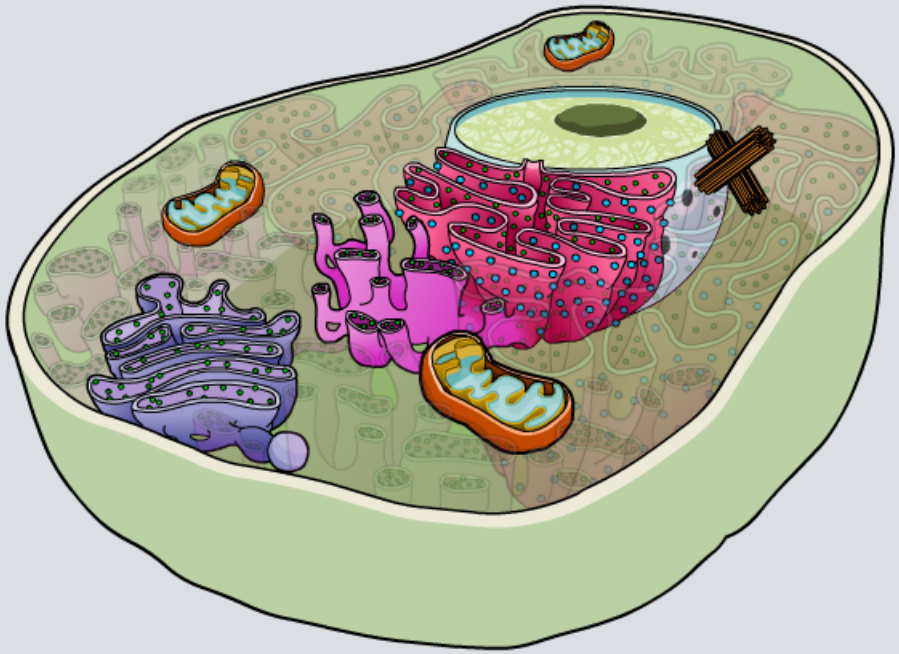
Eukaryotic Cells



What is a eukaryote?

A **eukaryote** is any organism consisting of one or more cells that contain DNA in a membrane-bound **nucleus**, separate from the cytoplasm.

Eukaryotes include:

- animals
- plants
- fungi
- a diverse group known as the protists (or protoctists).

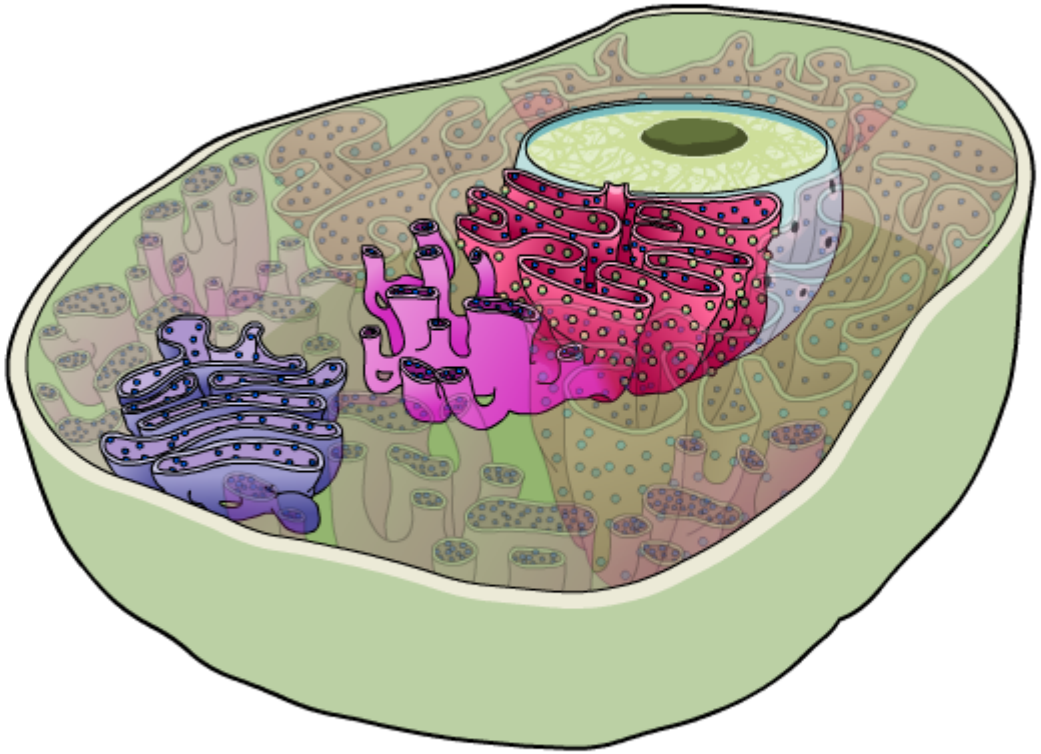
All eukaryotic cells contain a large number of specialized, membrane-bound **organelles**.

