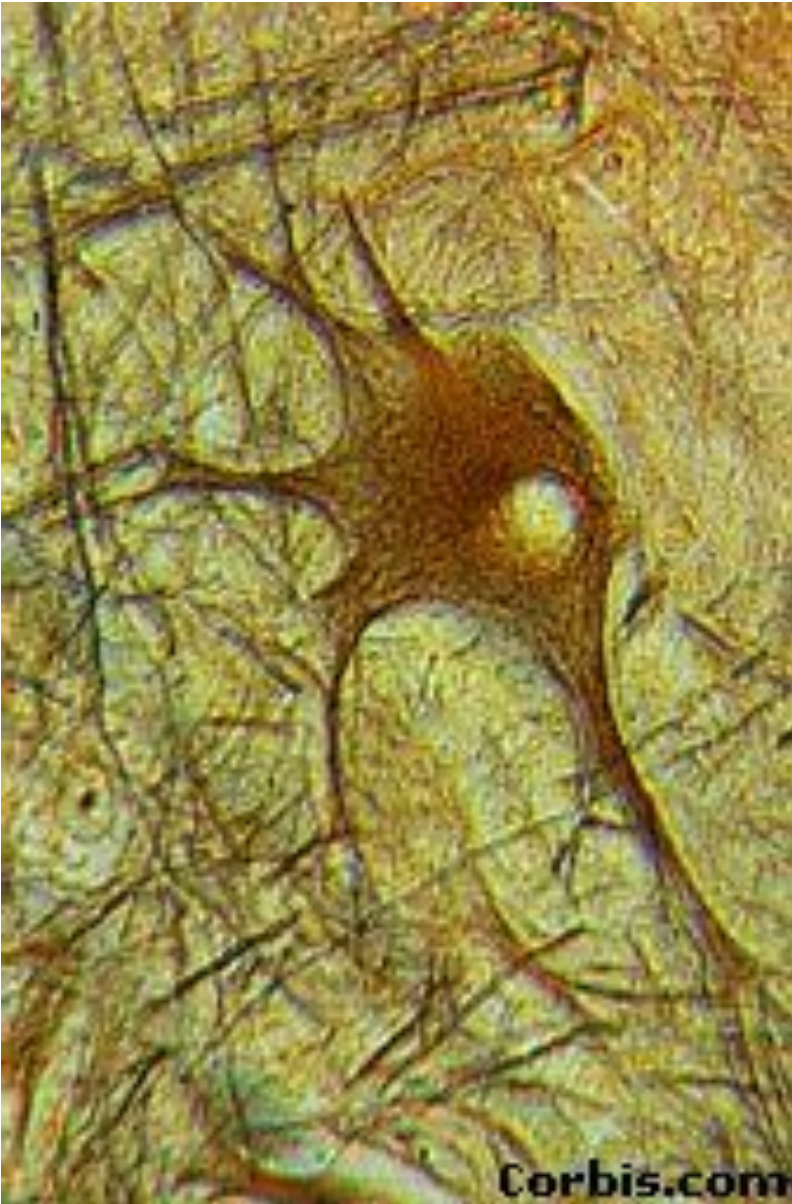
These are liver cells at x600. The nucleus is visible right in the middle of the cell – there appears to be no vacuole as there was in plant cells.

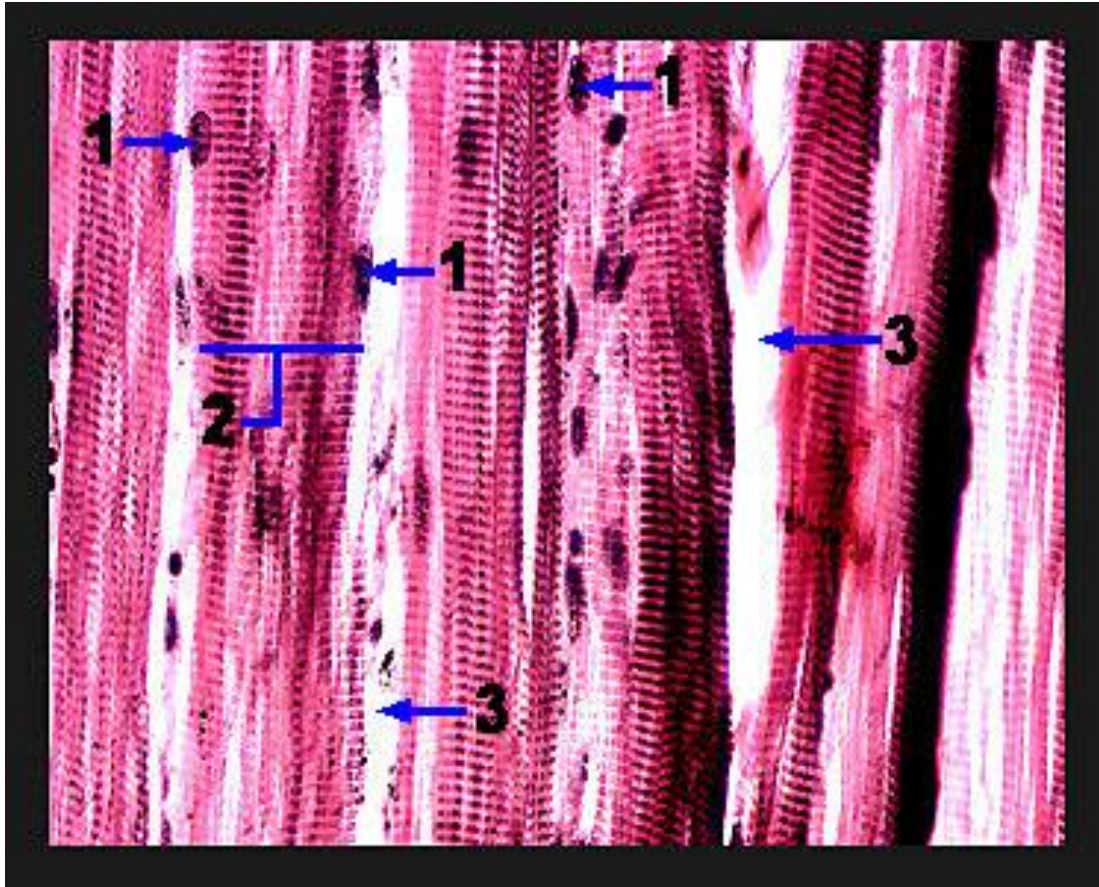
Most of the cell is taken up by a grainy looking jelly called the **cytoplasm**. This is present in plant cells too, but is squashed up against the side in a thin layer by the central vacuole.

All cells have a structure which is suited to its function.

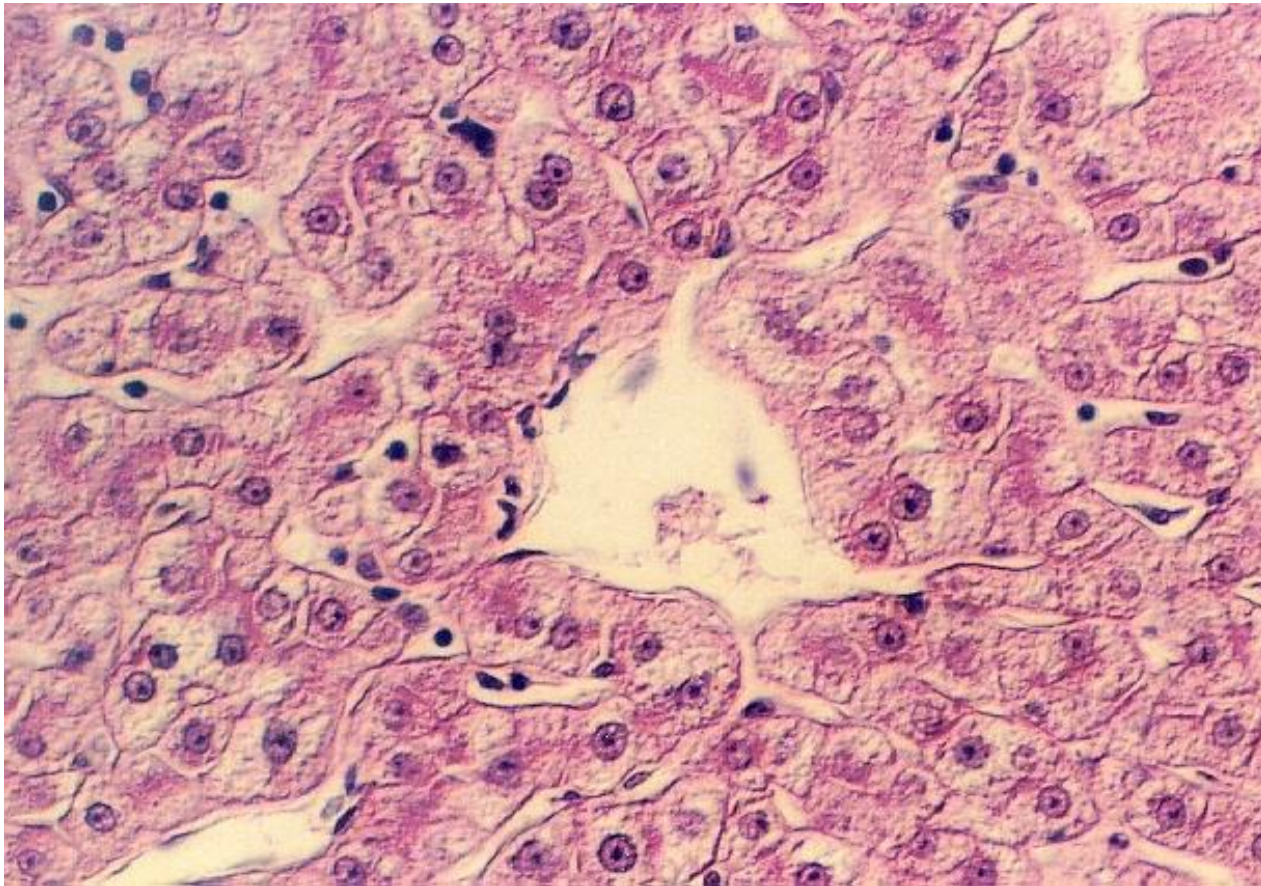
These are **nerve cells**.

