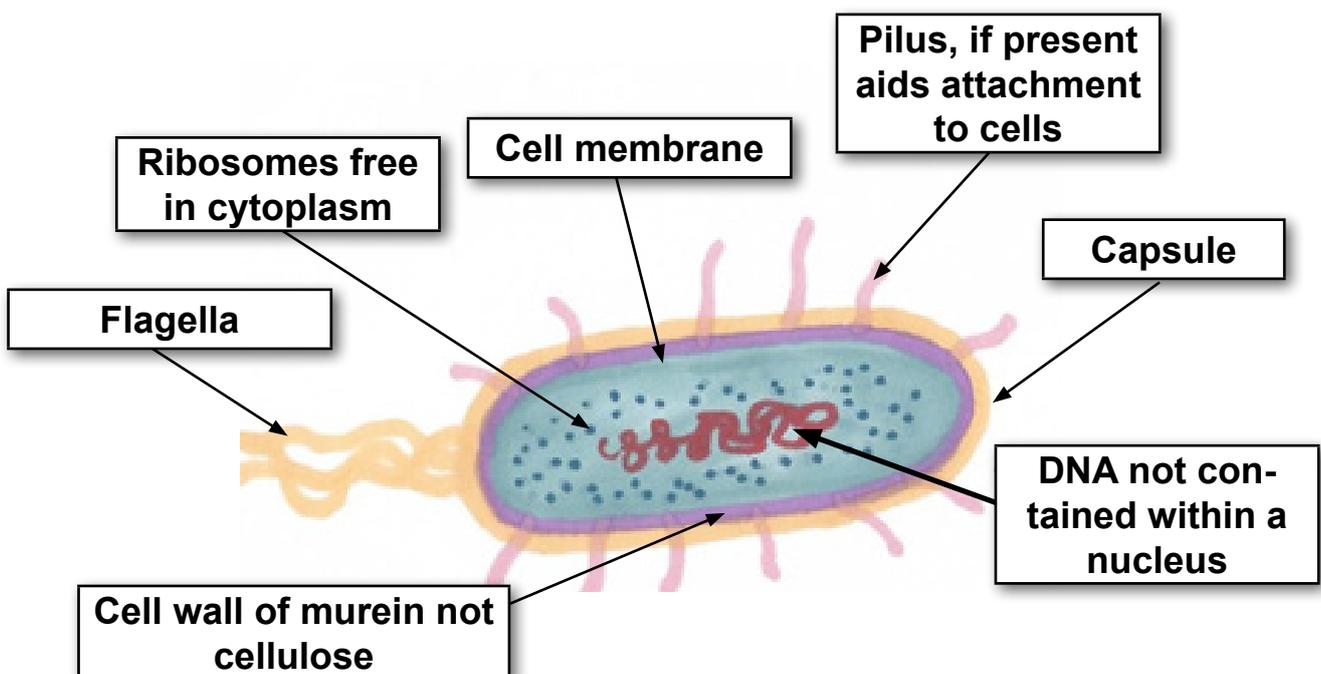


Bacterial cell

These are the smallest cells we will look at ranging from **only 1-2 μm** .

It has a **cell wall** but it is made of a different substance to the plant cell wall.

Bacterial cells are different in many ways to the other cells we will look at, they **have no nucleus**, the chromosome is loose in the cytoplasm in a long loop, they have **no chloroplasts or mitochondria** and exist as **single cells**. They sometimes have a **slime capsule** around the cell wall to stop them drying out.



