



Cell Structure

- WALT: Describe eukaryotic cells as seen under electron microscope.
- Recognise the structure, function & interrelationships between various cell organelles.
- Explain the importance of the cytoskeleton.
- Compare & contrast animal & plant cell structure.
- Compare & contrast eukaryotic prokaryotic cell structure.



Remember Mrs Gren?

- What 7 processes are common to all living things?
 - Movement
 - Respiration
 - Sensitivity
 - Growth
 - Reproduction
 - Excretion
 - Nutrition

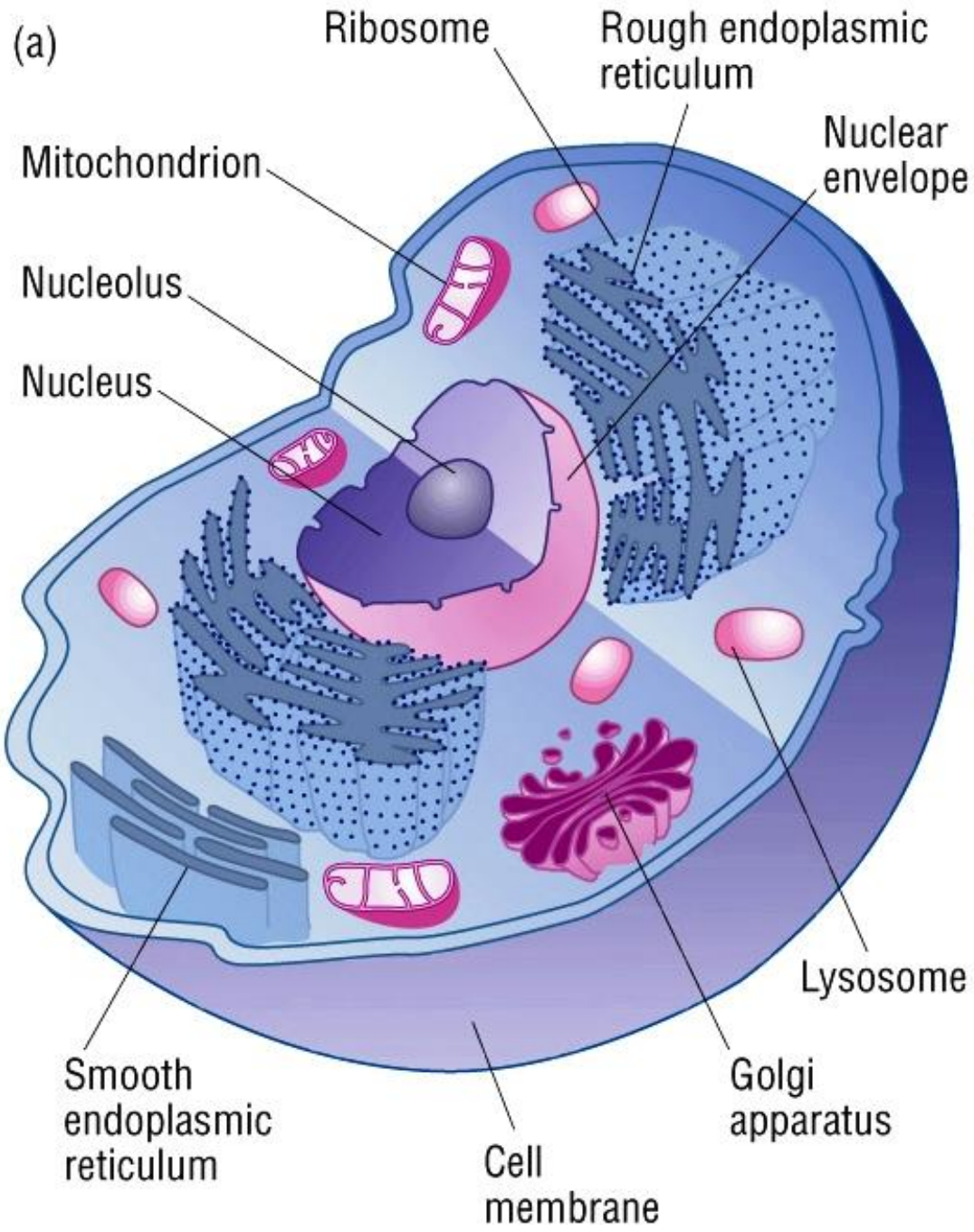


Animal & Plant Cells (Eukaryotic)

