THE CELL

The smallest unit of living matter.

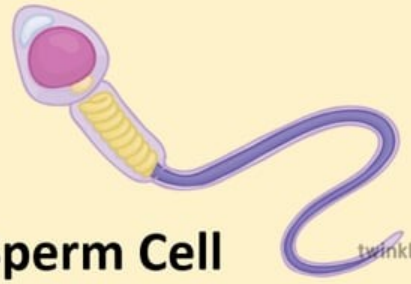
Animal & Plant Cells -basic structure

- **Animal Cells**
  - Cell membrane
  - Cytoplasm
  - Nucleus
- **Plant Cells**
  - Cell membrane
  - Cytoplasm
  - Nucleus
  - Cell wall
  - Chloroplast
  - Large vacuole

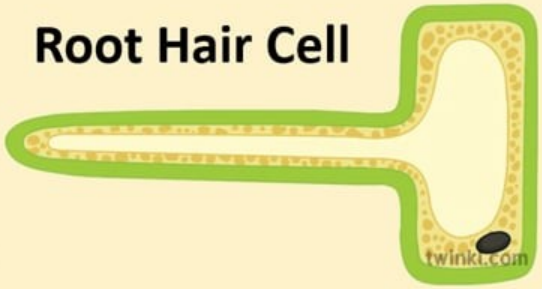
Lesson Title

Specialised Cells

Some examples of specialised cells:



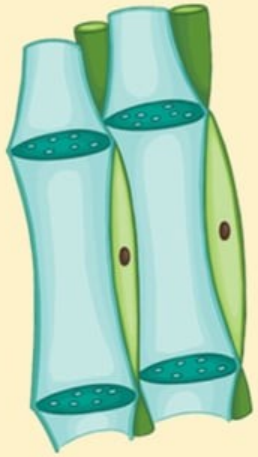
Sperm Cell



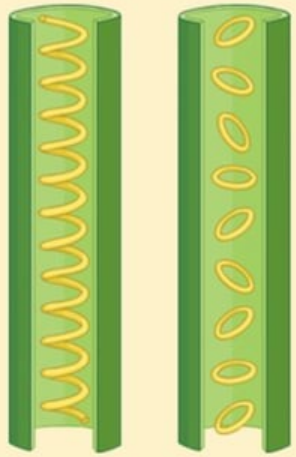
Root Hair Cell

Muscle Cell

Nerve Cell



Phloem

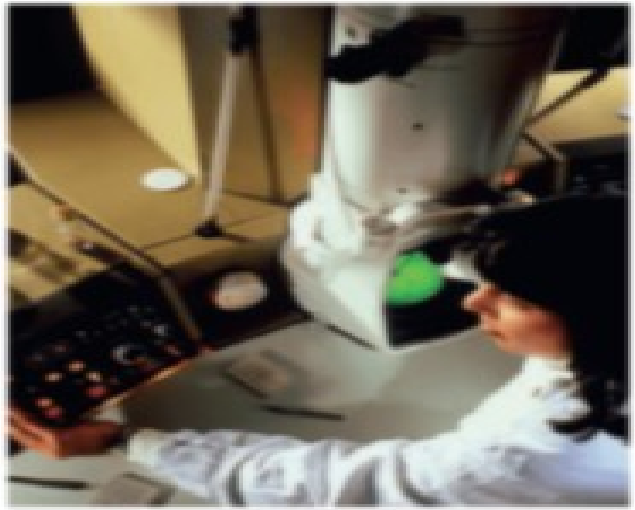


Xylem

Microscopes

- Cells are very small and can only be seen using a microscope.
- A microscope magnifies objects.
- A light microscope shines a beam of light through the specimen and magnifying lenses.

8.1 A light microscope



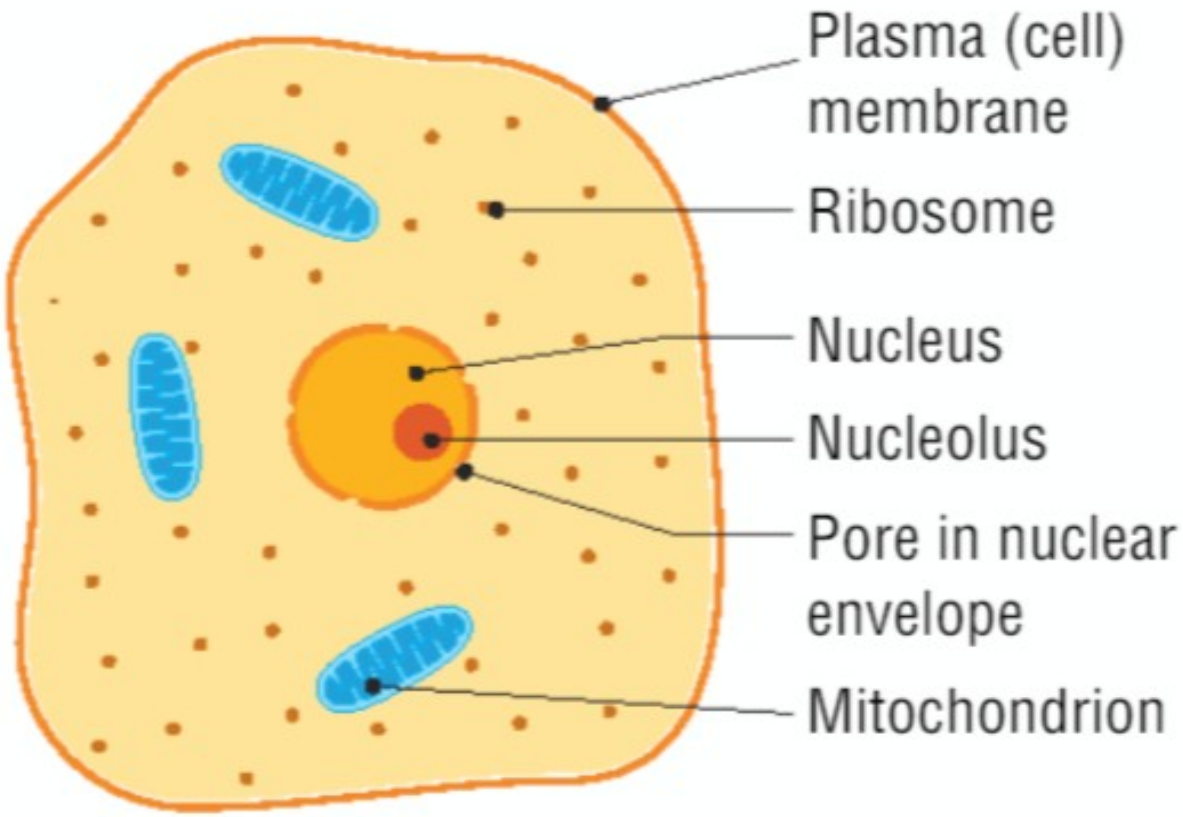
8.2 An electron microscope

- **An electron microscope** uses a beam of electrons and obtains a much higher level of magnification.

