Surface area

Digestion

B2.1 Cells, tissues and organs

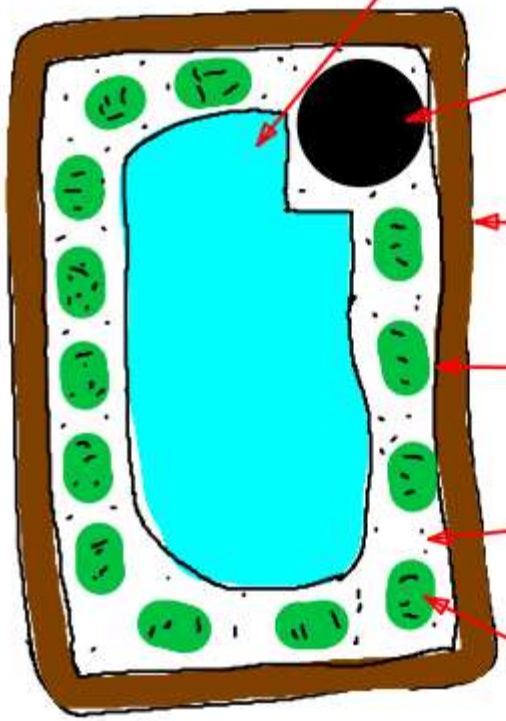
Diffusion

Cells

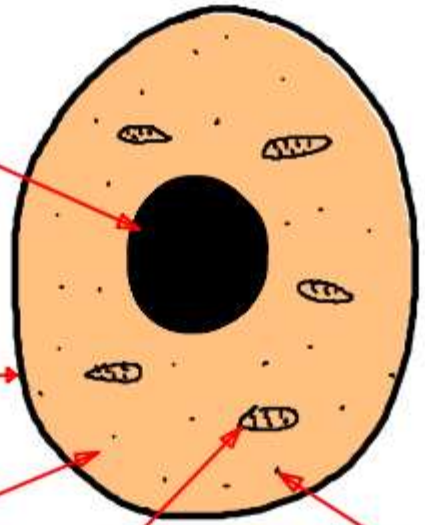
Osmosis

Plant and Animal Cells

A typical plant cell



A typical animal cell

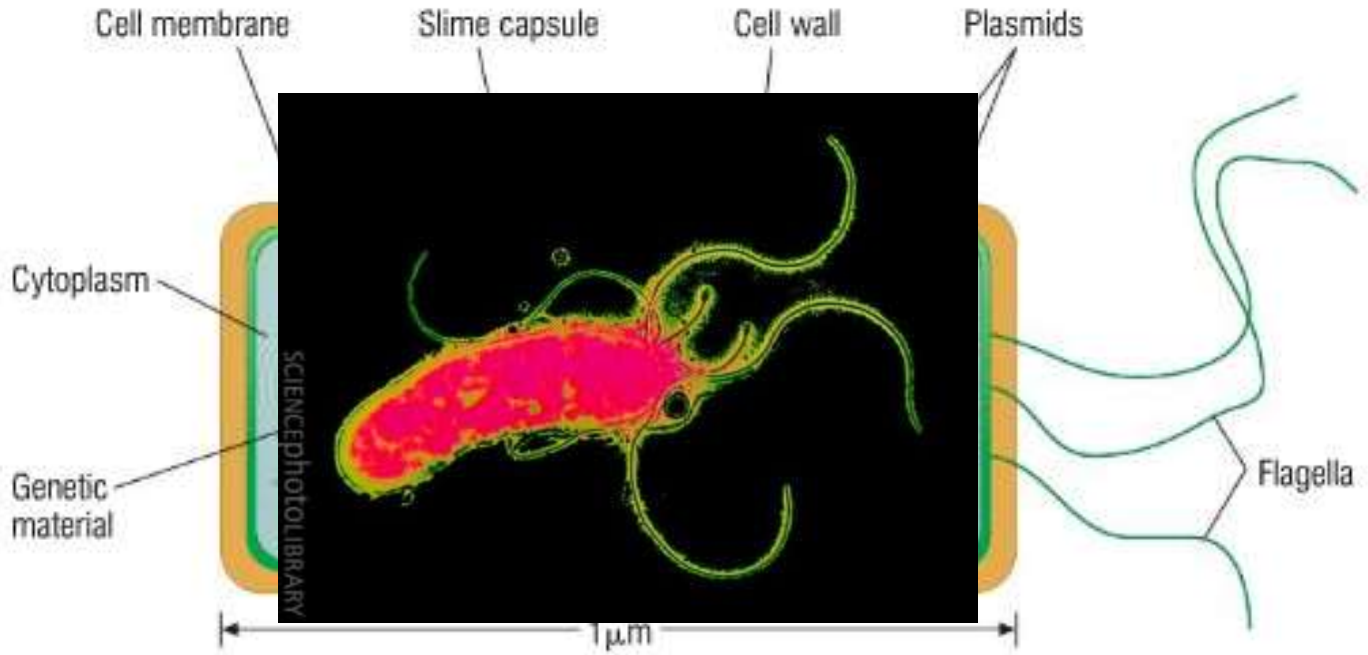


The function of the organelles in Animal and Plant Cells

Organelle	Function
Cell membrane	To let substance in and out of the cell
Mitochondria	For respiration to occur
Nucleus	Where the genetic information is kept and controls the cell