- In pairs:
 - Study the following diagram of an animal cell for 30 seconds.
 - Try to copy as much of it as possible.



Animal Cell





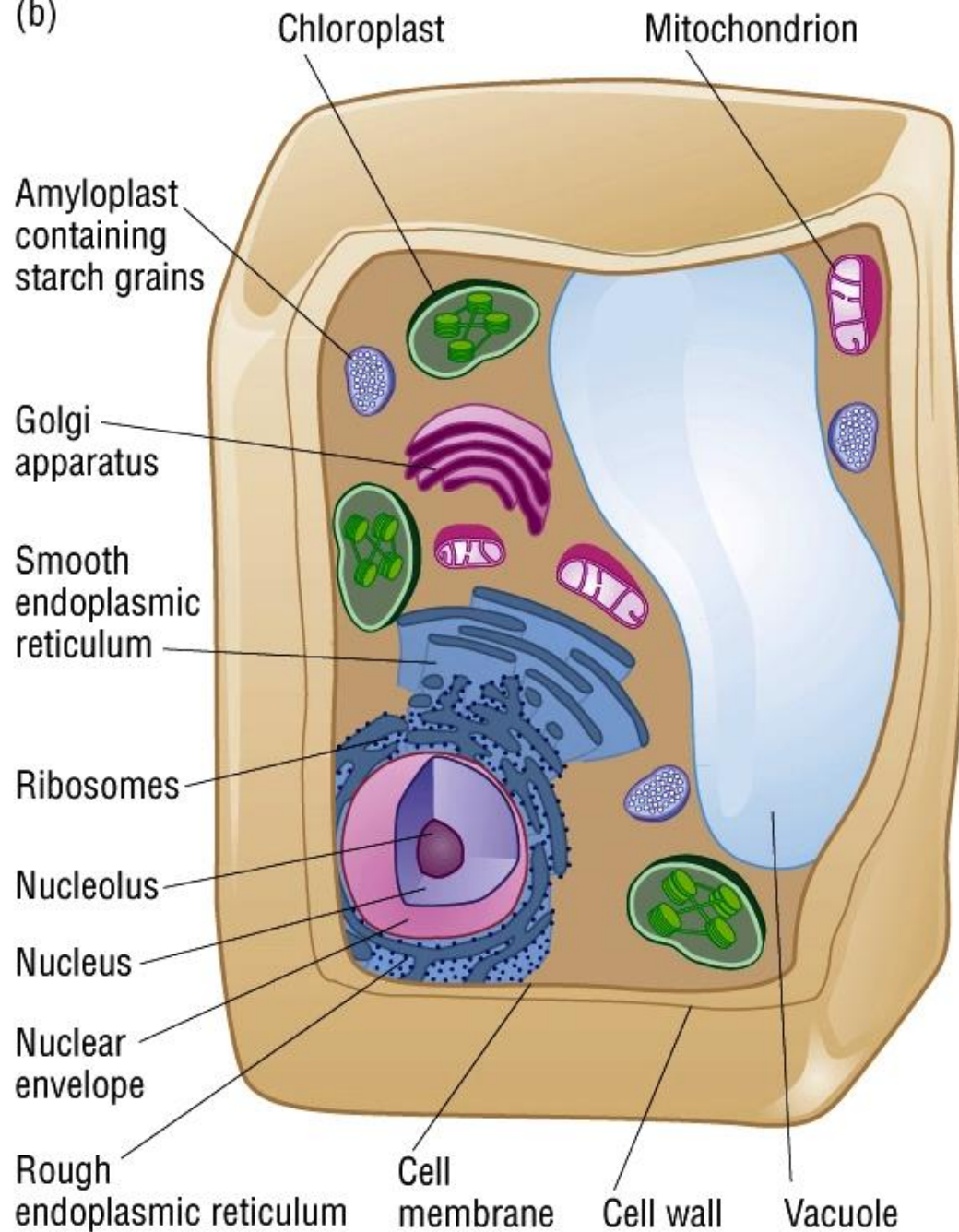
Animal & Plant Cells

- In pairs:
 - Study the following diagram of a plant cell for 30 seconds.
 - Try to copy as much of it as possible.



Plant Cell

(b)





Cell Ultrastructure

- This is the term for the organelles revealed by an electron microscope.
- Use the information provided to prepare information cards about the following organelles:
 - Nucleus
 - Mitochondria
 - Endoplasmic reticulum
 - Lysosomes
 - Golgi apparatus
 - Ribosomes
 - Centrioles
 - Chloroplasts
 - Plasma membrane
 - Cell wall



Some other cell components

- **Vesicles & Vacuoles**
 - Membrane-bound sacs to carry fluids.
- **Cytoskeleton**
 - Provide an internal framework to support the cell and move organelles around.
- **Flagella & Cilia**
 - Hair-like extensions that stick out of the cell.
- **Plant Cell Walls**
 - Strong cellulose wall to support plant cells.



Vesicles & Vacuoles

- Vesicles
 - Membrane-bound sacs.
 - Used to carry substances around the cell.

- Plant Cell Vacuoles
 - Contain cell sap.
 - Maintains cell turgidity.



Cytoskeleton

- A network of protein fibres running throughout the cell.
- Two main types of fibre:
 - Actin filaments.
 - Similar to the fibres of muscles.
 - Able to move over one another.
 - Cause amoeboid movement.
 - Microtubules.
 - Cylindrical fibres (25nm diameter).
 - Made of tubulin units.
 - Microtubule motor proteins “walk” along dragging vesicles/chromosomes with them.

**Amoeboid
movement video**

**Microtubule
motor video**



Cytoplasm

- What a GCSE student thinks is just a solution of ions & sugars.
- It is actually a lot more than this:
 - Cytoskeletal fibres
 - Microtubule motors
 - Vesicles

**Workings of a
Cell video**



Flagella & Cilia

- Flagella (undulipodia)
 - Longer than cilia.
 - Usually occur in small numbers.
 - Eg. tail of a sperm cell.
- Cilia
 - Shorter than flagella (<10 μ m long).
 - Usually occur in large numbers.
 - Eg. ciliated epithelial cells in lungs