*Thought to be the earliest forms of life

*Reproduce asexually by splitting into two (binary fission)

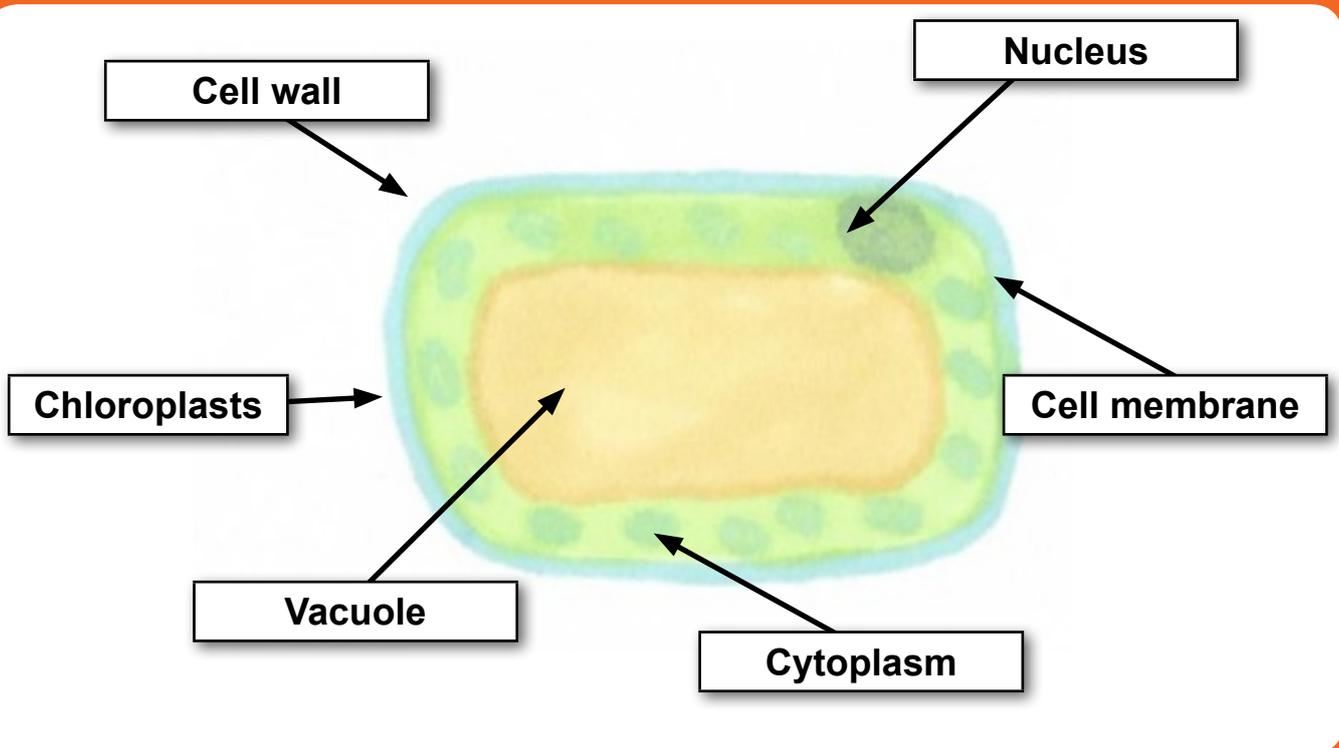
Bacterial cells **reproduce asexually** (only one parent is involved) by dividing into two.

Bacteria can be adapted to the most extreme conditions on earth and have been found living almost everywhere on earth, this is one of the reasons it is thought that bacteria were the **earliest forms of life** on earth.

Plant cells

Plant cells have a nucleus, cytoplasm, mitochondria and cell membrane like animal cells but they have 3 extra structures not found in animal cells:

1. The large vesicle of a plant cell is called a vacuole. It contains fluids and helps in storage of water.



2. The outermost covering of a plant cell is called the **cell wall**. It is made up of **cellulose** and helps provide **mechanical support** to the cell.