Cytoplasm	Where chemical reactions take place
Ribosome	Protein synthesis
Centriole	For cell reproduction
Plant Cells Only	
Cell wall	Strengthens the cell, contains cellulose to do so
Chloroplast	For photosynthesis, contains chlorophyll to trap light
Vacuole	Maintains pressure of plants cells

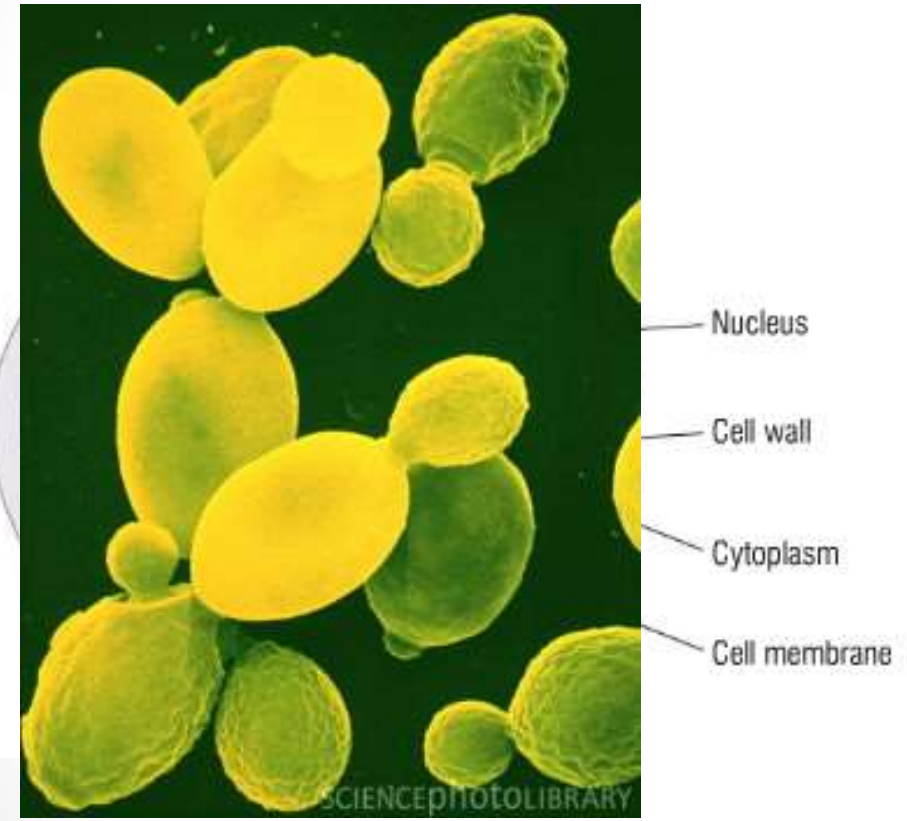
A bacterium

Most bacterial cells have a **plasmid**. Plasmids play a very important role in **genetic engineering**.