They have **many side branches** to connect to other cells, and so pass on information in the form of tiny electrical signals.

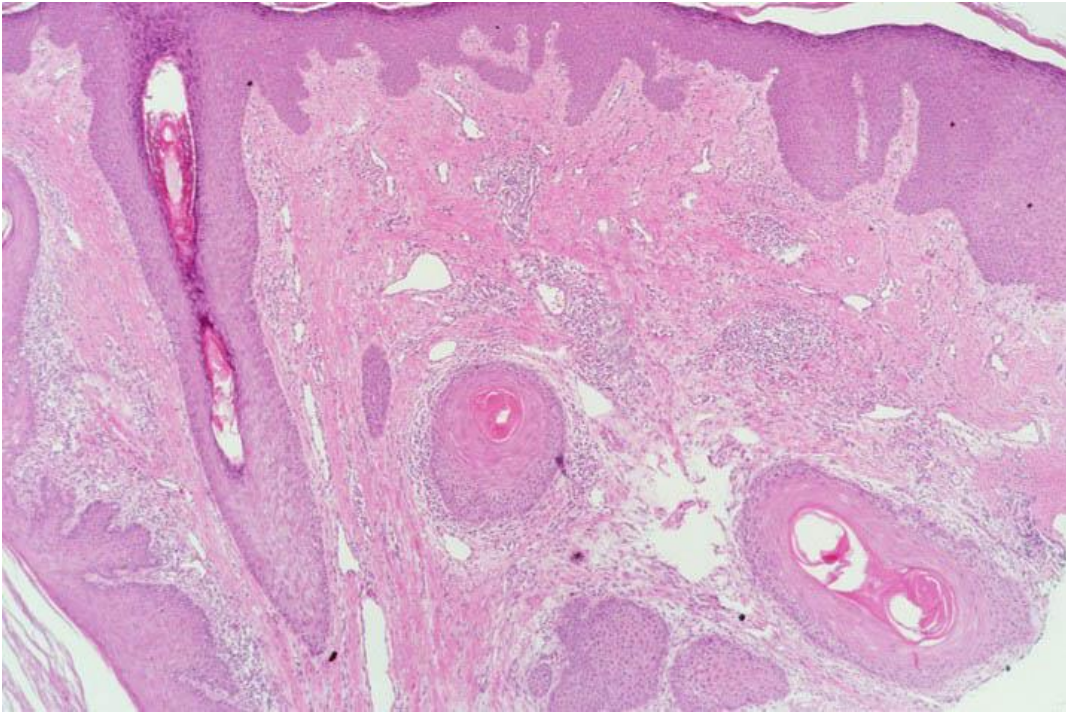




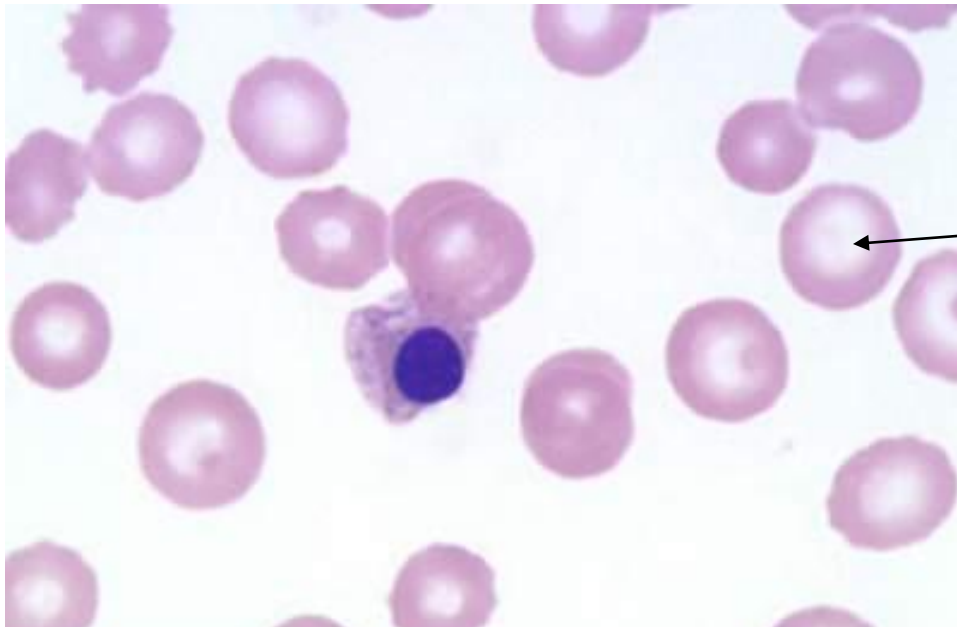
These are **muscle cells**. In order to carry out their function, muscle cells are able to **contract**. This is how muscles pull on bones to make you move. The individual cells are organised together into **fibres**.



These are **liver cells**. They do not look very specialised, because their particular function goes on within the cells. They carry out many different **chemical reactions** on digested food, for example. Their specialisation is in the chemical reactions they can carry out in their **cytoplasm**.



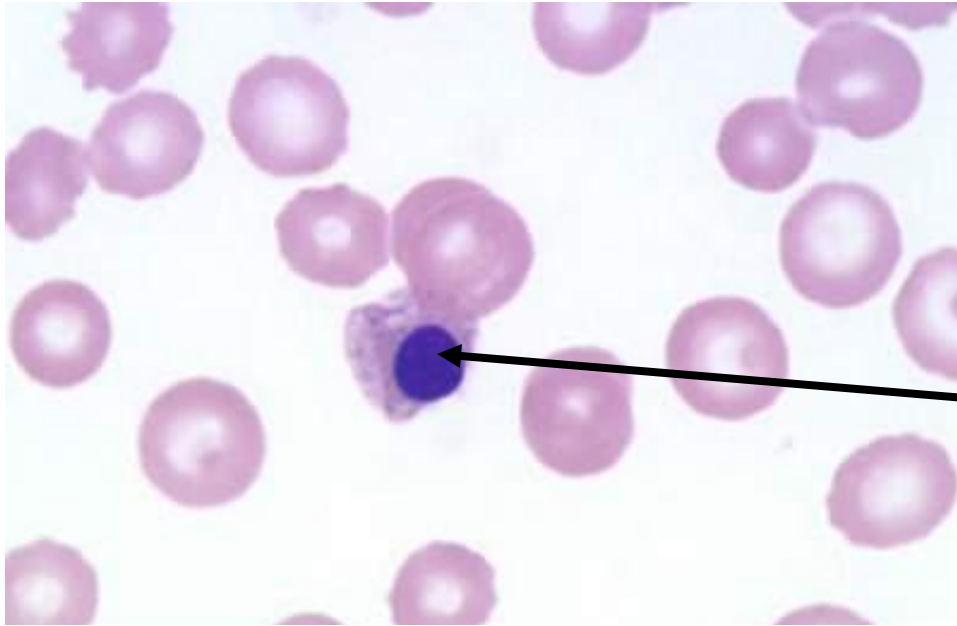
These are skin cells at x100. At this magnification the cells are too small to make out individually, but the nuclei show up as tiny dots. The cells are arranged into different layers within the skin.



**Red
cell**

Back to the blood cells...

