Eukaryotes and prokaryotes

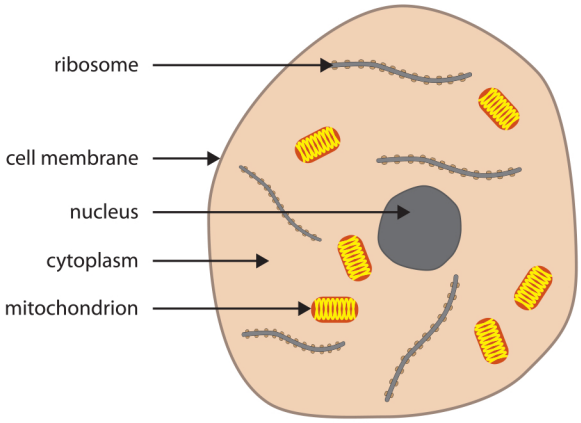
All cells are either eukaryotic or prokaryotic.

Eukaryotic cells

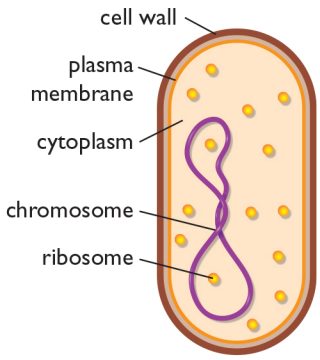
All animal cells and plant cells are eukaryotic. They have a cell membrane and cytoplasm with genetic material enclosed in a nucleus.

Prokaryotic cells

Bacterial cells are prokaryotic. They have cytoplasm and a cell membrane surrounded by a cell wall. The genetic material in prokaryotic cells is not enclosed in a nucleus. It is a single DNA loop in the cytoplasm. There may also be smaller rings of DNA called plasmids in the cytoplasm. Some cells have a tail called a flagellum, this helps them to move around. Multiple flagellum are called flagella.



Eukaryotic cell



Prokaryotic cell

Scale and size of cells

All cells are very small and can only be seen with a microscope. Prokaryotic cells are much smaller (about one tenth smaller) than eukaryotic cells. Eukaryotic cells are measured in micrometres (μm). Prokaryotic cells can be measured in micrometers or nanometres (nm).

MATHS SKILLS

1 centimetre (cm) = 10 mm

1 millimetre (mm) = 1000 μm

1 micrometre (μm) = 1000 nm

1 nanometre (nm) = 1000 picometres (pm)

In standard form, 1×10^4 is the same as writing 10 000.

WORKIT!

An *E.coli* bacterium measures 2×10^3 nm in diameter. How many μm is this?

2×10^3 nm is the same as 2000 nm.

There are 1000 nm in 1 μm

2000 nm / 1000 = 2 μm

CHECKIT!

1 How is the genetic material stored in a prokaryotic cell?

2 A cell measures 5×10^3 nm. How many μm is this?

3 A bacterial cell is one-tenth the width of a eukaryotic cell. The eukaryotic cell is 2 μm wide. Calculate the width of the bacterial cell. Give your answer in nm using standard form.