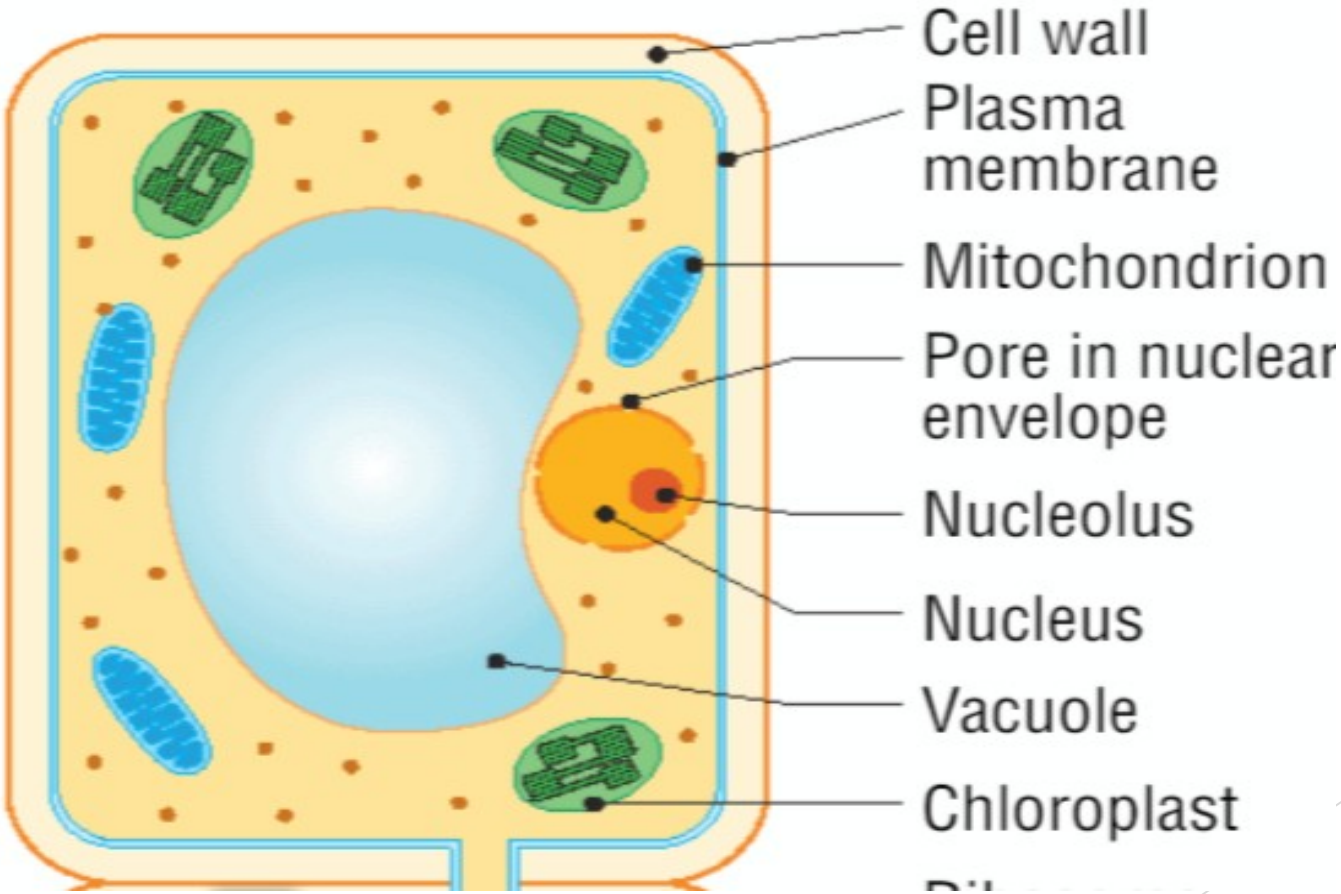
Cell Ultrastructure

- The fine detail of cell structure which can only be seen using an electron microscope.
- Cytoplasm is the watery liquid inside the cell membrane.
- Organelles are small structures found in the cytoplasm.

Animal Cell


Plasma (cell) membrane
Ribosome
Nucleus
Nucleolus
Pore in nuclear envelope
Mitochondrion

Plant Cell


Cell wall
Plasma membrane
Mitochondrion
Pore in nuclear envelope
Nucleolus
Nucleus
Vacuole
Chloroplast

Organelles

- Cells contain a variety of internal structures called **ORGANELLES**.

- An organelle is a cell component that PERFORMS SPECIFIC FUNCTIONS FOR THE CELL.

Organelles we need to know

- Cell membrane
- Nucleus
- Mitochondria
- Chloroplast
- Ribosomes
- DNA
- Cell Wall
- Vacuole

Learning Check

What are Cells?

What are organelles?

Can you name 8 organelles?

Animal Cells

Animal Cells contain the following structures

Cell Membranes

Mitochondria

Nucleus

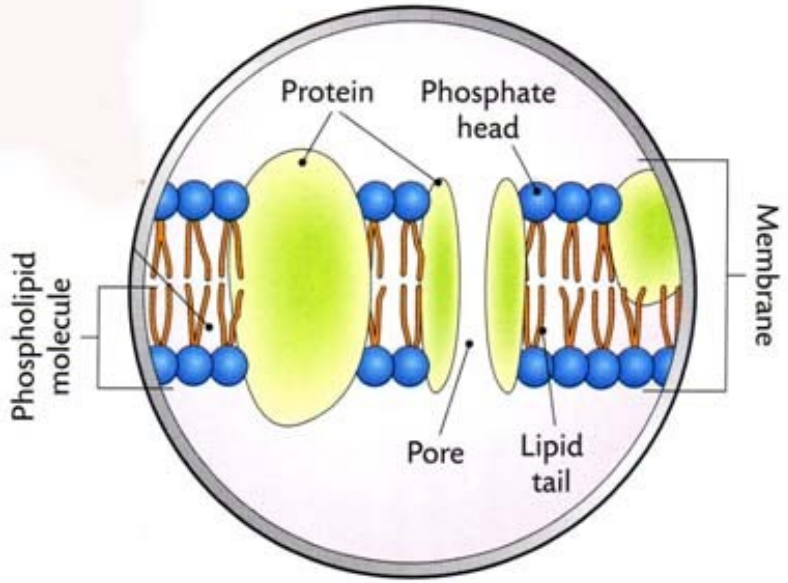
Cytoplasm

Only the cell membrane, the cytoplasm and the nucleus can be seen under the light microscope.