**Flagella & Cilia
video**



Ultrastructure of Cilia and Flagella

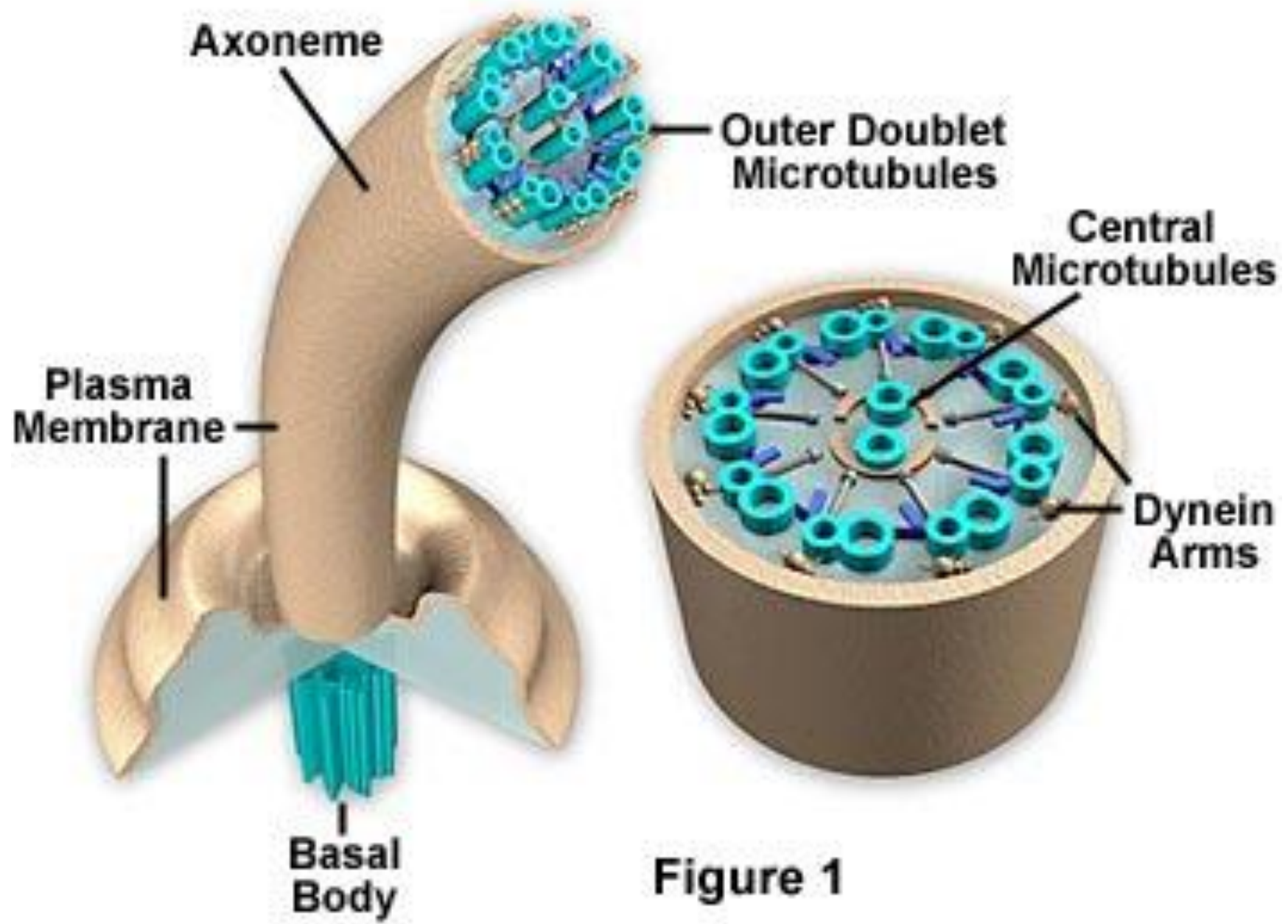
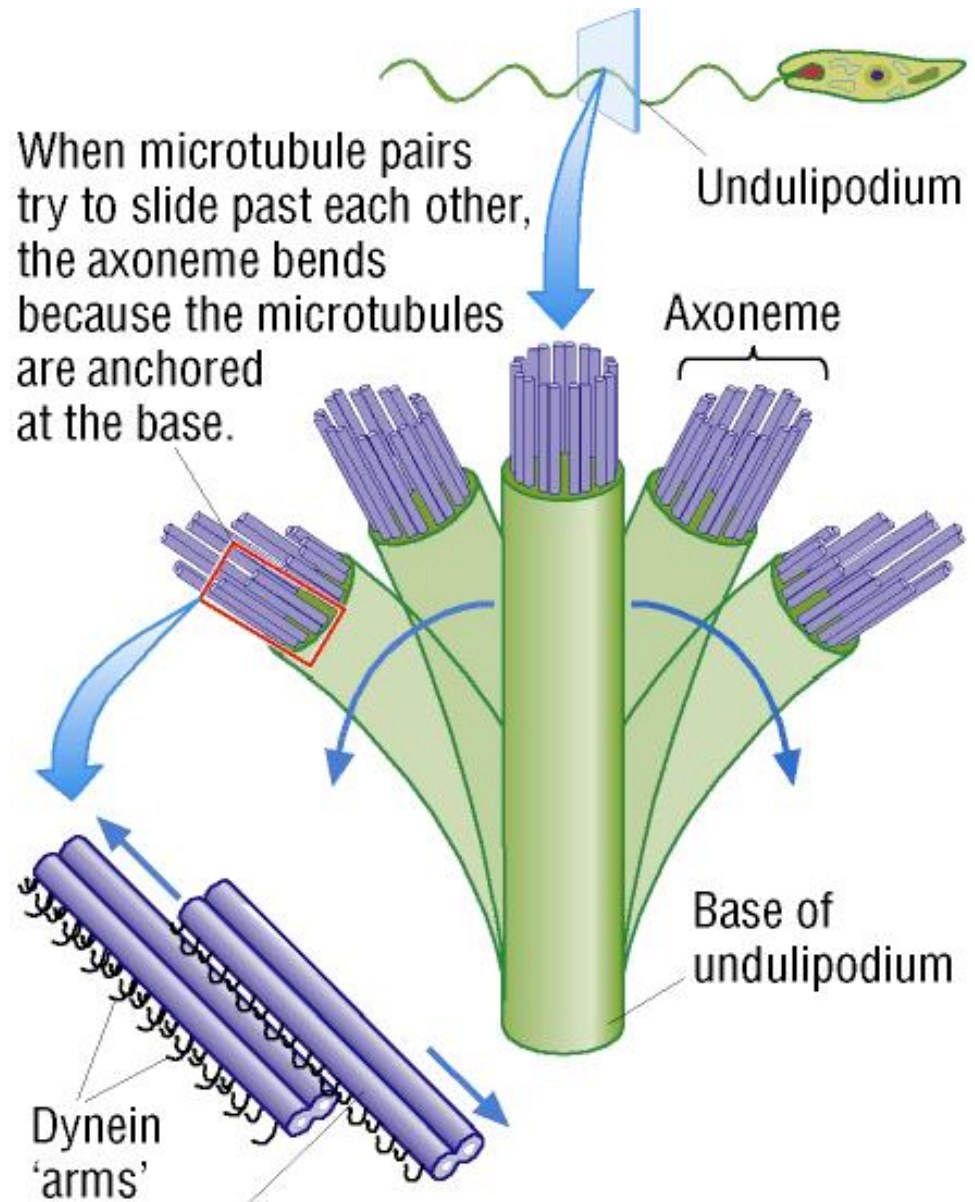