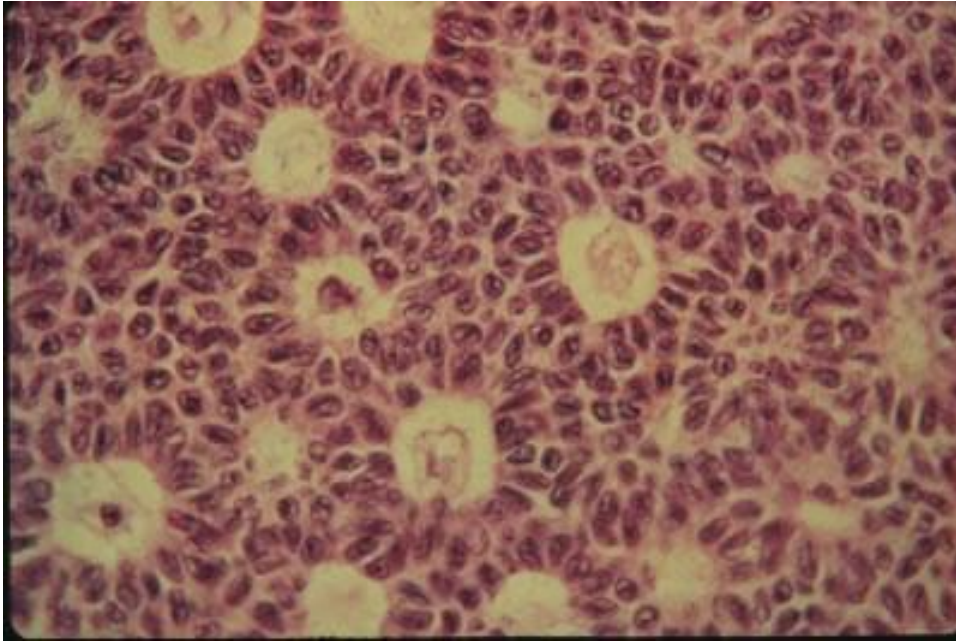
There are two types – **red cells** are filled with a chemical called haemoglobin. This chemical lets them carry oxygen. Red blood cells are the only cells which have no nucleus – it disintegrates as soon as the cells are formed.



White cell

Back to the blood cells...

There are two types – **white cells** have large, obvious nuclei. They fight off invading germs either by engulfing and digesting them or by firing chemicals called **antibodies** which help to destroy them..



These cells are bad news. This slide shows many very small cells all packed together. This is because these cells are dividing, then dividing , then dividing ... they are dividing out of control. These are **cancer** cells, which form a **tumour**, a clump of cells dividing out of control.

Part 3

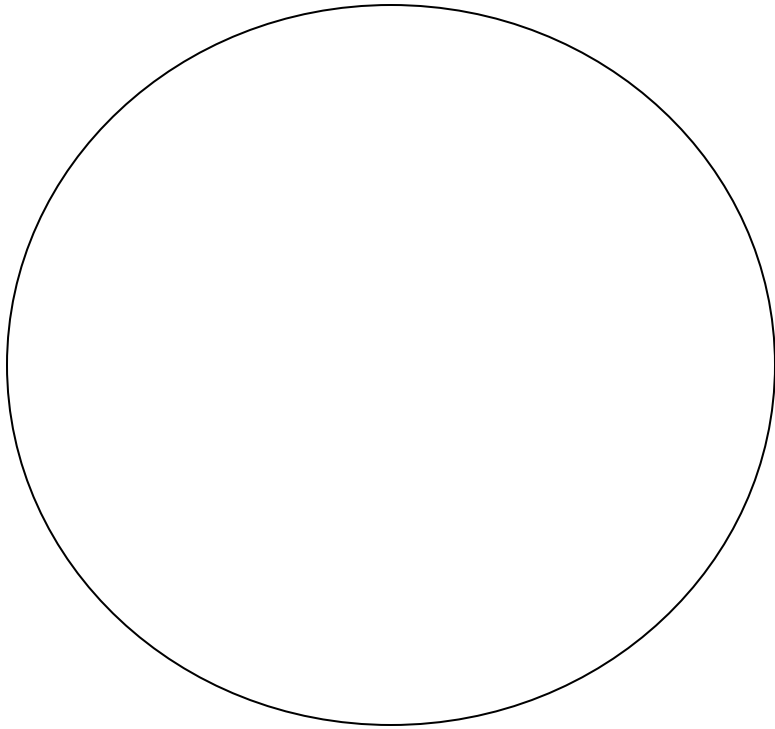
Building cells

What you have seen so far is that the cell is made up from a number of **different components**.

Each of these components has its own **job** to do in the cell.

Plant cells have a far wider range of components in them, and you can use evidence from which components are you can see to decide if a cell comes from an animal and a plant.

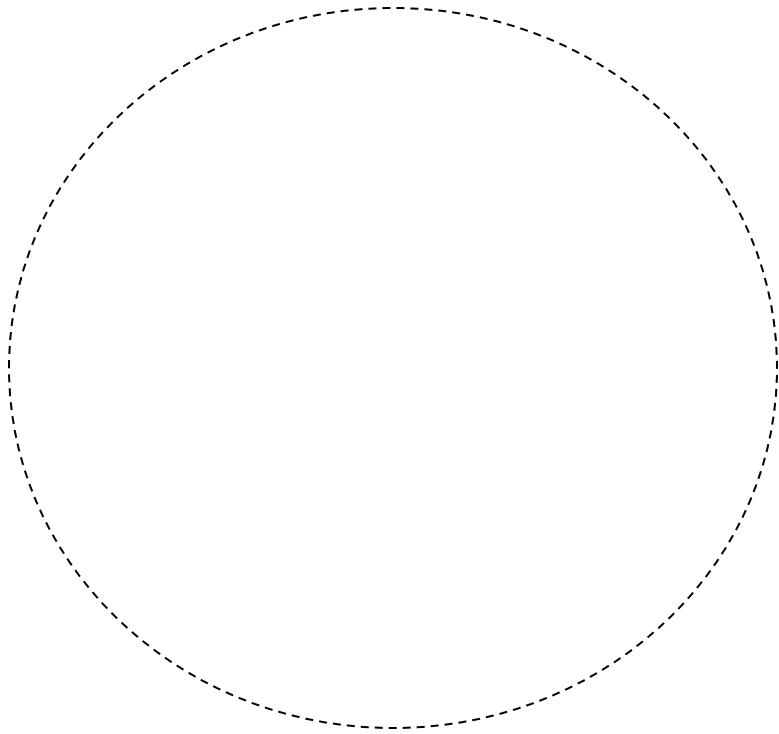
Lets put together an **animal cell**



Around the outside of an animal cell is the **cell membrane**.

It is a very thin layer and its job is to control what can or cannot pass through.

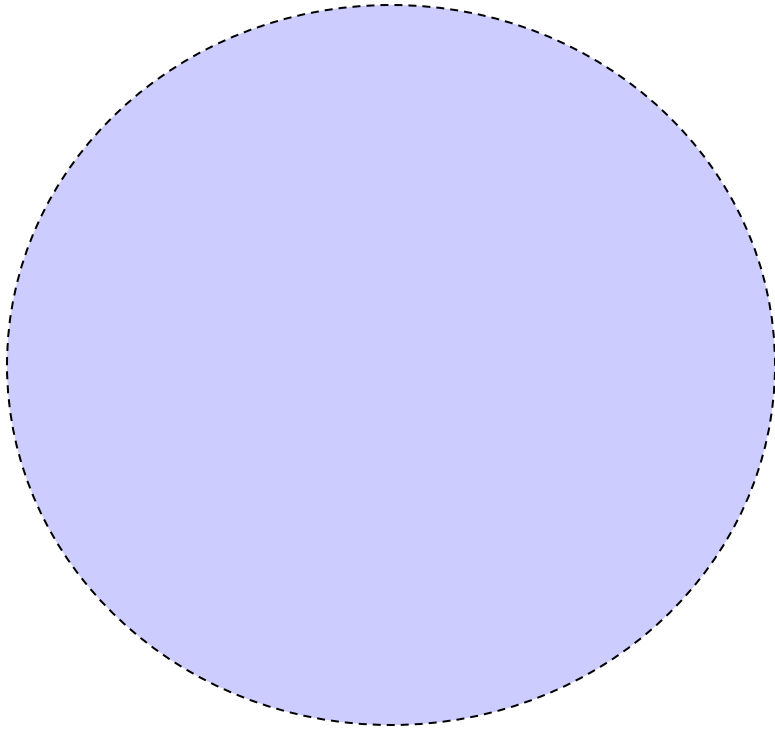
The cell membrane is so thin that it does not really show up clearly under the microscope.



The membrane has many tiny **pores** (holes) in it.