The organelles of protein synthesis

What organelles are involved in protein synthesis?

Many of a cell's organelles are involved in protein synthesis, which is central to all life's processes.

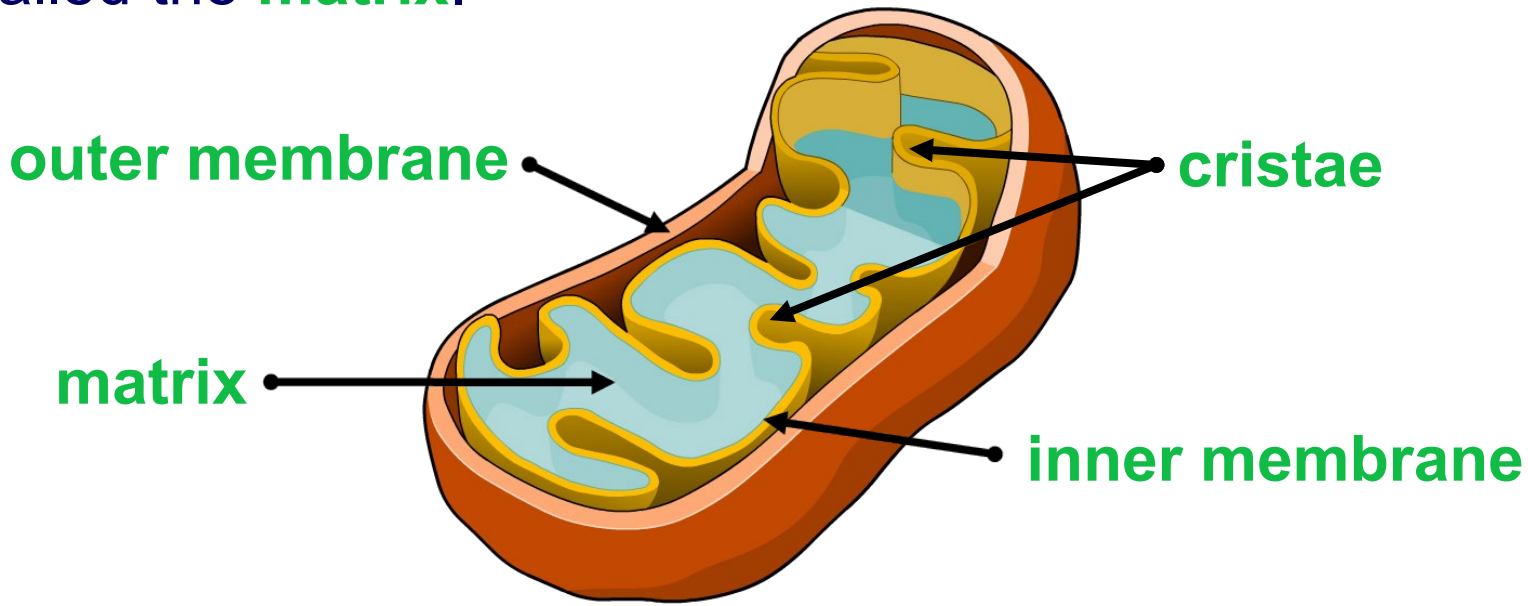
Click "**play**" or the cell to find out more about the different organelles.



Mitochondria

The **mitochondrion** is an energy-generating organelle.

It is surrounded by two membranes. The inner layer folds inwards to form the **cristae**. The cristae project into a liquid called the **matrix**.