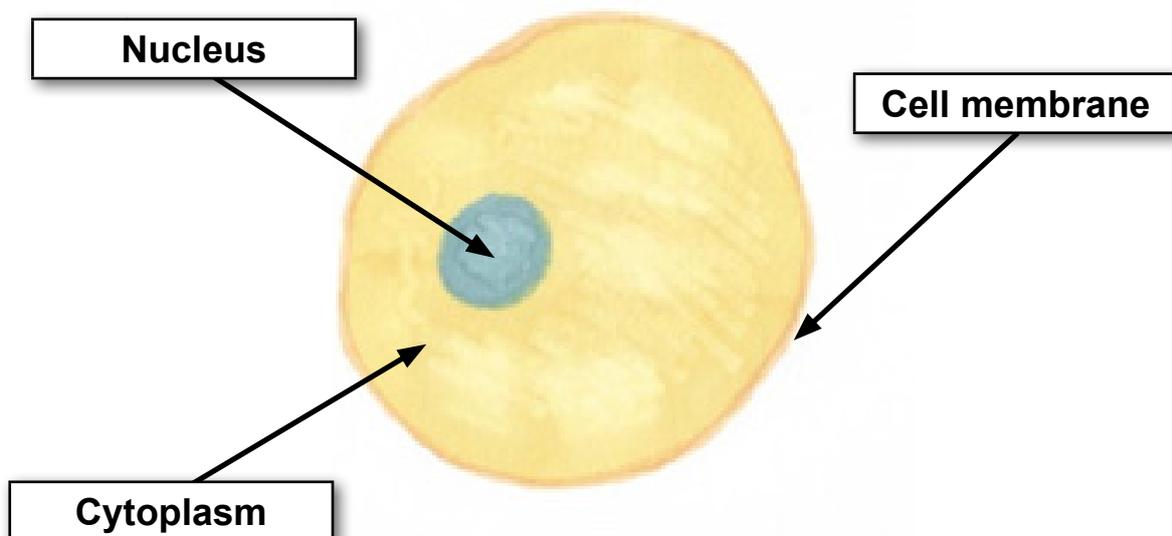
3. **Chloroplasts** are green coloured organelles.

They help in **production of food** in the presence of **sunlight** by **photo synthesis**.

Animal cells

Animal cells are between 10-20 μm in size, they are smaller than plant cells but bigger than bacterial and fungal cells. They contain 4 main parts.

1. The **cell membrane**, it allows entry and exit of substances e.g. Oxygen, glucose are allowed in and carbon dioxide out.
2. **Mitochondria** are the powerhouses of the cell where ATP (energy) is generated by cellular respiration.
3. The jelly like substance inside the cell is called the **cytoplasm**. All the chemical reactions of an animal cell take place here.



4. The cell nucleus controls all the functions occurring in the cell. It contains the genetic material, DNA.

The DNA is a code which can be translated to make specific proteins and these determine the structure of the animal itself.

Animals are multicellular; they can differentiate their cells to carry out different functions.

Yeast cells (Fungi)

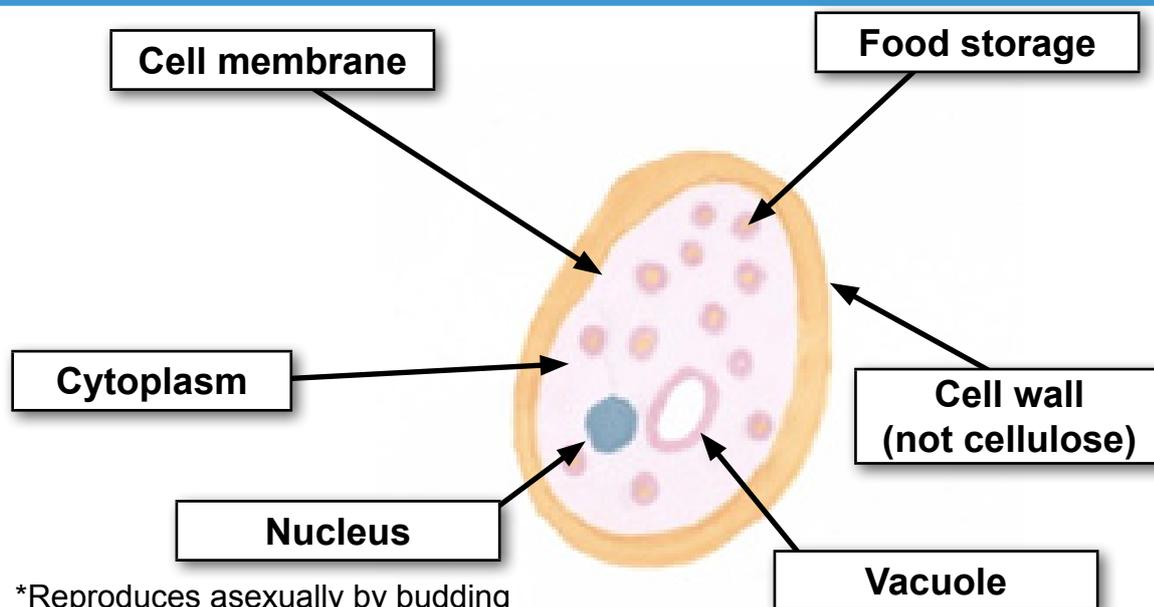
They vary in size, but are usually about 4 μm which is bigger than bacterial cells.