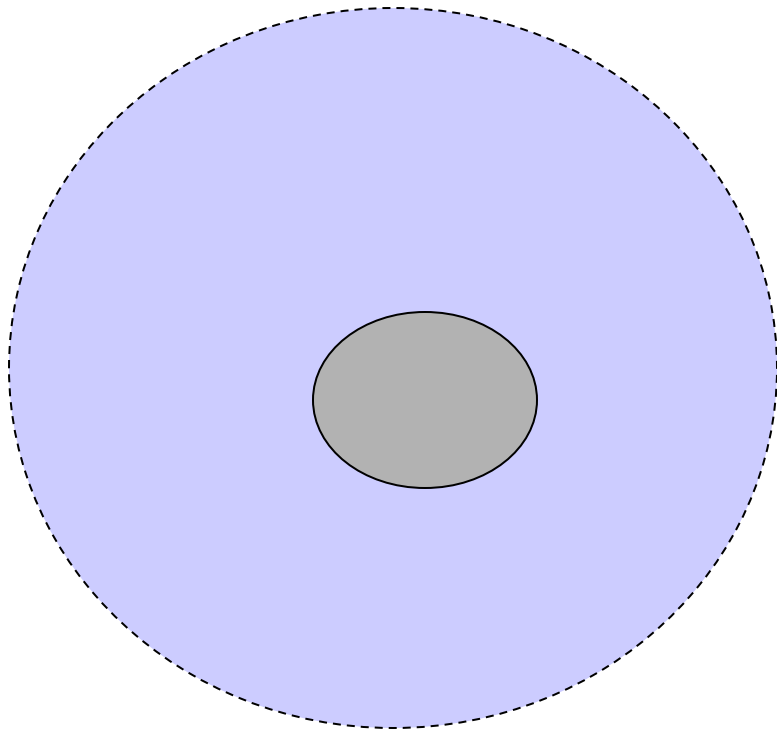
These can let small molecules or particles of substances pass through, but not larger ones.

The membrane therefore controls what can and cannot pass through on the basis of **size**. Only small molecules can pass through.



The cell is filled with a watery jelly called the **cytoplasm**. The cytoplasm presses out against the thin membrane, giving the cell its shape.

The importance of the cytoplasm is that it is the site for all the cell's **chemical reactions** – the **metabolism**.



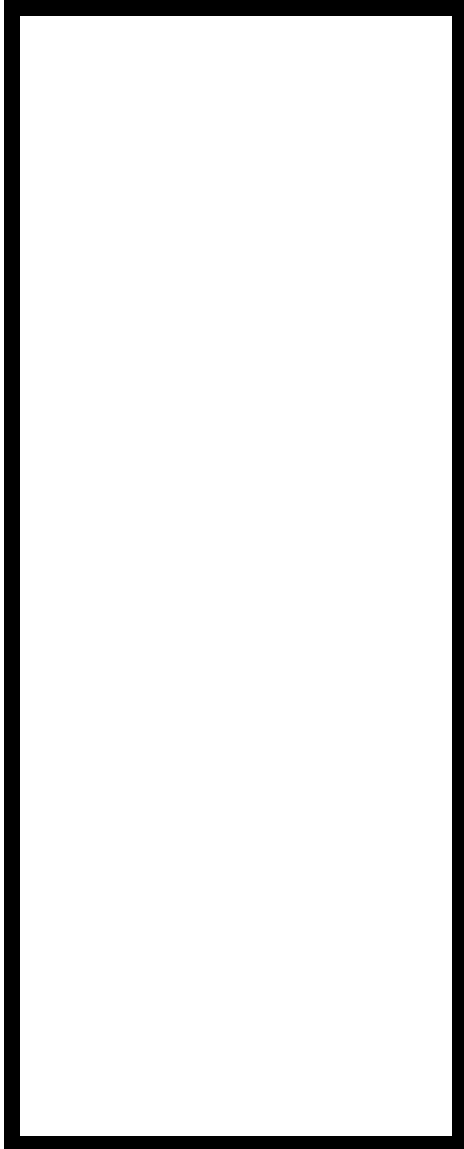
Virtually every cell has a single **nucleus**.

The nucleus contains the cell's **inherited** or **genetic information**.

This information is passed on when cells divide and carry the instructions for how to develop and what chemical reactions to carry out.

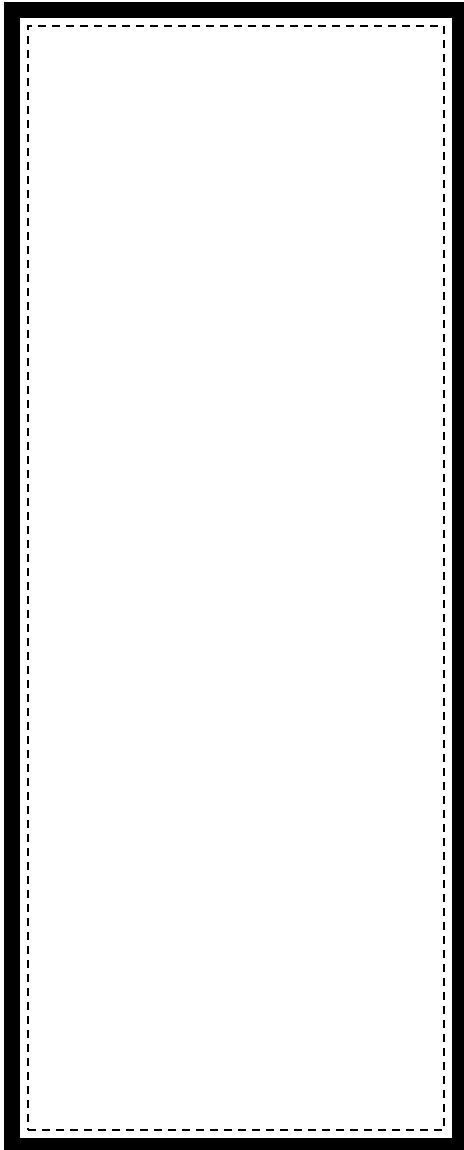
The nucleus therefore **controls the cell's development and processes**.

In the same way, we can build up the structure of a **plant cell**. The plant cell has more of a variety of components, but these are always put together in a similar way.



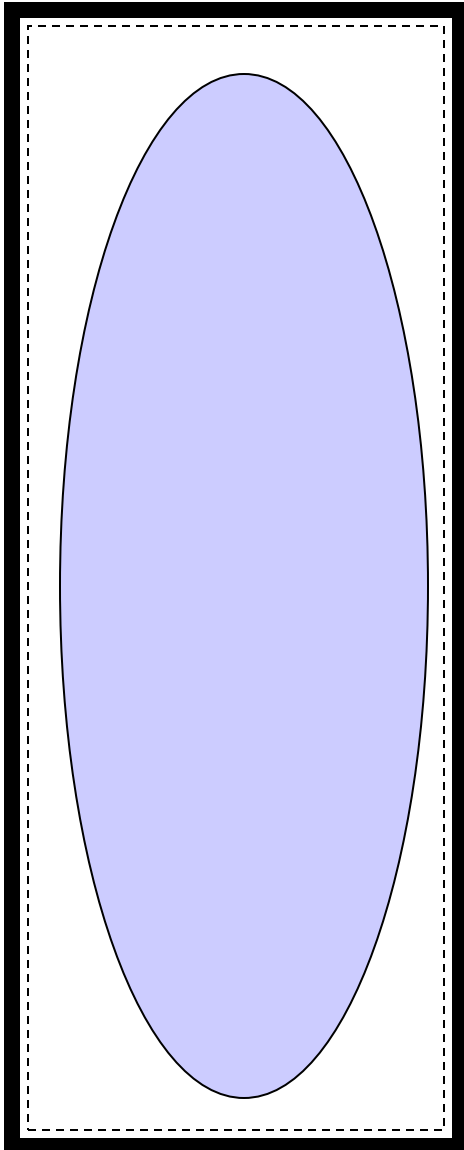
The **cell wall**

- Makes the cell a regular shape
- Is made of tough, indigestible **cellulose**
- Is relatively thick and strong
- Has a **support** and **protection** role



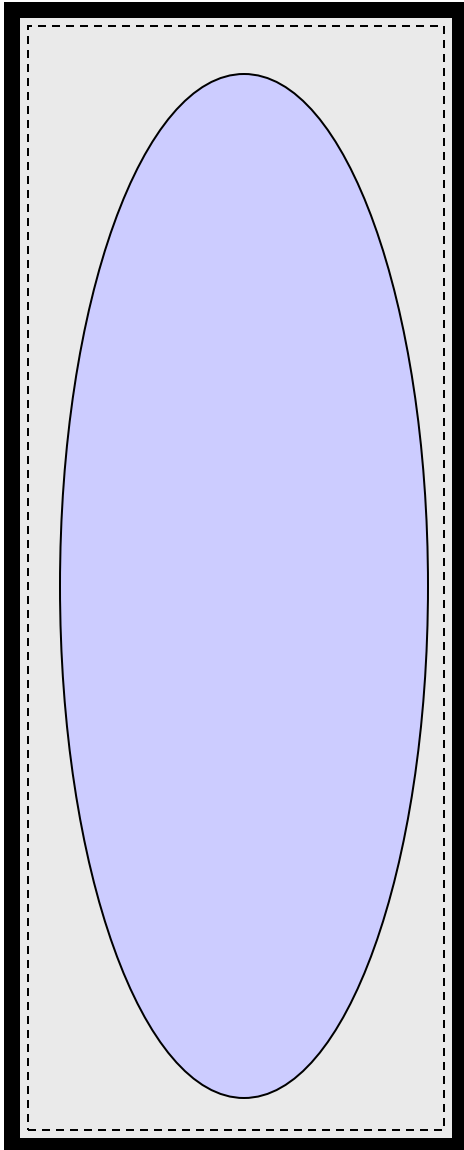
The **cell membrane**

- Is squashed up against the wall so is very hard to see
- Is very thin
- Has pores to let small substance pass through
- Controls entry and exit of materials



