

## Cell Structures & Functions

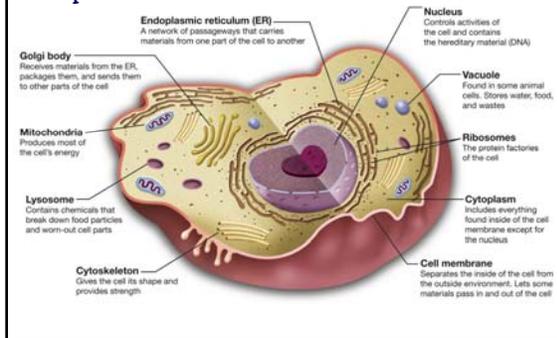
Cells function similarly in all living organisms.

Characteristics distinguish plant cells from animal cells, including chloroplasts and cell walls.

Cells have many different functions and come in many shapes and sizes.

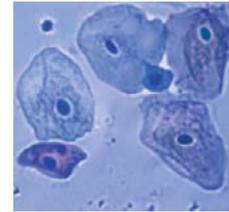
- But all cells have some parts in common:
  - All cells are surrounded by a cell membrane.
  - Cells have organelles, which are structures inside the cell that have specific jobs.

Here is a diagram of a typical animal cell and its parts.



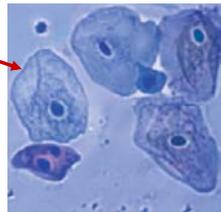
To make cell parts visible under a microscope, you can apply a stain to the cells.

- Methylene blue is a stain often used to look at animal cells.



## Cell membrane

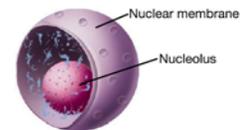
- The cell membrane is a thin layer that separates the inside of the cell from its outside environment.
- It keeps the cytoplasm inside while letting waste products out.



Can you identify the nucleus too?

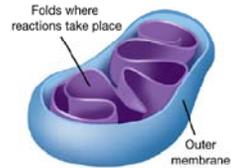
## Nucleus

- The nucleus is covered with a membrane that allows materials to pass in and out.
- It's often called the "control center" of the cell because it contains DNA.
- The nucleolus acts as a storage area for materials.



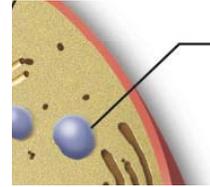
Mitochondria are called the "powerhouses" of cells.

- Mitochondria produce much of the energy a cell needs to carry out its functions.



A vacuole is the storage area of the cell.

- Vacuoles store water, food, and waste.



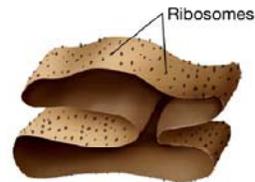
The endoplasmic reticulum (ER) is a series of tunnels throughout the cytoplasm.

- They transport proteins from one part of the cell to another.



Ribosomes are the protein factories of the cell.

- When ribosomes make proteins, they release them into the ER.



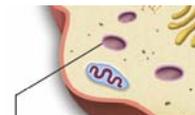
Golgi bodies receive proteins and other compounds from the ER.

- They package these materials and distribute them to other parts of the cell.



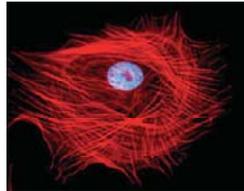
Lysosomes contain enzymes that can break things down.

- Lysosomes pick up bacteria, food, and old organelles and break them into small pieces that can be reused.

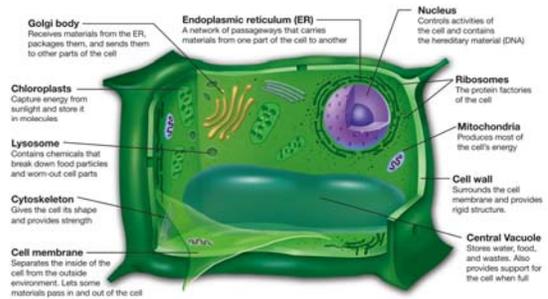


The cytoskeleton is a series of fibers made from proteins.

- It provides structure to the cell and gives it its shape.

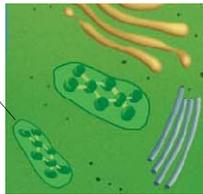


What organelles does this plant cell have in common with the animal cell?



How are plant cells different from animal cells?

- Plant cells have chloroplasts, but animal cells do not.
- A chloroplast is an organelle that contains a green pigment called chlorophyll.



Plant cells have a cell wall, but animal cells do not.

- The cell wall is made of a carbohydrate called *cellulose*.
- Cell walls provide structure and support for the plant.



Plant cells have a large central vacuole that stores cell sap.



When a plant needs water it wilts because the central vacuoles in its cells are empty.

- They no longer push against the cell walls to keep the plant upright.
- Watering the plant restores water in the central vacuoles.