Yeasts are unicellular, which means they are microbes as we need a microscope to see them.

Yeast have a nucleus, cytoplasm and cell membrane surrounded by a cell wall.

Yeast are useful to us as they make carbon dioxide which makes our bread rise.

All forms of alcohol, like beer or wine, are made by certain yeast that respire sugar and excrete alcohol.



Yeast cells reproduce asexually (only one parent is involved) by budding.

Budding is when yeast put out a small bud from one side of themselves, and move a piece of their nucleus into it, and then they gradually pinch off the bud to make a new, smaller yeast cell.

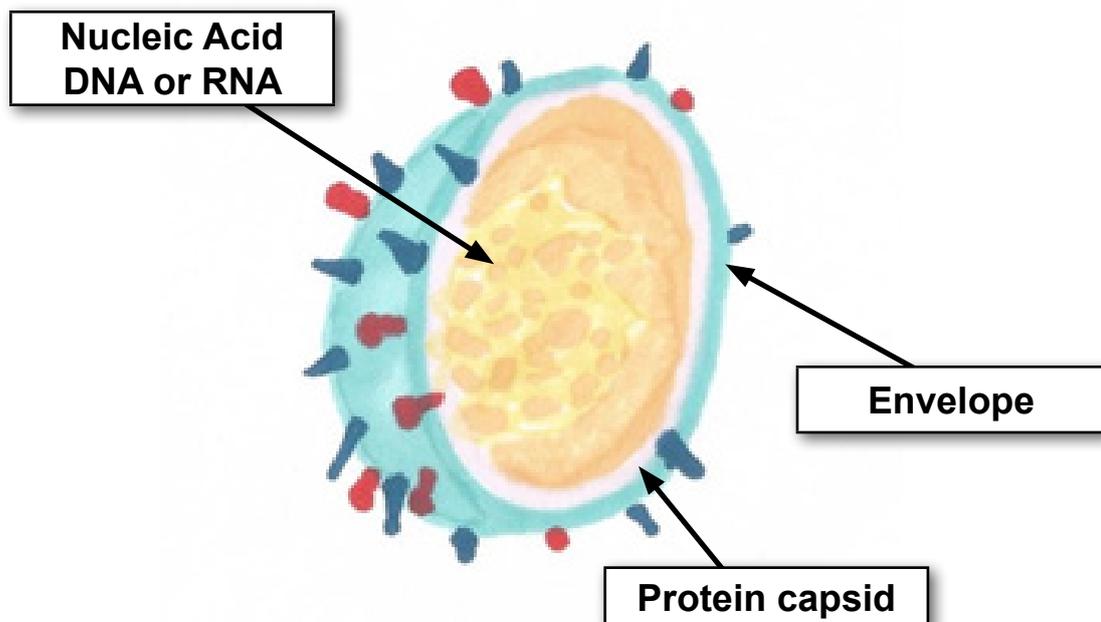
Virus Particles

Viruses are not cells. They do not have a cell membrane or other components of living cells.

A virus particle is made up of a **protein coat (capsid)** **DNA or RNA (genetic material)** and **binding proteins to attach to a host cell.**

They do not carry out the 7 characteristics of living things.