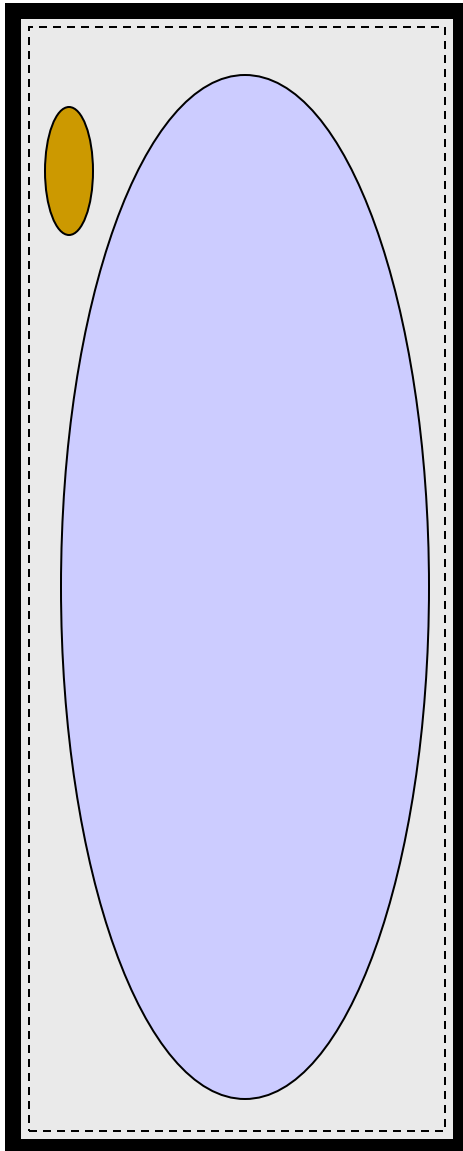
The **vacuole**

- Is found in the middle of the cell
- Takes up most of the cell, so pushes other things out towards the side
- Contains mainly water, but also some salts and sugars
- Presses out against the wall to provide support for the cell



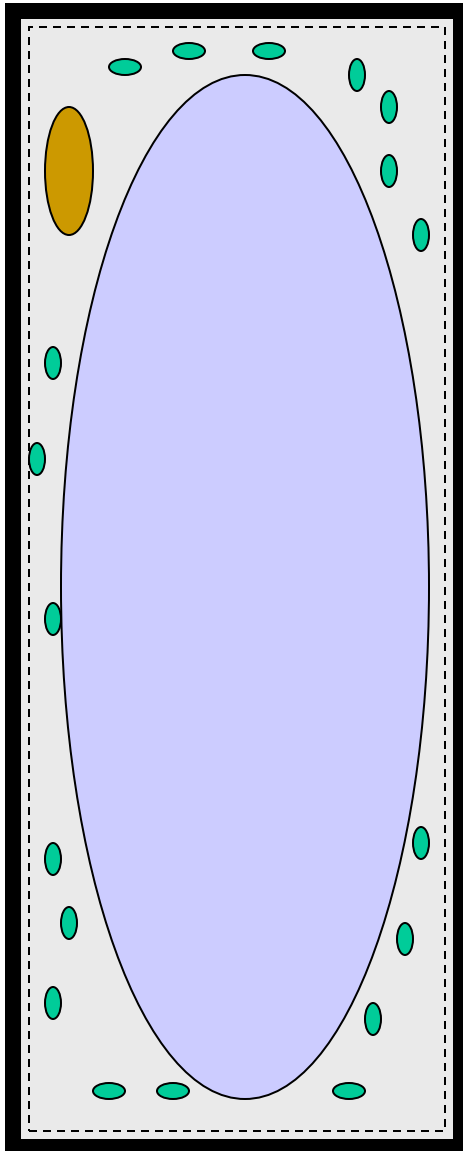
The **cytoplasm**

- Fills up the rest of the cell
- Is the site of all the cell's chemical reactions – the metabolism
- Is a watery jelly



The **nucleus**

- Is found in the cytoplasm
- Controls the cell's development and processes
- Can be made to show up with stains (iodine)
- Is often seen at the side of the cell, as the vacuole takes up the centre.