Cell Membrane

Cell Membranes are made up of

phospholipids and **proteins**



The phospholipids and proteins are in constant motion.

Membranes are said to be fluid

Functions of Cell Membranes

- Separate the cell organelles and cytoplasm from the outside
- Semi permeable - allows some molecules freely into and out and others to enter
- Membranes give some support to the cell
- Membranes recognise molecules that touch them

Learning Check

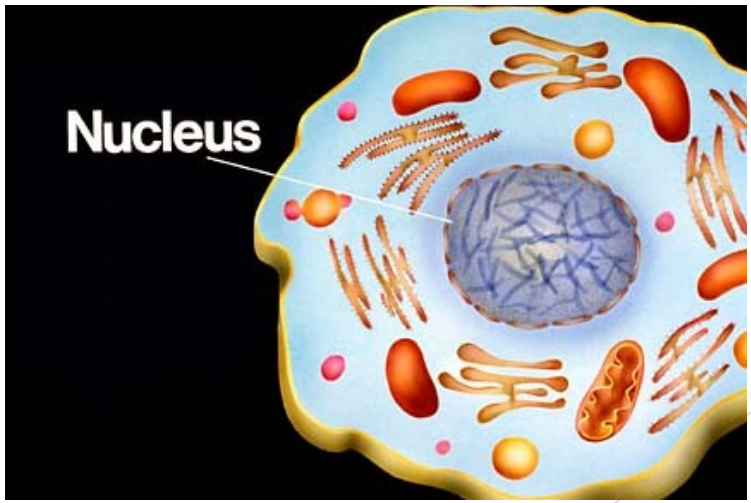
All cells have a cell membrane.

What are its 3 functions?

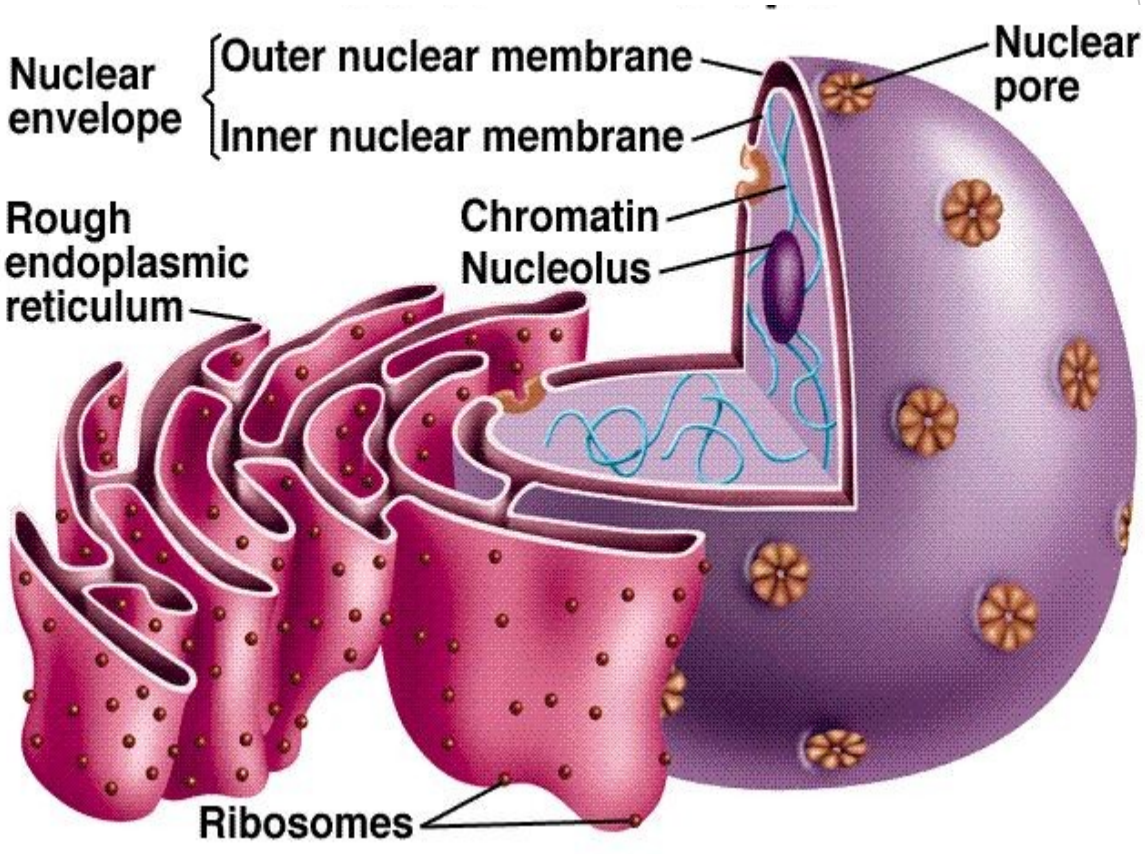
- _____
- _____
- _____

Nucleus

- A large organelle near the center of the cell is the **NUCLEUS**.
- It contains the cell's genetic information
- It controls the activities of the cell.



Ultra Structure of The Nucleus



What’s in a nucleus

The nucleus is made up of a double membrane with numerous nuclear pores.