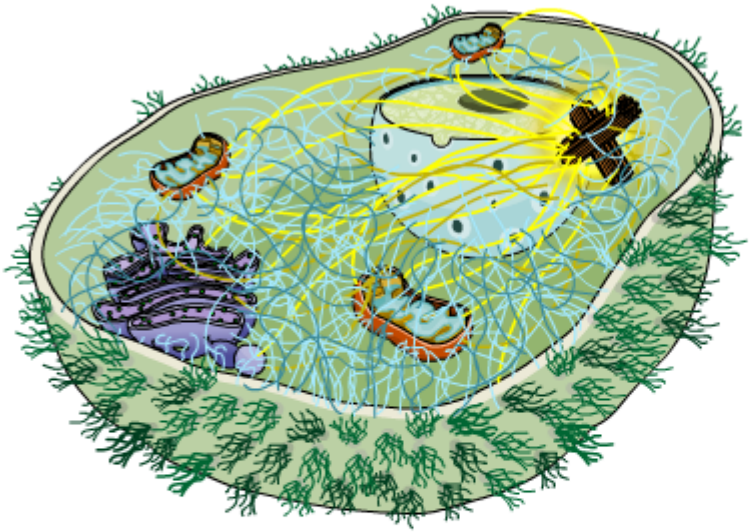


The inner membrane is coated in enzymes, which catalyze the reactions of aerobic respiration to produce **ATP**.

Microtubules and the cytoskeleton

What are microtubules and why are they important?

Microtubules are hollow filaments of the protein tubulin. They give a cell structural support as part of the **cytoskeleton**, and form organelles such as **centrioles** and **cilia**.
Click on a button for more infomation.

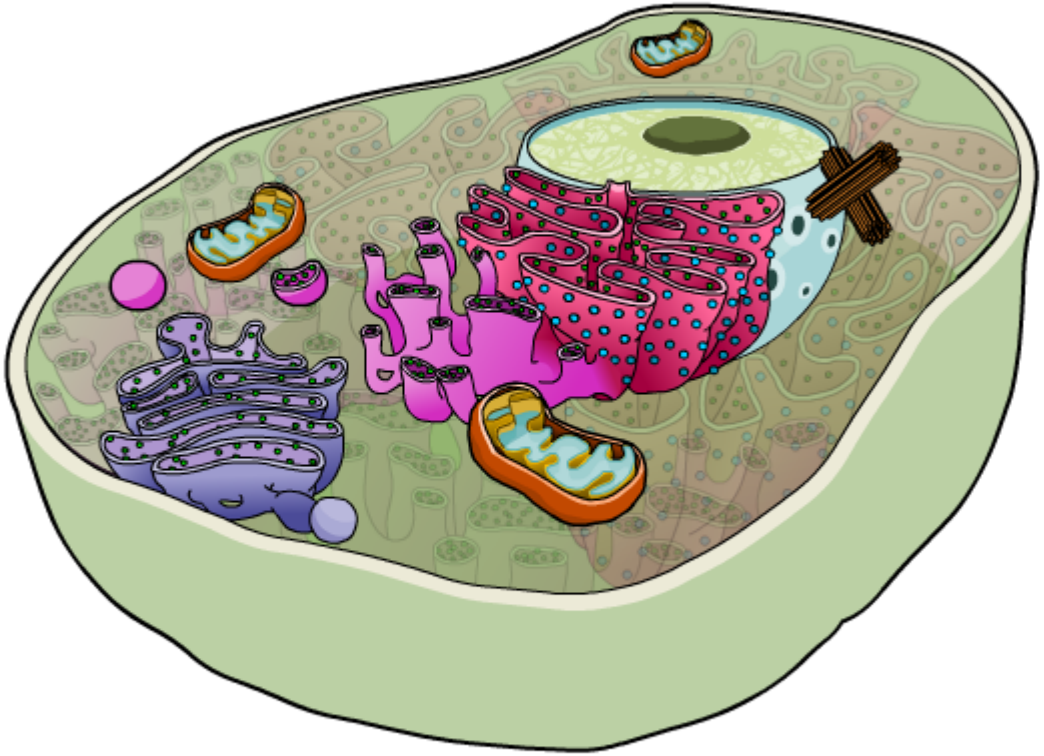


microtubules | centrioles

cilia | actin filaments

Which organelle?