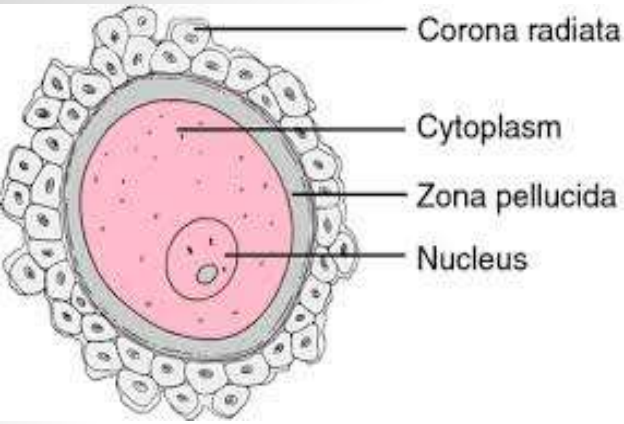


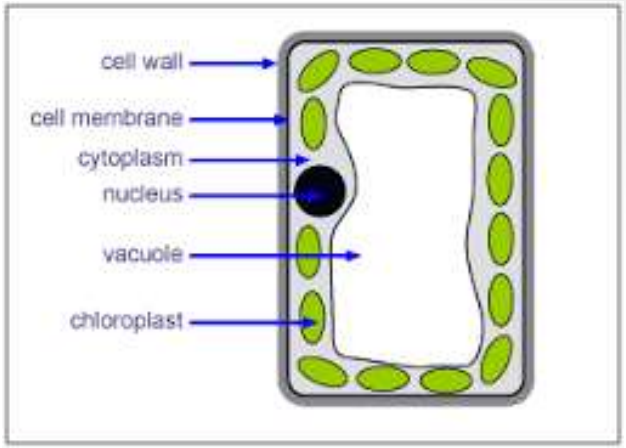
A bacterial cell has a different structure to an animal or plant cell. It has cytoplasm, a membrane and a surrounding cell wall, but the genetic material in a bacterial cell is **not in a nucleus**.

A yeast cell

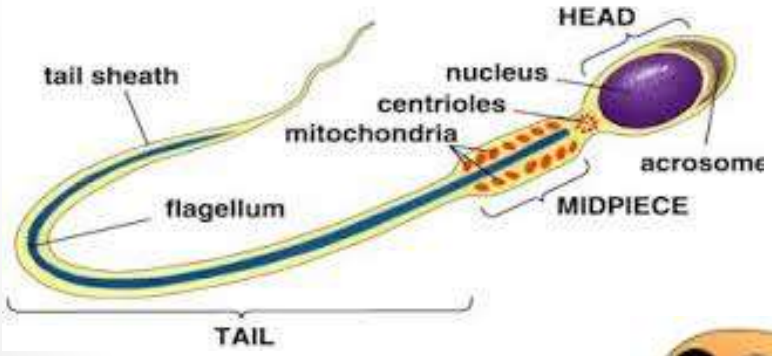


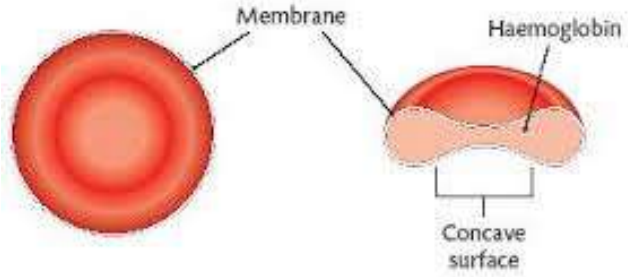
- Yeast is a type of fungus.
- It is a single celled organism that uses sugars as its food source.
- When oxygen is available yeast use **aerobic respiration** to release the energy from the sugars.
- When little oxygen is available yeast carry out **anaerobic respiration**.

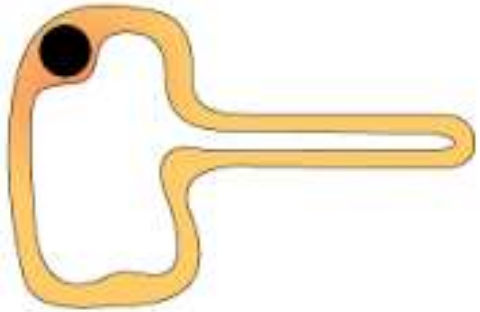


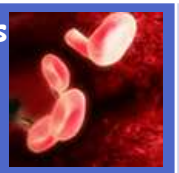
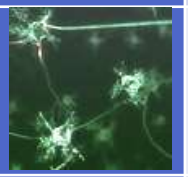
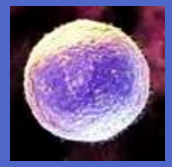