These control the movement of substances into and out of the nucleus

A nucleolus which contains RNA, DNA, and Proteins and it makes Ribosomes

Chromatin which contains DNA that is arranged into chromosomes which stores our genes

Fill in the blanks

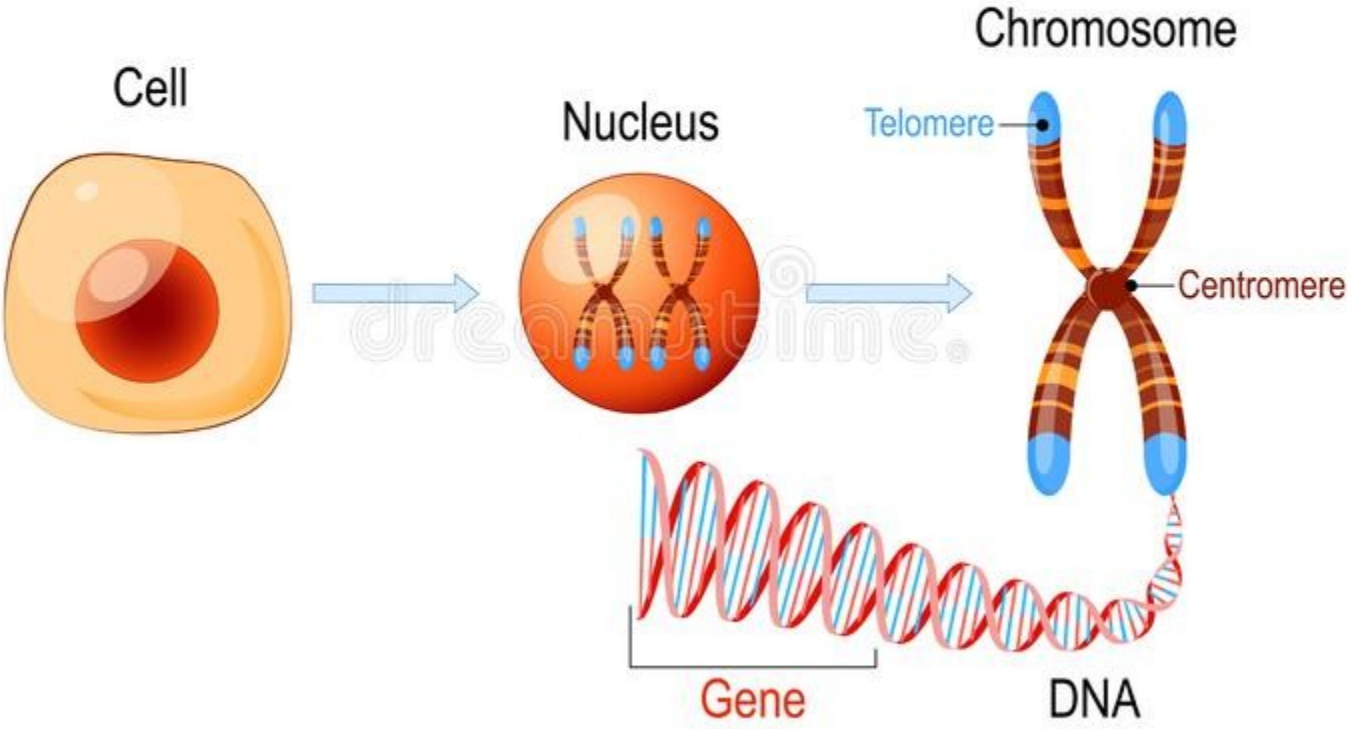
The control center of the cell is called the _____.

It is enclosed by a double membrane called the _____ _____.

Openings in the nuclear envelope called _____ allow for movement of substances in and out of the nucleus

Structures inside the nucleus that contain DNA and proteins are called _____.

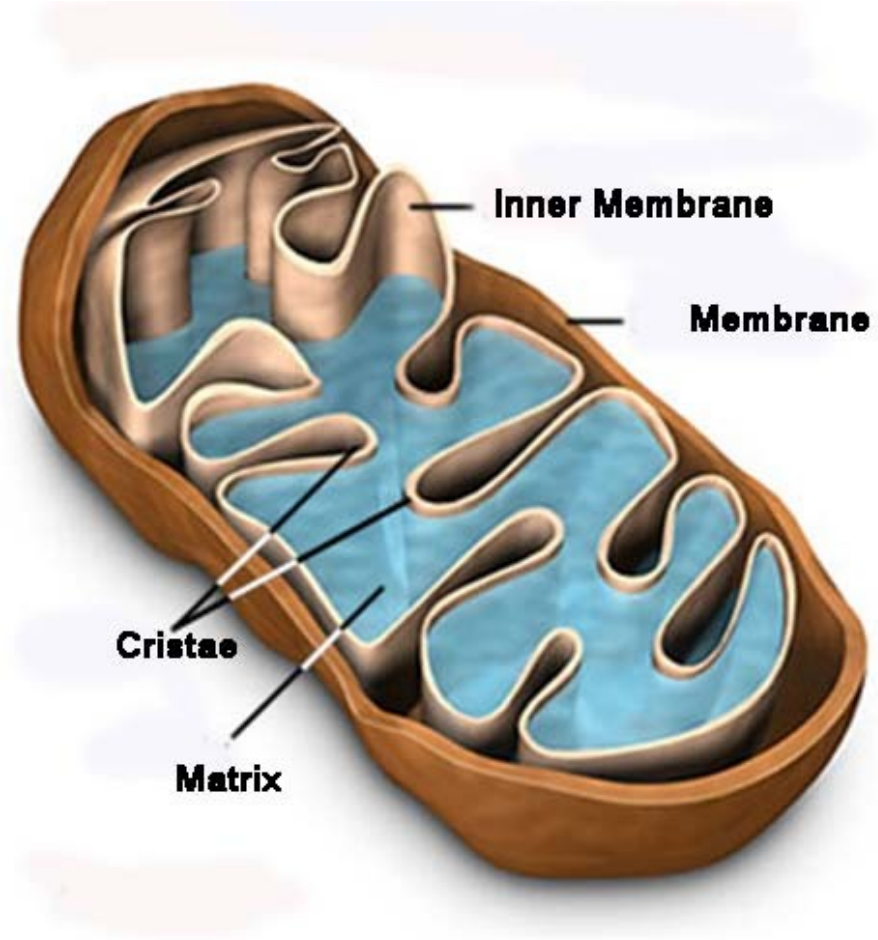
Since DNA cannot leave the nucleus, genetic information is copied into molecules of _mRNA_ and sent out into the cytoplasm. This information is used to manufacture Protein _____.