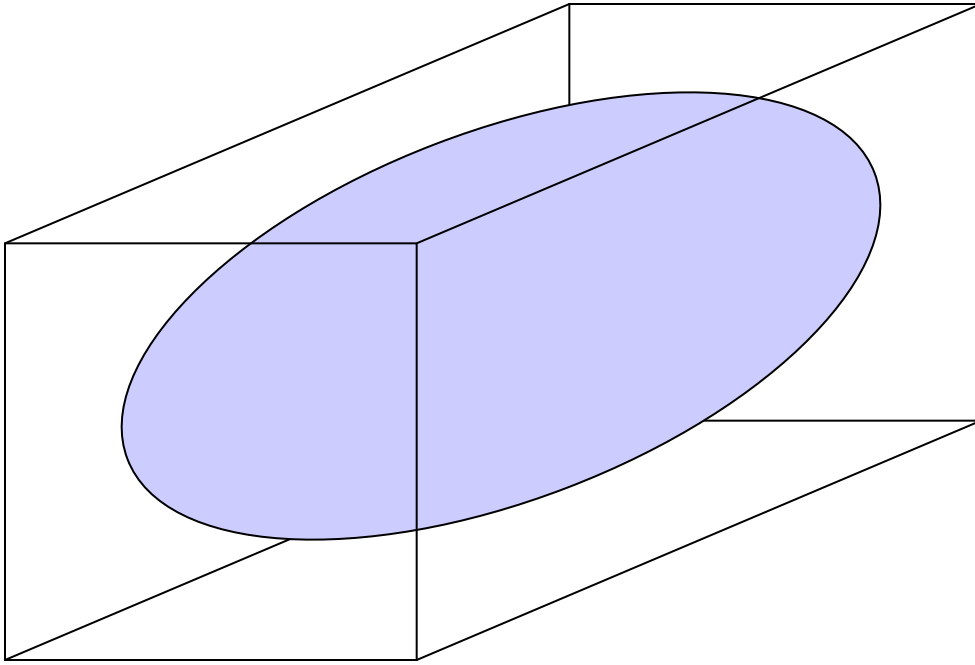


The **chloroplasts**

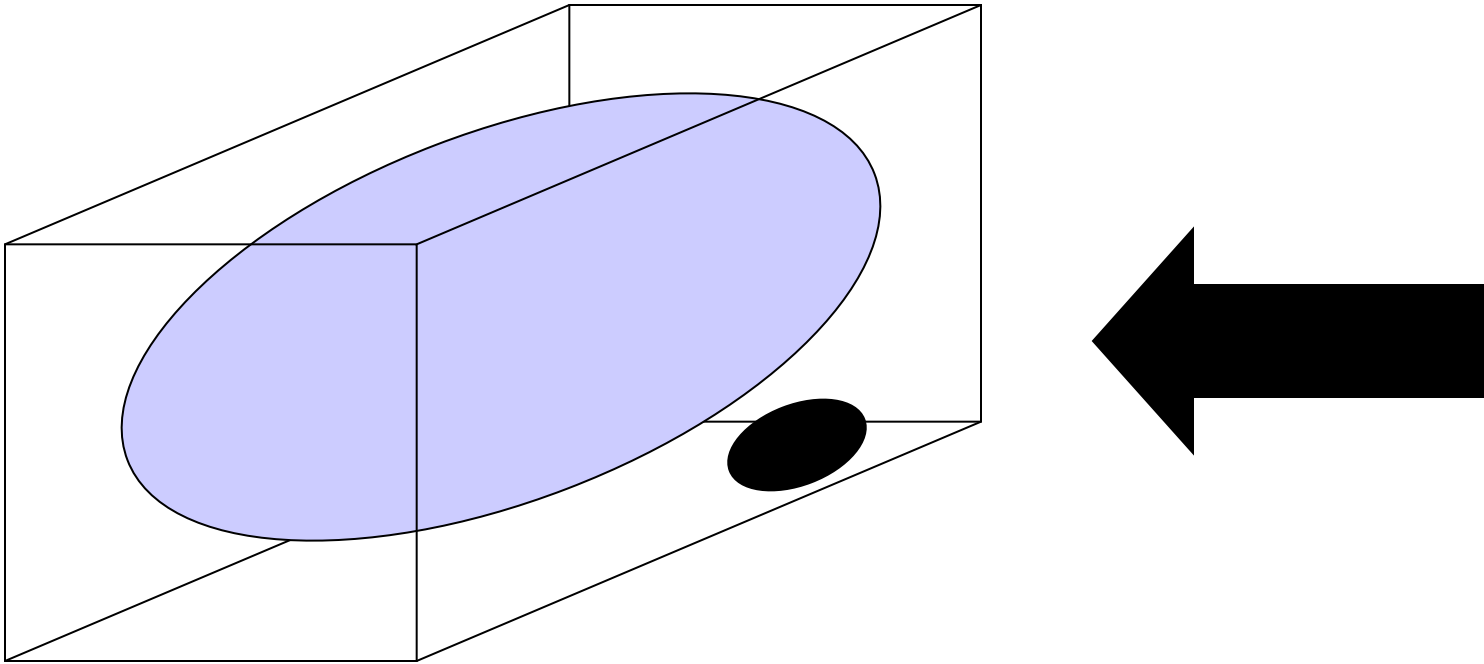
- Are small, rounded green components
- Are found in the cytoplasm
- Contain the green chemical chlorophyll
- Trap the light energy which plants need for photosynthesis
- Are only found in *green* plant cells

Part 4

Thinking in 3 dimensions

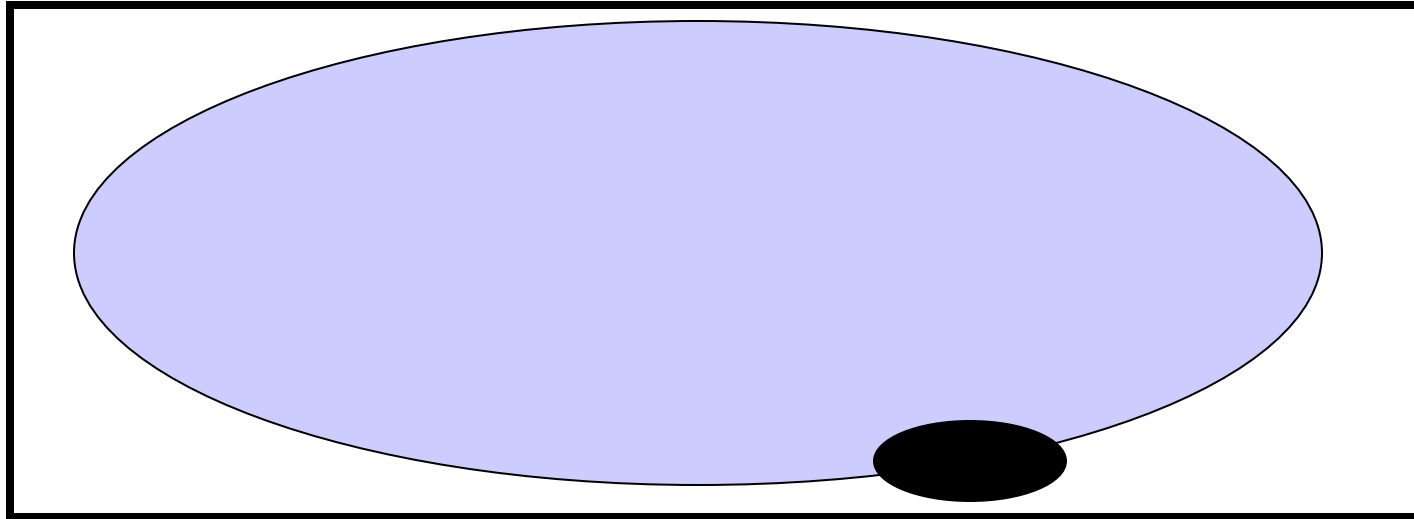


The vacuole fills up most of the cell. This means that there is most space left at the corners and around the edges.



The mental 'jump' is not to realise that when you look at the cell, you are looking at it **face on** – at one complete side. The next slide shows you how this would look ...

Side view ...



The next few slides are questions on cells. **Your teacher will give you a paper copy of the slides to work on.**

When the question slide appears, fill in the answers on your copy.

The following slide will then let you check your answers.

Ready ... steady

Q1. Link the parts of the cell to their function and whether they are found in animal or plant cells.

Nucleus

Controls entry and exit of materials

Animal cell only

Cytoplasm

Photosynthesis

Cell wall

Site of metabolism

Both animal and plant cells

Chloroplast

Controls cell activity

Membrane

Rigid for support

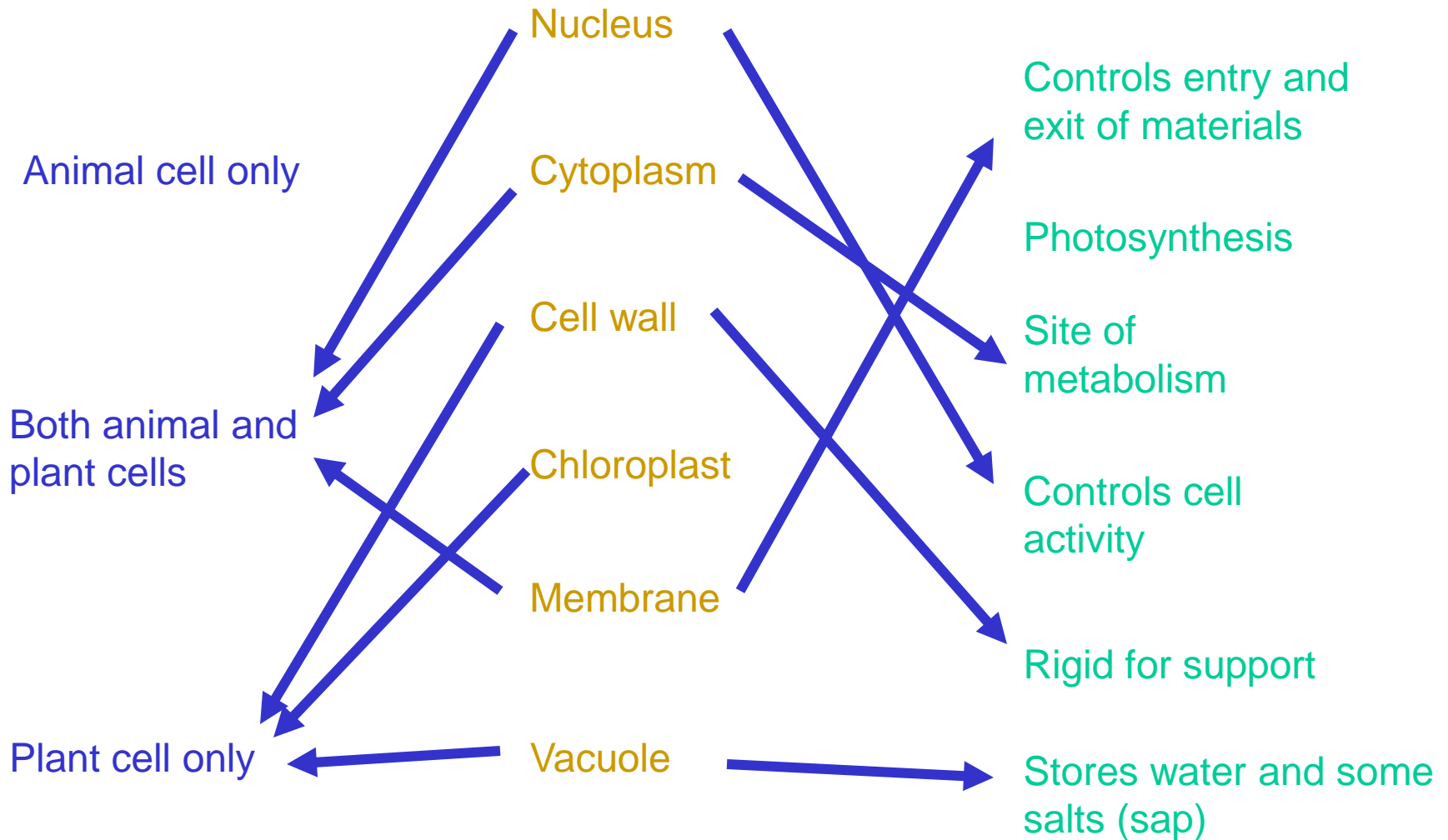
Plant cell only

Vacuole

Stores water and some salts (sap)