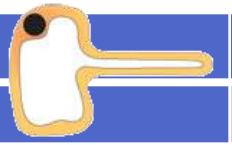
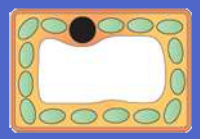
Specialised cells







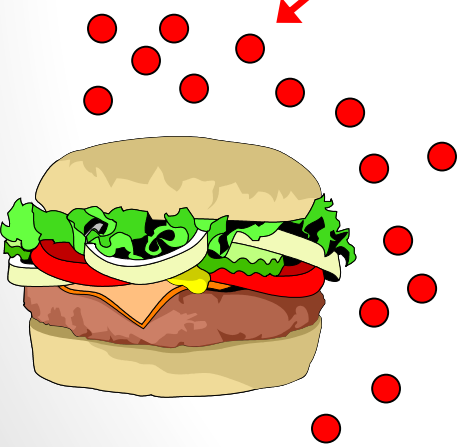
Type of animal cell	Function	Special features
Red blood cells 	To carry oxygen	• Large surface area, for oxygen to pass through • Contains haemoglobin, which joins with oxygen
Nerve cells 	To carry nerve impulses to different parts of the body	• Long • Connections at each end • Can carry electrical signals
Female reproductive cell (egg cell) 	To join with male cell, and then to provide food for the new cell that's been formed	• Large • Contains lots of cytoplasm
Male reproductive cell (sperm cell) 	To reach female cell, and join with it	• Long tail for swimming • Head for getting into the female cell

Type of plant cell 	Function	Special features
Root hair cell	To absorb water and minerals	• Large surface area
Leaf cell 	To absorb sunlight for photosynthesis	• Large surface area • Lots of chloroplasts

Diffusion

Diffusion is when something travels from an area of high concentration to an area of low concentration. For example, consider the scent from a hamburger…

The "scent particles" from this hamburger are in high concentration here:



Eventually they will "diffuse" out into this area of low concentration:

diffusion animation

Movement of substances

Diffusion is the **movement** of **substances** from a **high concentration** to a **low**.
The **steeper** the gradient, the **faster** diffusion will be.

It is essential in living organisms, we wouldn't function without it.

In plants:

Water and mineral absorption in roots

- Through root hair cells

Photosynthesis and respiration

- Oxygen and carbon dioxide diffuse in and out of stomata

In humans:

Gaseous exchange

- Oxygen diffuses in through alveoli and into blood stream
- Carbon dioxide diffuses out from blood stream, into alveoli

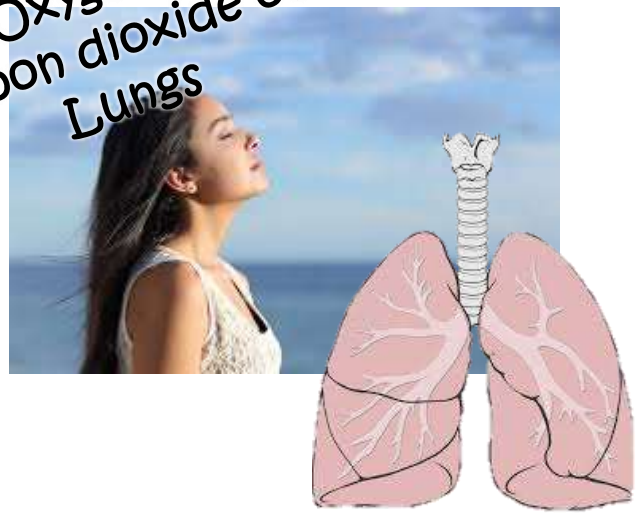
Respiration

Digestion

- Absorption of nutrients in small intestine
- Absorption of water in large intestine

Without diffusion we'd DIE!!!!!!

Oxygen in
Carbon dioxide out
Lungs



Small intestine
Food molecules

Where does diffusion happen in every day life?