Cell
Nucleus
Chromosome
Telomere
Centromere
Gene
DNA

Mitochondria

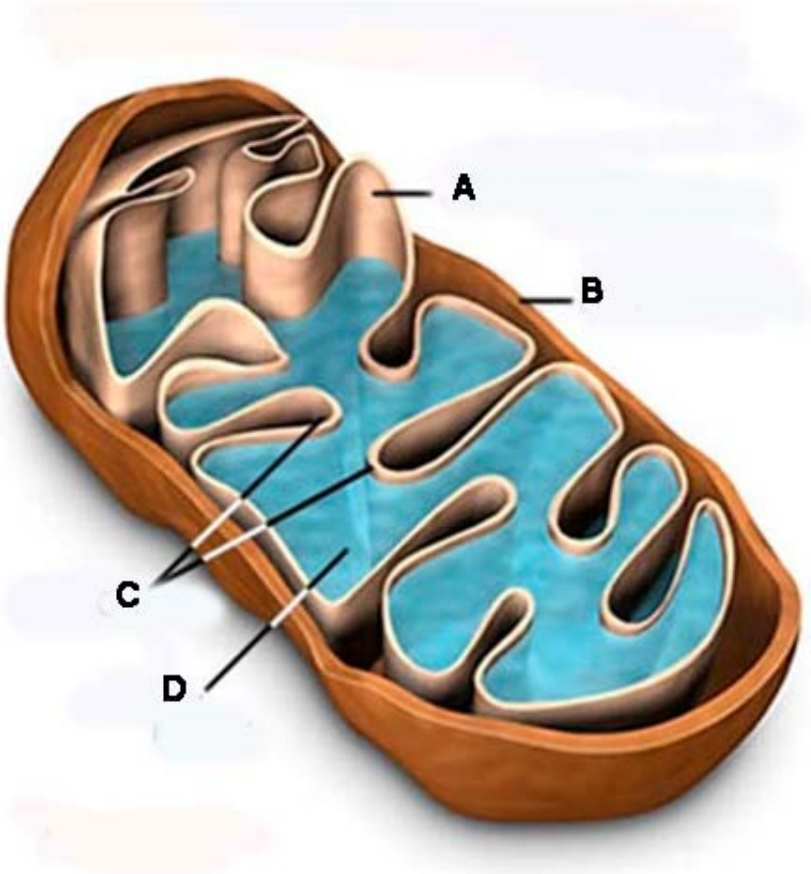
- Mitochondria supply energy to the cell in a process known as respiration
- Cells with lots of mitochondria produce a lot of energy
- The inner membranes of the mitochondria produce the energy

Mitochondrion



The more folds a mitochondrion has the more energy it produces

Learning Check



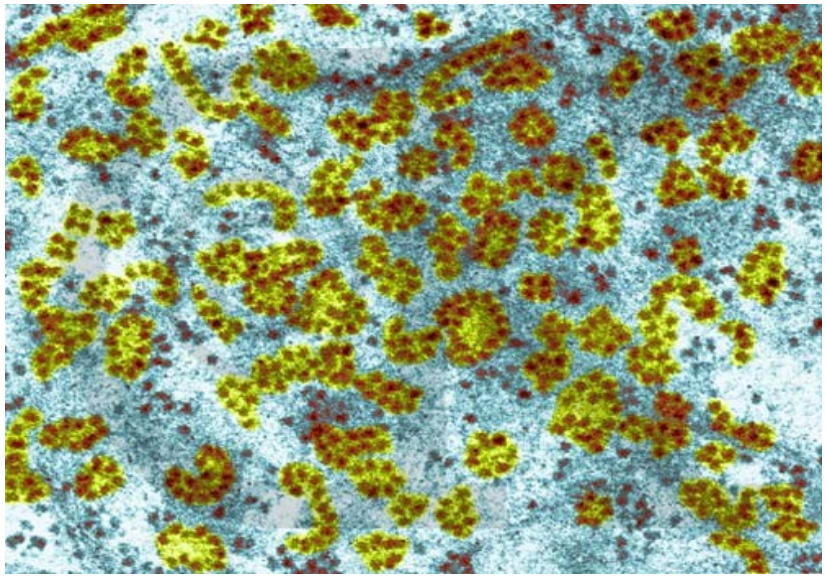
Identify this organelle

Which letter represents its outer membrane?

Why are they known as powerhouses?

What type of cells would have these organelles in large numbers?

Ribosomes

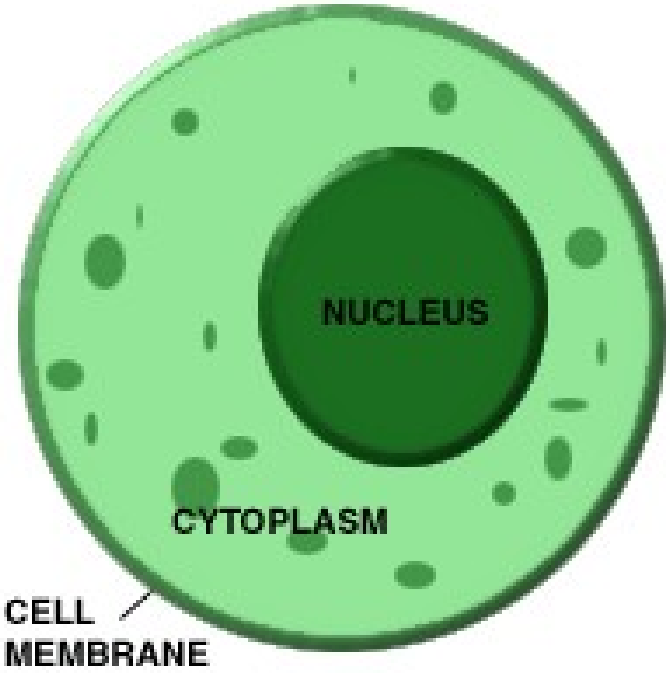


Ribosomes can be seen as red dots in this cell

Their function is to make proteins

Cytoplasm

- Cytoplasm is a clear jelly like fluid that fills the cell
- It contains all the organelles within the cell