Identify the correct organelle



Can you identify all the organelles in a typical animal cell from their function?

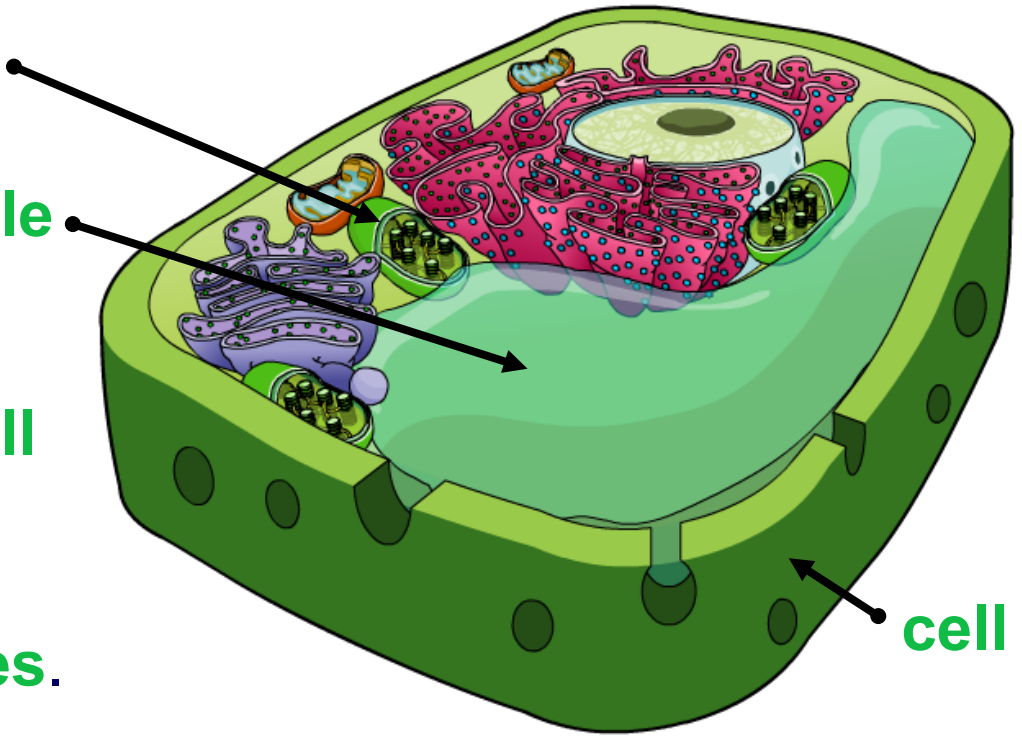
Click "**start**" to find out.

start

Plant cells

Plant cells share all the common features of animal cells, but also contain some additional organelles.

Plants gain all their energy from sunlight; cells in their leaves contain many **chloroplasts** to convert this into a useful form.