Cells, Tissues and Organs

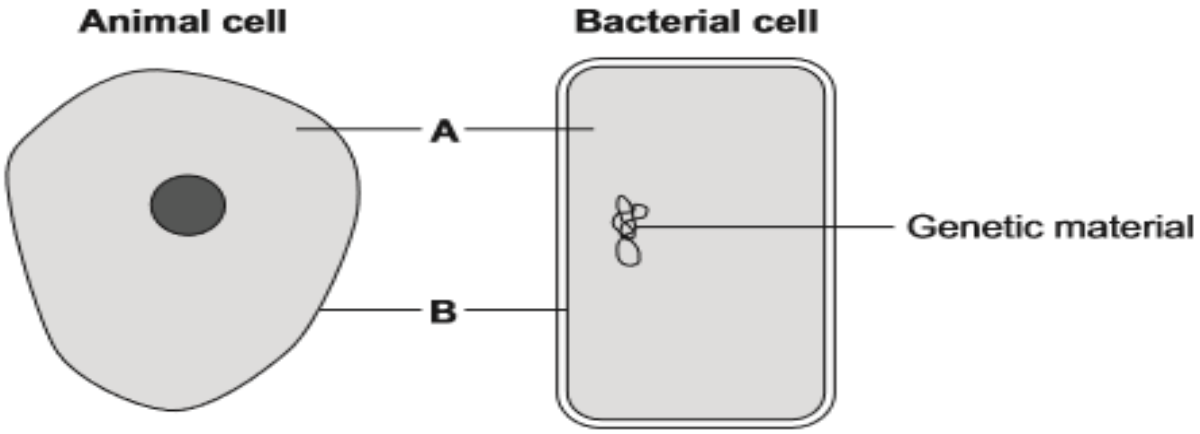
- **Tissue** – A group of cells carrying out the same function

- **Organ** – A group of different tissues working together to carry out a function

- **Organ System** – A group of organs working together to carry out a function

Exam questions

1 The diagrams show an animal cell and a bacterial cell.



1 (a) (i) Structures **A** and **B** are found in both the animal cell and the bacterial cell.

Use words from the box to name structures **A** and **B**.

cell membrane	**chloroplast**	**cytoplasm**	**vacuole**

A .....

B .....

(2 marks)

1 (a) (ii) Both cells contain genetic material.

Name the structure in the animal cell that contains genetic material.

.....

(1 mark)

1 (b) **List A** gives three structures found in animal cells.

List B gives four functions of cell structures.

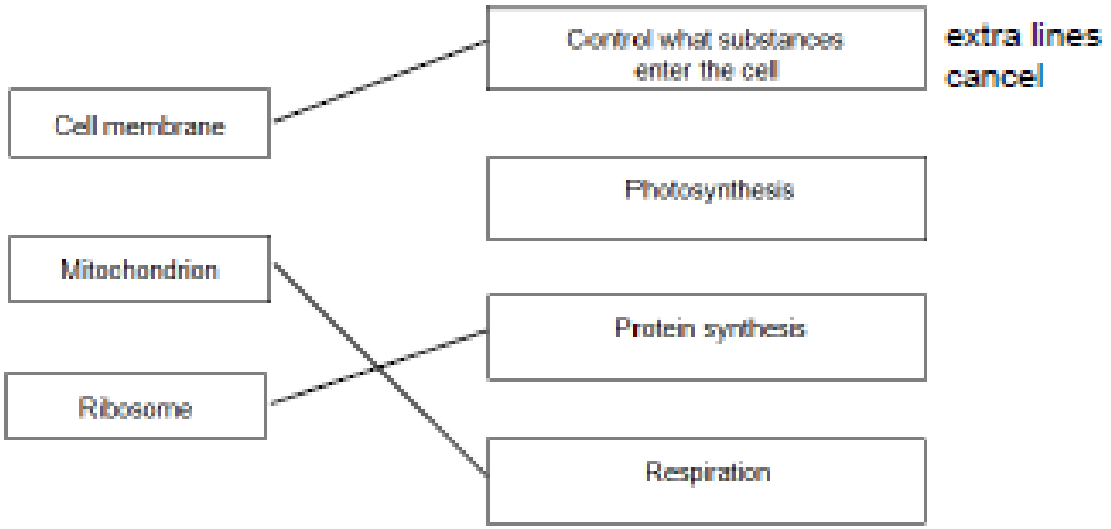
Draw **one** line from each structure in **List A** to its correct function in **List B**.

List A – Structure	**List B – Function**
	Controls what substances enter the cell
Cell membrane	
	Photosynthesis
Mitochondrion	
	Protein synthesis
Ribosome	
	Respiration

(3 marks)

6

Question 1

question	answers	extra information	mark
1(a)(i)	A = cytoplasm B = (cell) membrane		1 1
1(a)(ii)	nucleus	accept chromosome / DNA / genes accept phonetic.	1
1(b)		extra lines cancel	3
Total			6