Learning Check

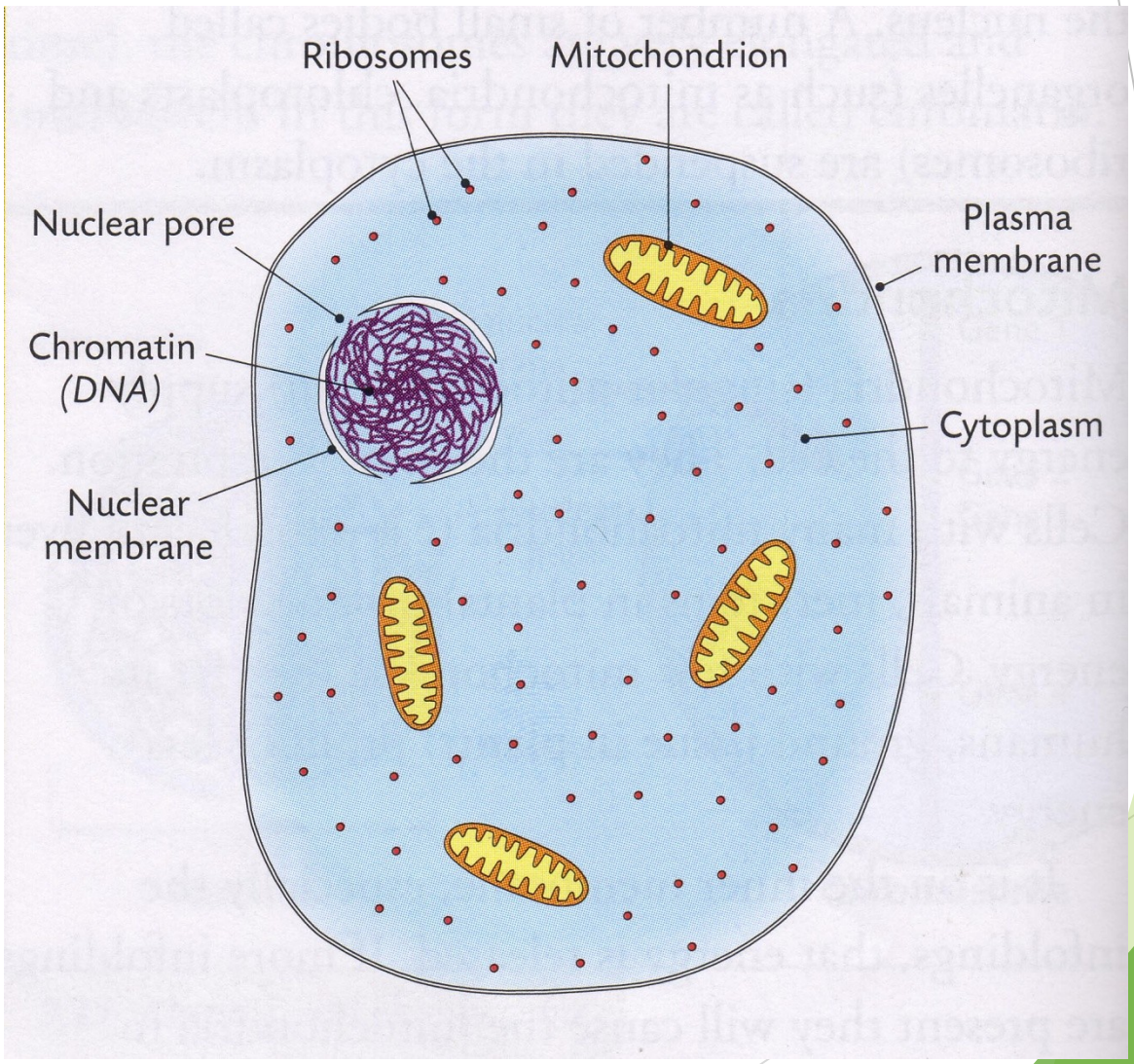
- What is the function of a ribosome?
- What is the cytoplasm?
- What is the function of the cytoplasm?

Plant Cells

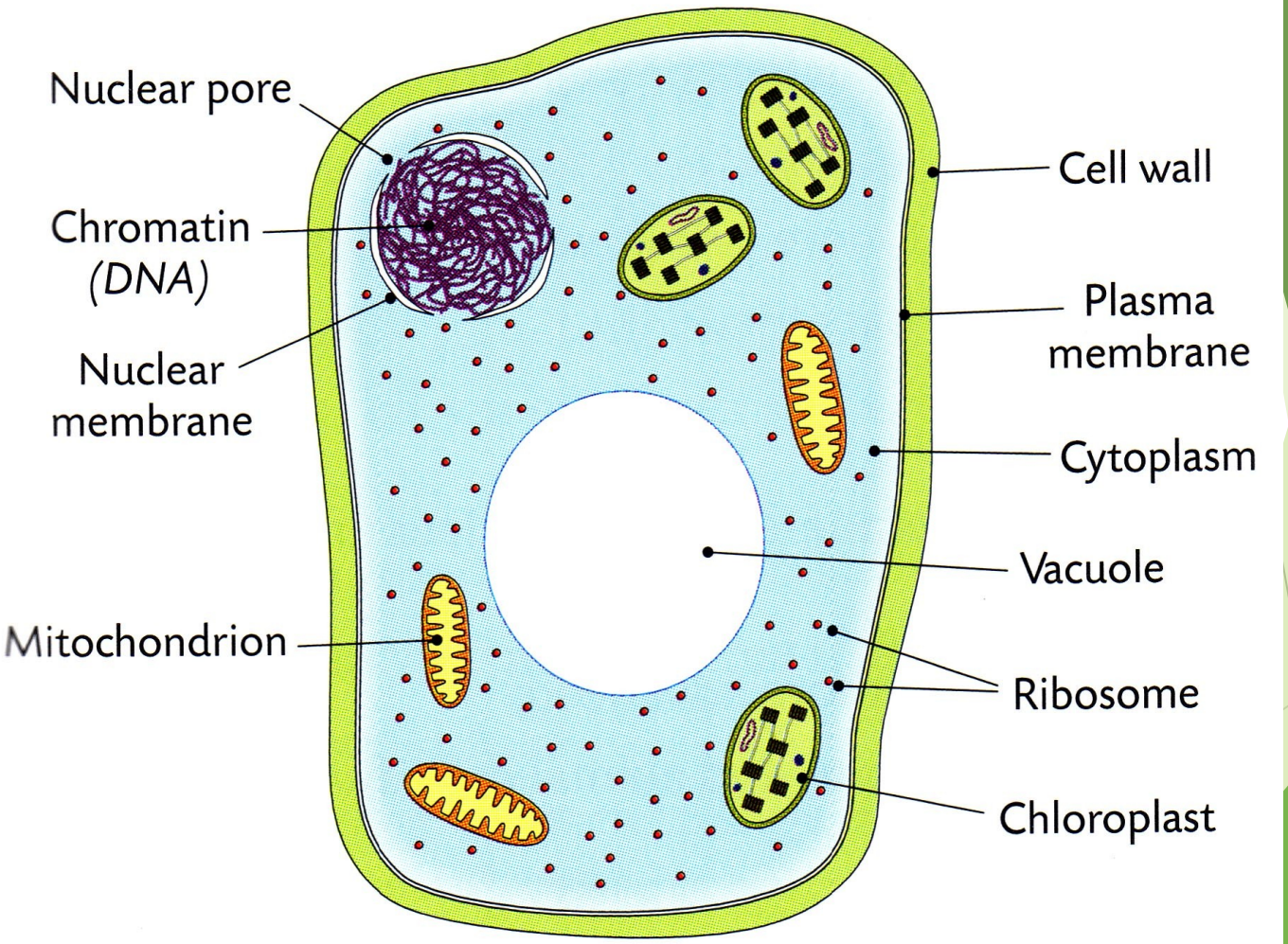
Plant cells also contain other organelles