Figure 1



How do flagella & cilia move?

When microtubule pairs try to slide past each other, the axoneme bends because the microtubules are anchored at the base.

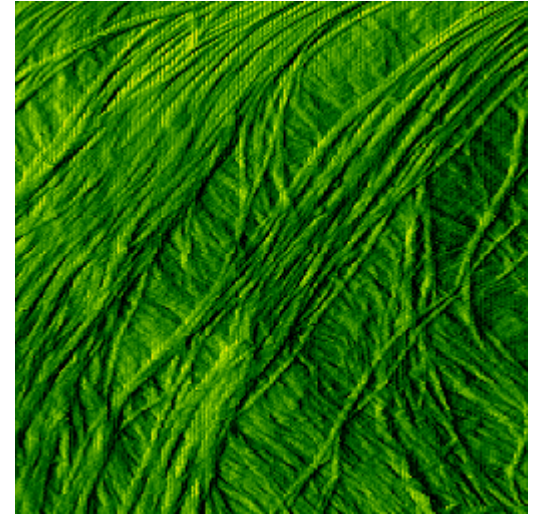


The motor protein, dynein, has 'arms' that can push one doublet ahead of the other



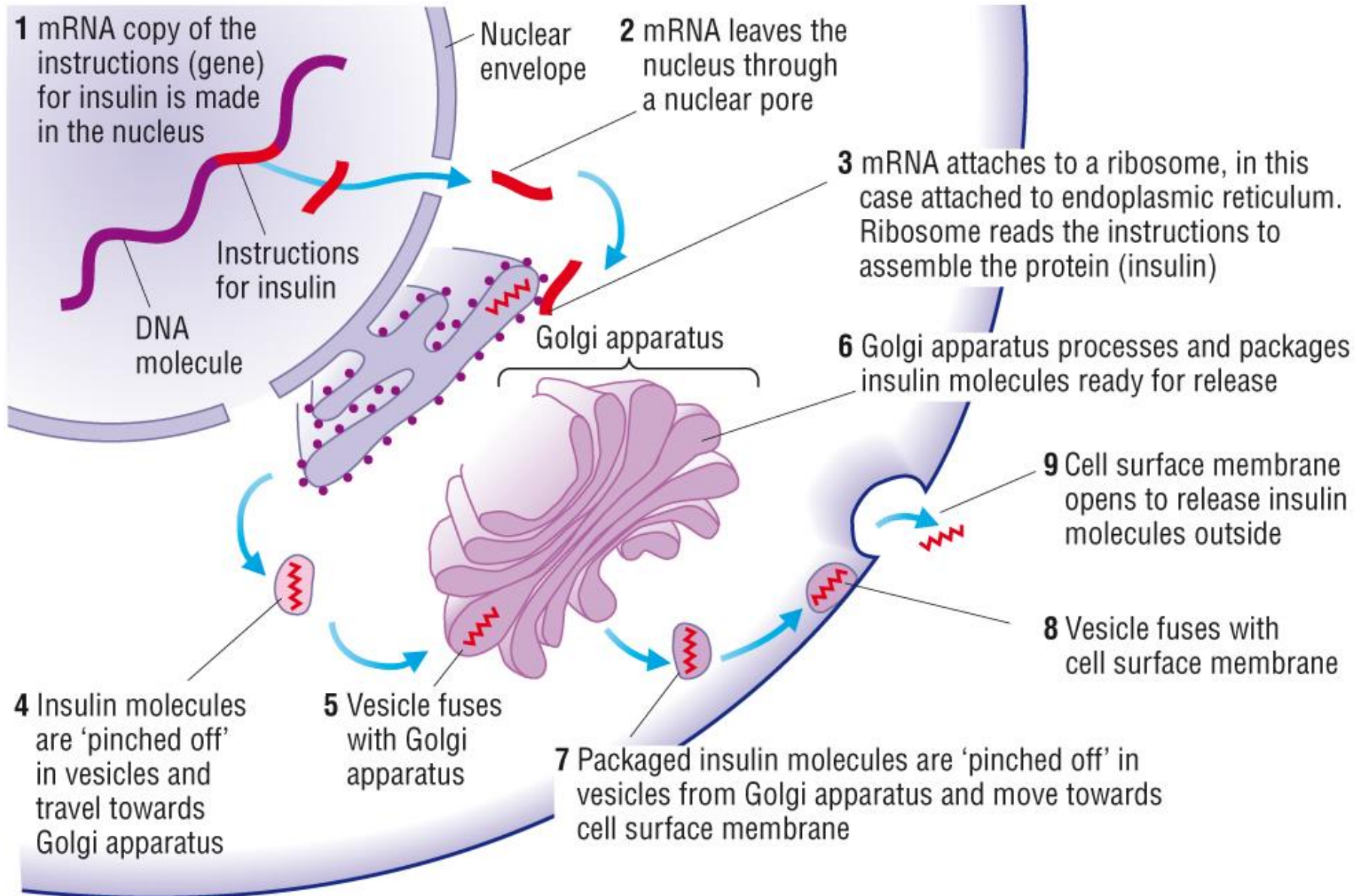
Plant Cell Walls

- Made from bundles of cellulose fibres.
 - Many fibres interlaced to form a strong, rigid wall.
 - Prevents a turgid cell from bursting.
 - Allows materials to pass through it.