They have genetic material and can therefore mutate and evolve.



Reproduction

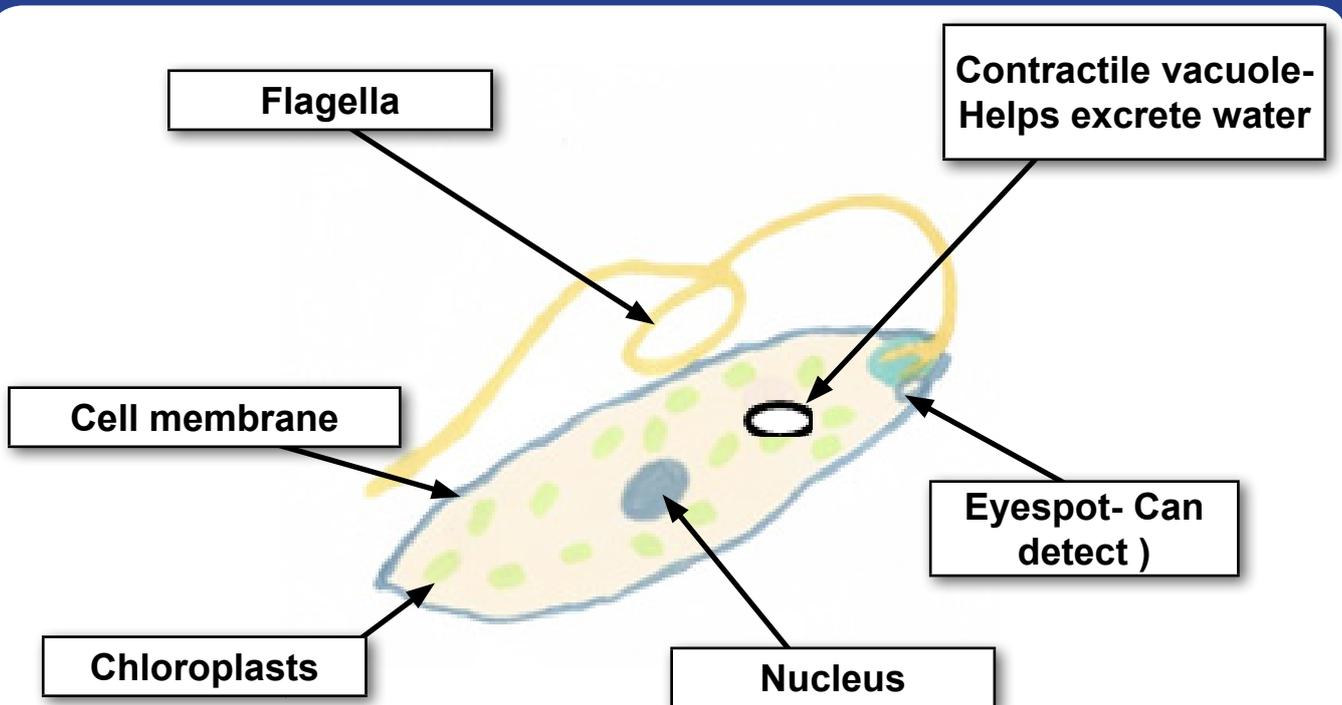
A virus lands on a cell (animal, plant or bacterial) it binds to proteins on the cell surface and injects its genetic material into the cell.

The host cell then uses the viral genes to make virus proteins and enough new viruses are made to burst the cell releasing more viruses to infect even more cells.

Algae

It is a large step in complexity from **prokaryotic cells** which do not have a nucleus like bacteria to the **eukaryotic cells** like algal cells which do have a nucleus.

All algae therefore have a **nucleus** and **cytoplasm** with a **cell membrane** around it. They also have organelles (like mitochondria and chloroplasts) bound in one or more membranes



*Has a mixture of plant and animal cell characteristics

All algae carry out photosynthesis using their **chloroplasts** just like plants, but algae may or may not have **cell walls**.

Algae can be unicellular and those that are can be considered microbes as they can only be viewed under a microscope.