- Cell walls
- Chloroplasts
- Large Vacuoles

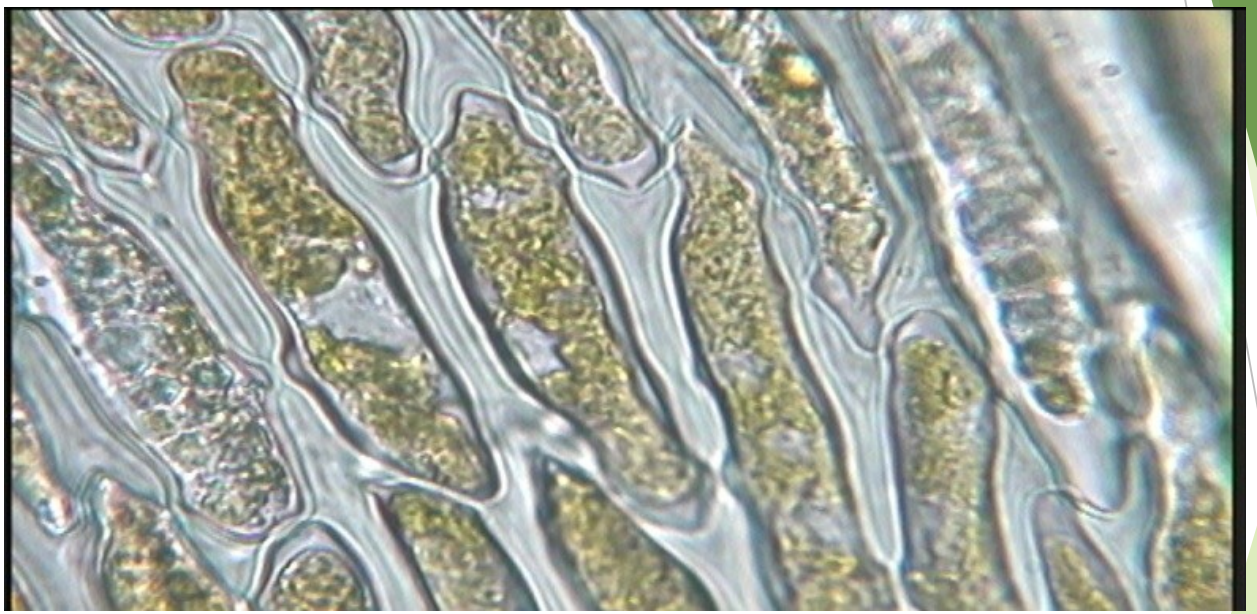
Ultra Structure of an animal cell



Ultra structure of an plant ce''