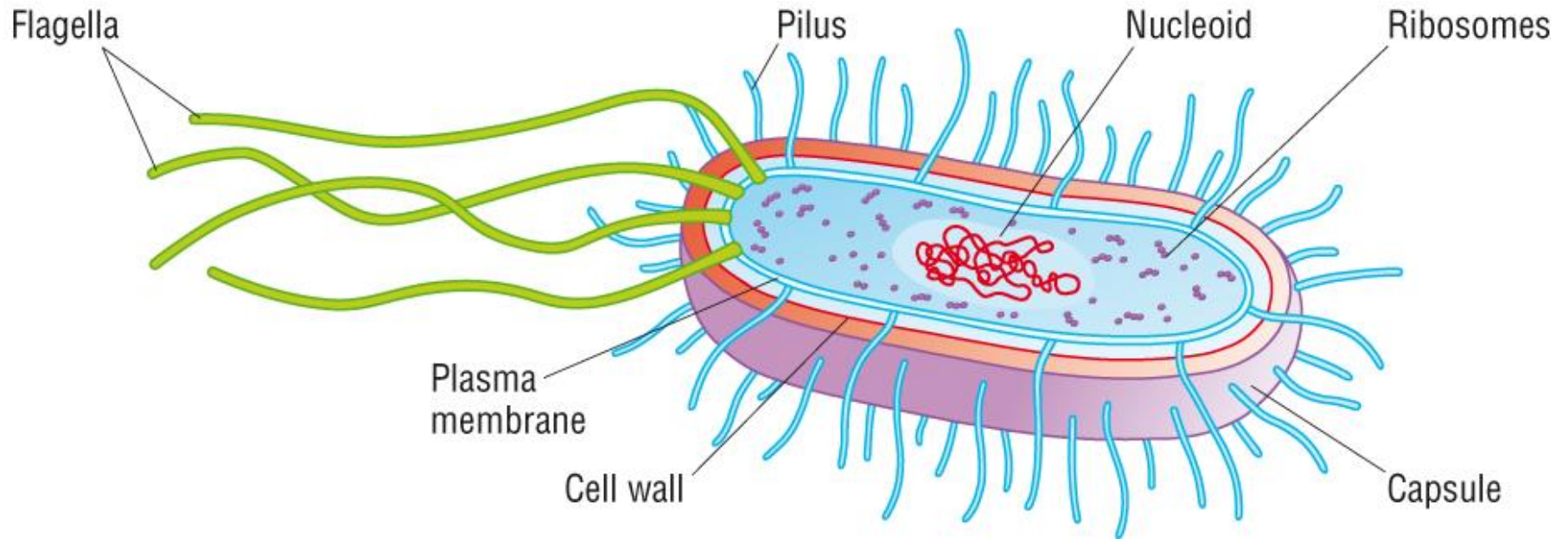
Division of Labour





Bacterial Cells (Prokaryotic)

- In pairs:
 - Study the following diagram of a bacterial cell for 30 seconds.
 - Try to copy as much of it as possible.