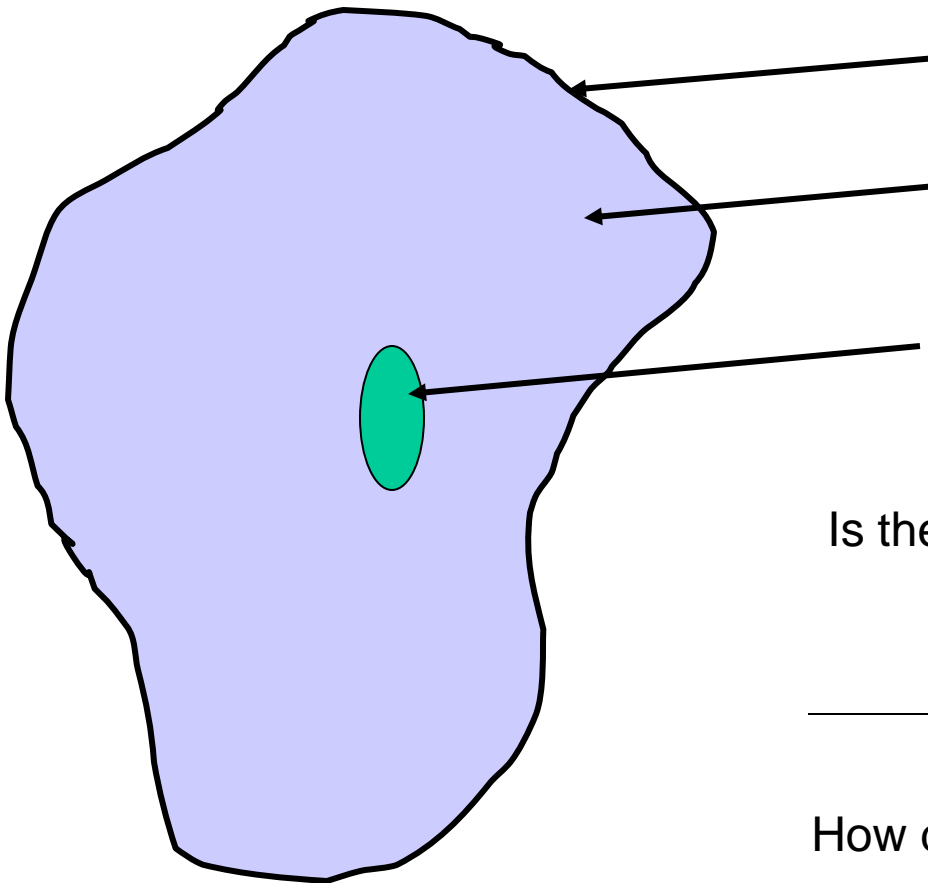
Q1.

Link the parts of the cell to their function and whether they are found in animal or plant cells.



Q2.

Label the parts shown as a,b and c



a. _____

b. _____

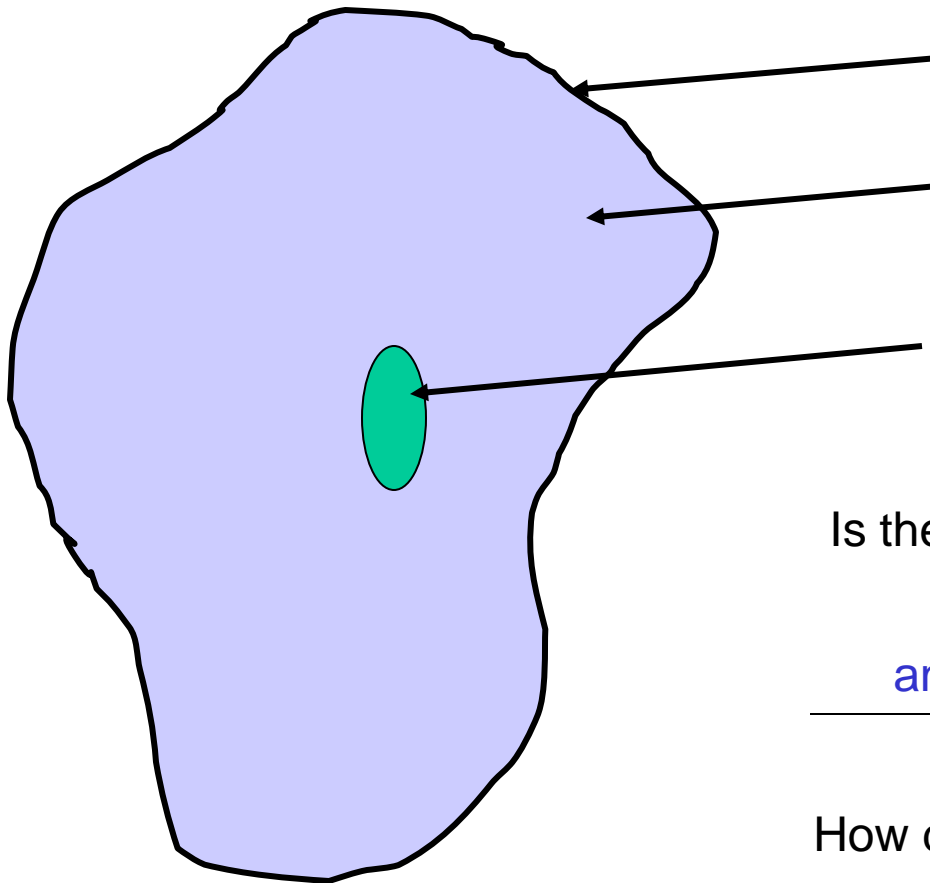
c. _____

Is the cell from an animal or plant ?

How do you know ?

Q2.

Label the parts shown as a,b and c



a. membrane

b. cytoplasm

c. nucleus

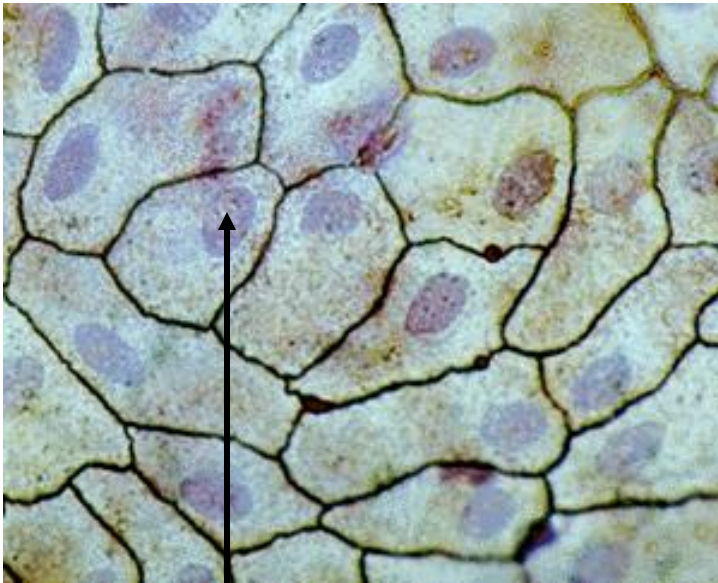
Is the cell from an animal or plant ?

animal

How do you know ?

Absence of cell wall, vacuole and cholroplasts

Q3. These cells are shown as seen under the microscope at x 400.



X

a. Are these animal or plant cells ?

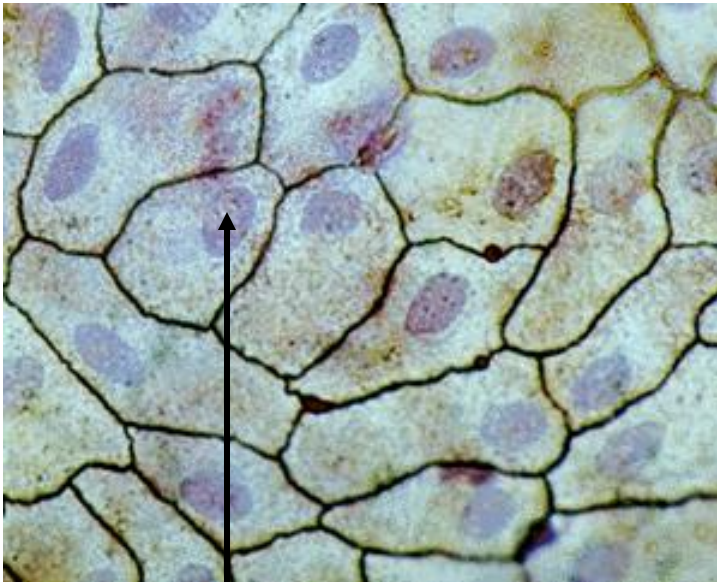
b. What features suggest this ?

c. What is the part labelled X ?

d. What is its function ?

Q3.

These cells are shown as seen under the microscope at x 400.



X

a. Are these animal or plant cells ?

animal

b. What features suggest this ?