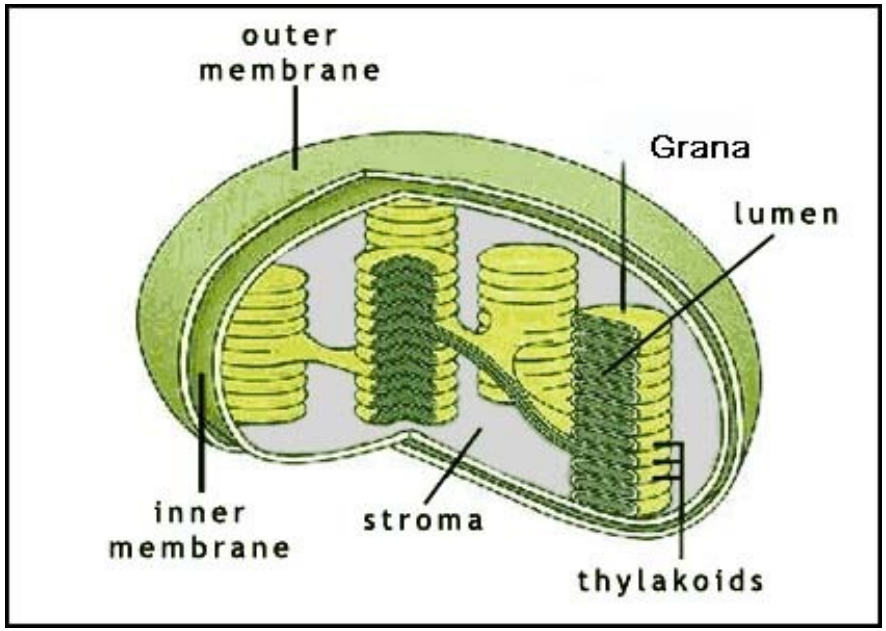


Chloroplasts



The function of chloroplasts is Photosynthesis

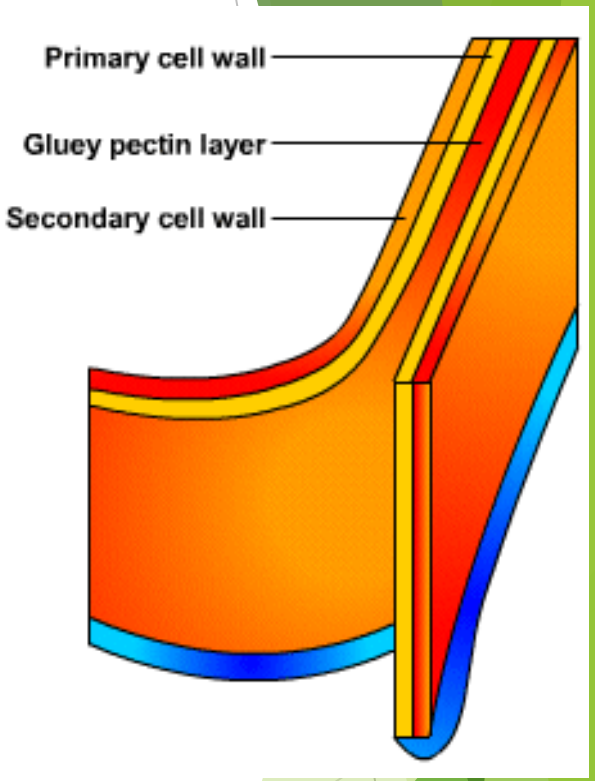
Ultra structure of the Chloroplast



The thylakoids contain the chlorophyll which traps the sun’s energy

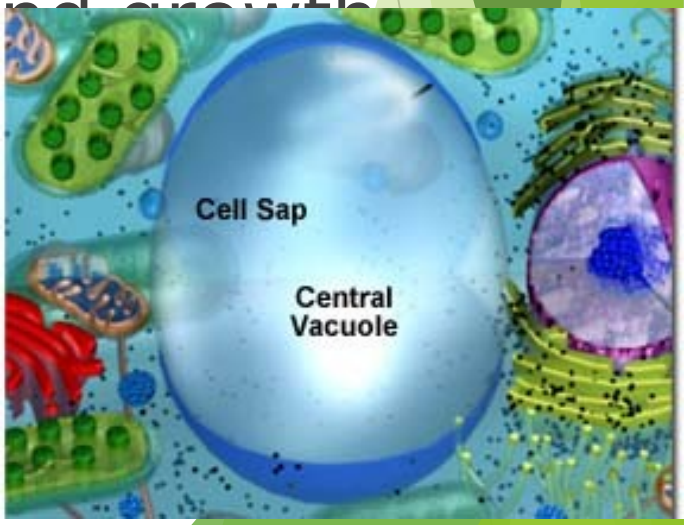
Cell wall

- The cell wall is rigid and gives plant cells a very defined shape.
- The cell wall is composed of cellulose fibre, polysaccharides, and proteins.
- The function of the cell wall is to support and strengthen the cell.



Vacuoles

- Vacuoles are membrane-bound sacs within the cytoplasm of a cell
- Vacuoles provide structural support, as well as serving functions such as storage, waste disposal, protection and growth
- Plant cells have large vacuo



Learning check

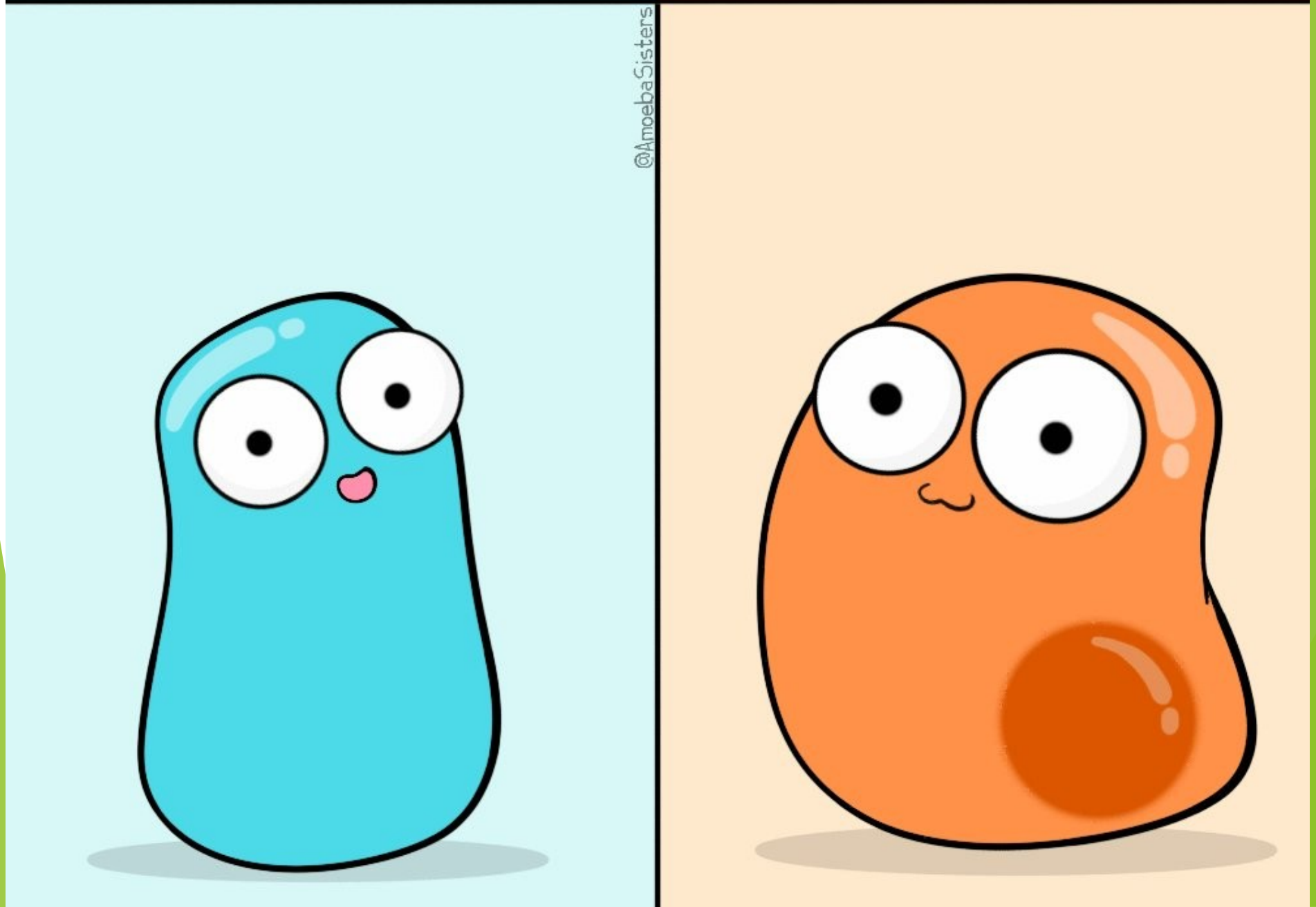
1. What organelle carries out photosynthesis?
2. What type of cells have large vacuoles and cell walls?
3. What is the function of vacuoles?
4. What is the function of cell walls?
5. What makes cells walls rigid?

Eukaryotes and Prokaryotes

- Organisms whose cell contain a nucleus and other membrane-bound organelles are called **eukaryotes**.e.g, plants & animal

- Organisms whose cells never contain a nucleus and other membrane-bound organelles are called **prokaryotes**.e.g bacteria

PROKARYOTE vs EUKARYOTE



Learning Check

- Define the term Eukaryotic cell
- Name 2 membrane-enclosed cell organelles
- Give an example of a eukaryotic cell
- Define the term Prokaryotic
- Give an example of a prokaryotic cell
- If a cell contains a chloroplast is it

  (i) plant or animal ?

  (ii) prokaryotic or eukaryotic ? Explain