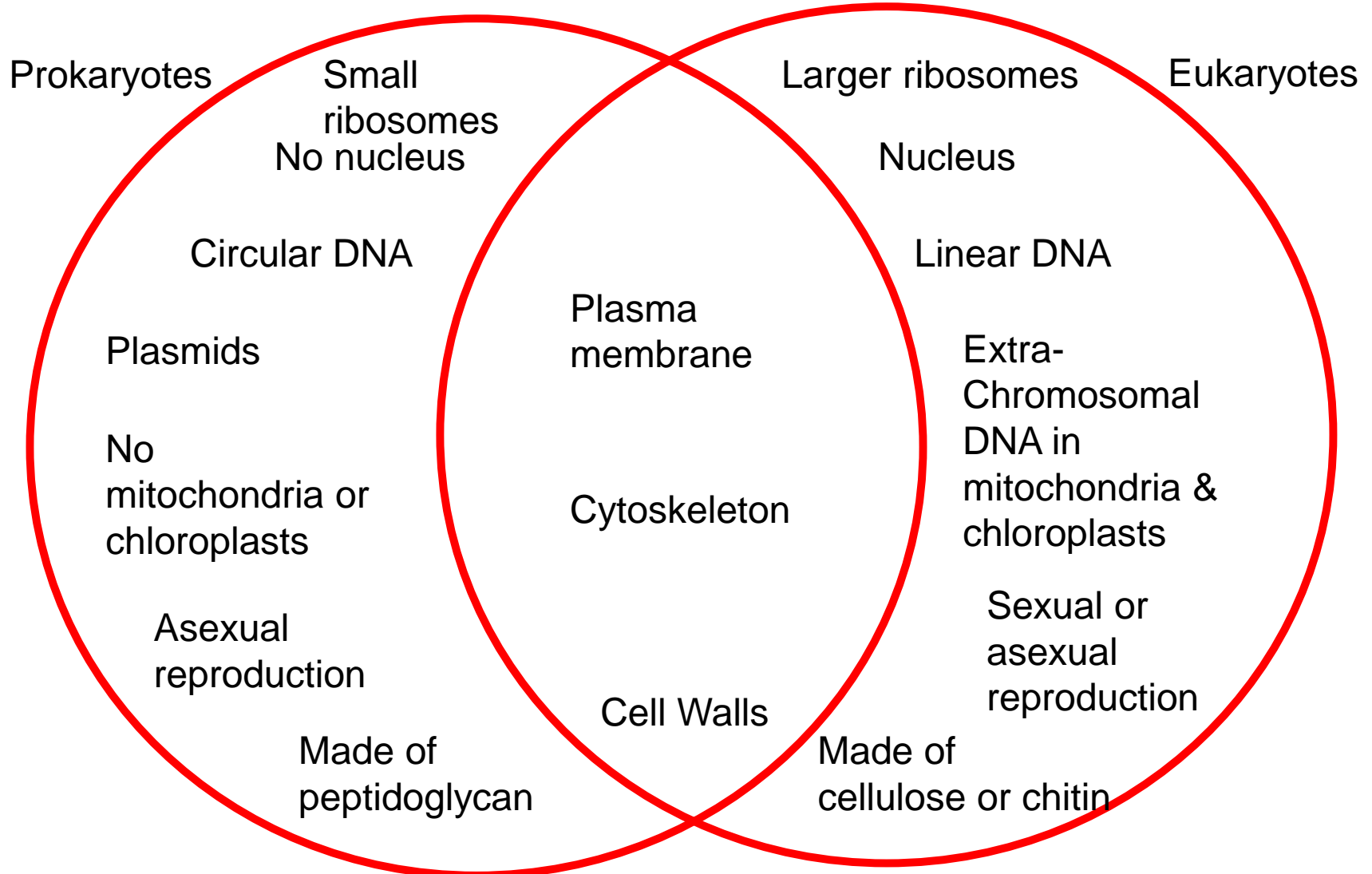


Prokaryotic Cells

- Smaller than eukaryotes (1-5 μm long).
- Obey Mrs Gren.
- Have just 1 membrane – plasma membrane.
- Have no membrane-bound organelles.
- Have a peptidoglycan cell wall.
- Have smaller ribosomes than eukaryotes.
- Have circular DNA with no nuclear envelope.
- Flagella are different in structure to eukaryotic flagella



Compare Prokaryotes & Eukaryotes





Homework

- Find electron micrograph images of the following cell components:
 - Nucleus
 - Mitochondrion
 - Ribosome
 - Nuclear envelope
 - Endoplasmic reticulum
 - Golgi apparatus
 - Plasma membrane
 - Vesicle
 - Flagellum

Cut them out and stick them onto a large sheet of paper to make up a labelled collage model of a typical animal cell.