Lack of cell wall, chloroplast
and vacuole

c. What is the part labelled X ?

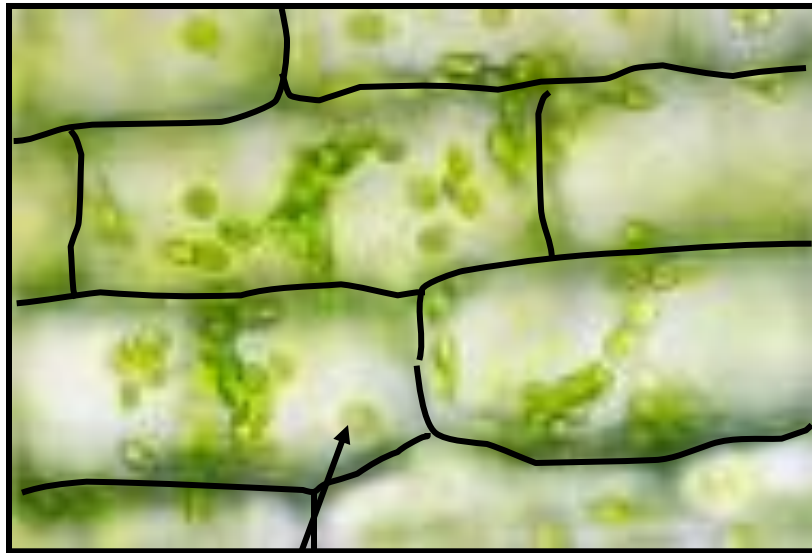
nucleus

d. What is its function ?

Control cell activities

Q4.

These cells are shown as seen under the microscope at x 200.



X

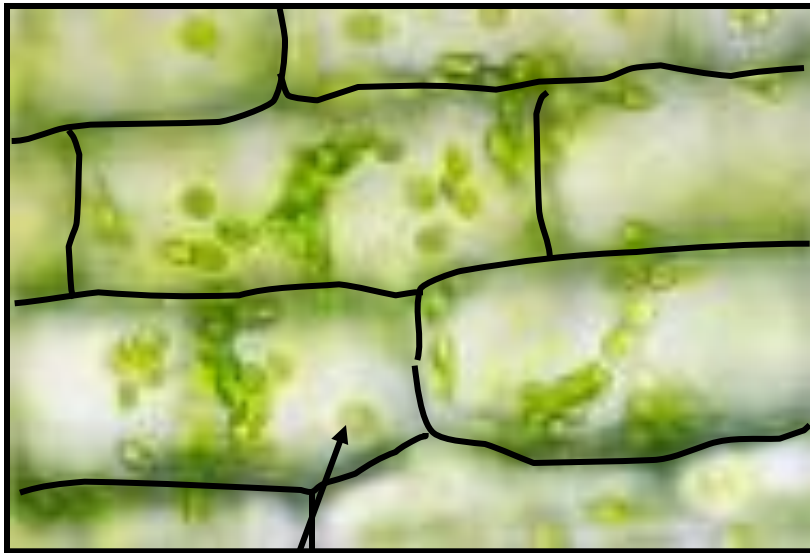
a. Are these animal or plant cells ?

b. What features suggest this ?

c. What is the part labelled X ?

d. What is its function ?

Q4. These cells are shown as seen under the microscope at x 200.



a. Are these animal or plant cells ?

Plant

b. What features suggest this ?

Obvious cell wall, green chloroplasts, vacuole

c. What is the part labelled X ?

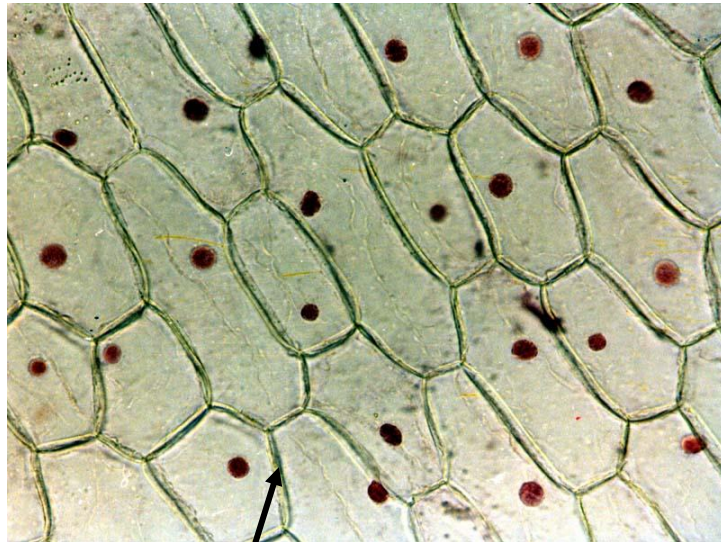
Chloroplast

d. What is its function ?

Traps light energy for photosynthesis

Q5.

These are onion cells under x 150.



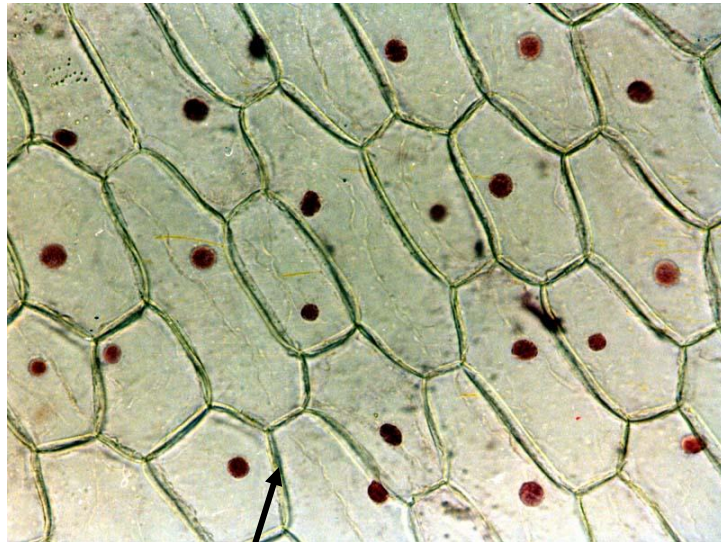
Y

a. What part, often found in a plant cell, is not visible in an onion cell ?

b. What is the part labelled Y and what is its function ?

c. What has been done to these cells to make them show up more clearly ?

Q5.



Y

These are onion cells under x 150.

a. What part, often found in a plant cell, is not visible in an onion cell ?

chloroplasts

b. What is the part labelled Y and what is its function ?

Cell wall

To protect and support the cells

c. What has been done to these cells to make them show up more clearly ?

Stained, probably with iodine

Q6. Add arrows to link the parts shown to their names and jobs -

Nucleus

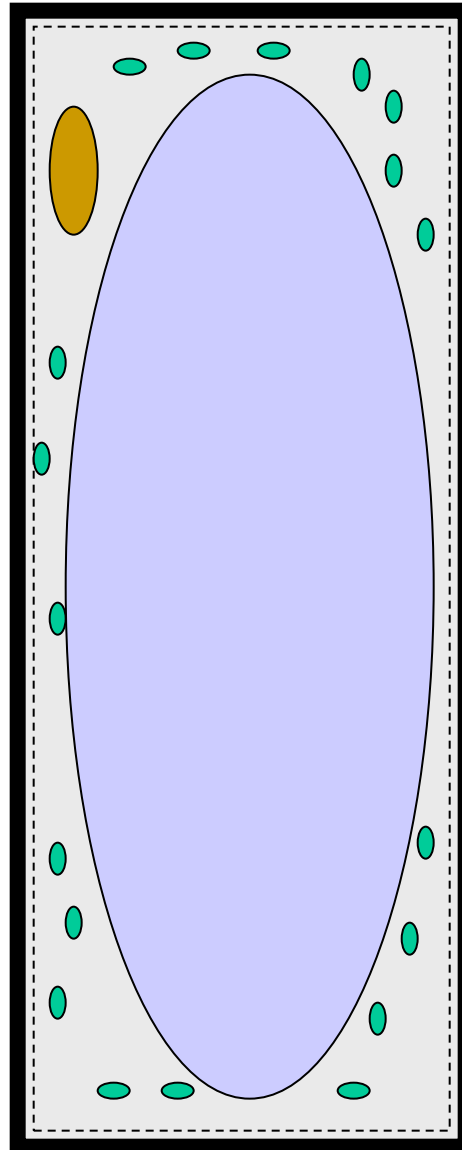
Cytoplasm

Wall

Chloroplast

Vacuole

Membrane



Controls what gets into and out of the cell

Strong, supporting layer

Controls the cell's development and metabolism

Traps light energy for photosynthesis

Stores water for the cell

Where all the chemical reactions (metabolism) take place

Did you hear about the lonely Biology teacher ?



He was in his sel' !