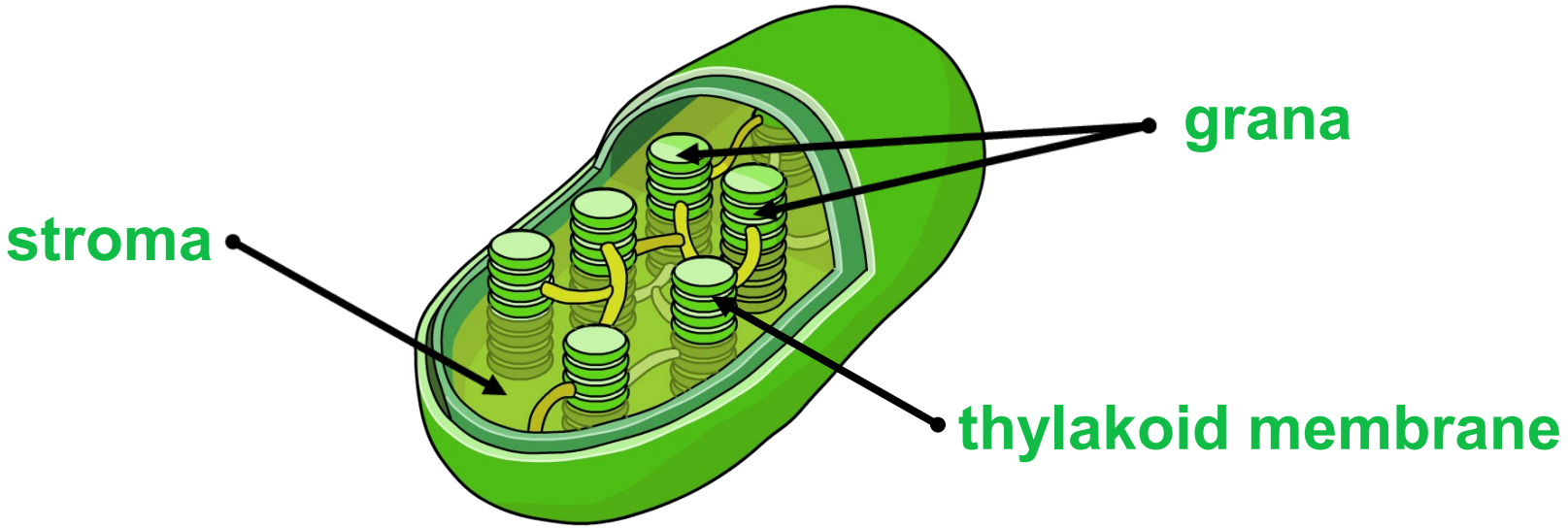


Every plant cell is surrounded by a **cell wall**, and contains one or more permanent **vacuoles**.

Chloroplasts

Chloroplasts use carbon dioxide, water and light energy to build sugars. They are present in all green plants.

The chloroplast is surrounded by a double membrane. It is filled with a liquid called the **stroma**, and contains stacks of **thylakoid membranes** called **grana**.

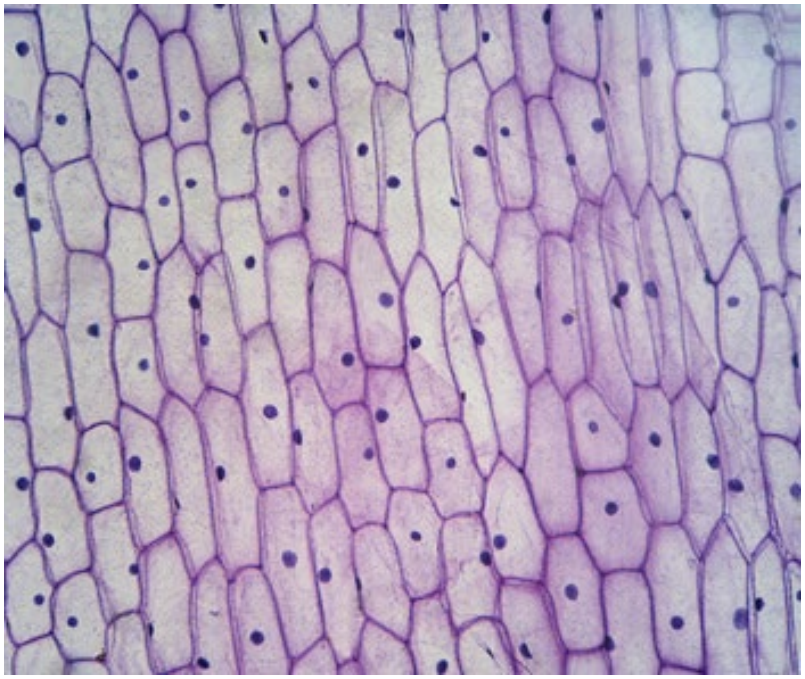


The thylakoid membranes are the site of **photosynthesis**.

The cell wall

The **cell wall** of a plant cell gives it support and structure. It is made of the polysaccharide cellulose, and can function as a carbohydrate store by varying the amount of cellulose it holds.

The cell wall does not seal off a cell completely from its neighbors. There are pores within the walls called **plasmodesmata**. These connect two cells together by their cytoplasm, enabling substances to be exchanged and transported between them.



Eukaryotic organelles

Match these cell organelles to their functions

nucleolus	manufactures ribosomes within the nucleus
Golgi apparatus	generates ATP by aerobic respiration
ribosome	provides structural support and protection from high turgor pressure
rough ER	the site of most protein synthesis; contains ribosomes
mitochondrion	translates mRNA into protein
cell wall	involved in processing and packaging of proteins