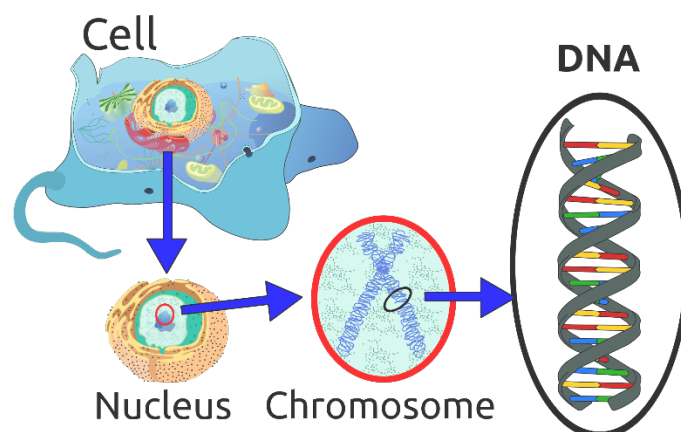


THE CELL THEORY

1. All living things are composed of _____ and cell products (e.g. bone, saliva).
2. New cells are formed by the division of pre-existing cells.
3. There are basic similarities in the chemical constituents and metabolic activities of all cells.
4. The activity of an organism, as a whole, is the sum of the activities and interactions of its independent cell units.



2 TYPES OF CELL ORGANISATION – PROKARYOTIC AND EUKARYOTIC CELLS

Prokaryotes

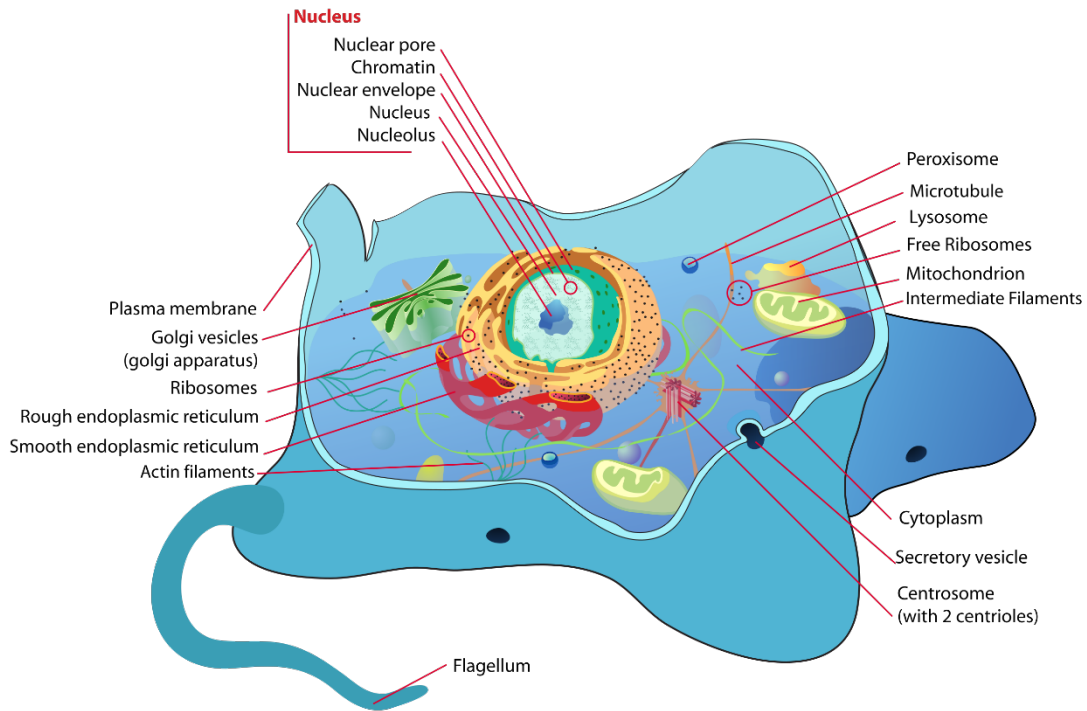
- e.g. bacteria, cyanobacteria (blue-green algae)
- Smaller than eukaryotes
- Less complex than eukaryotes
- Do _____ have membranes enclosing cellular components, therefore _
_____ distinct nucleus
- DNA (genetic material) is on a circular chromosome in the centre of cell
- Do not contain ribosomes that are involved in protein production

Eukaryotes

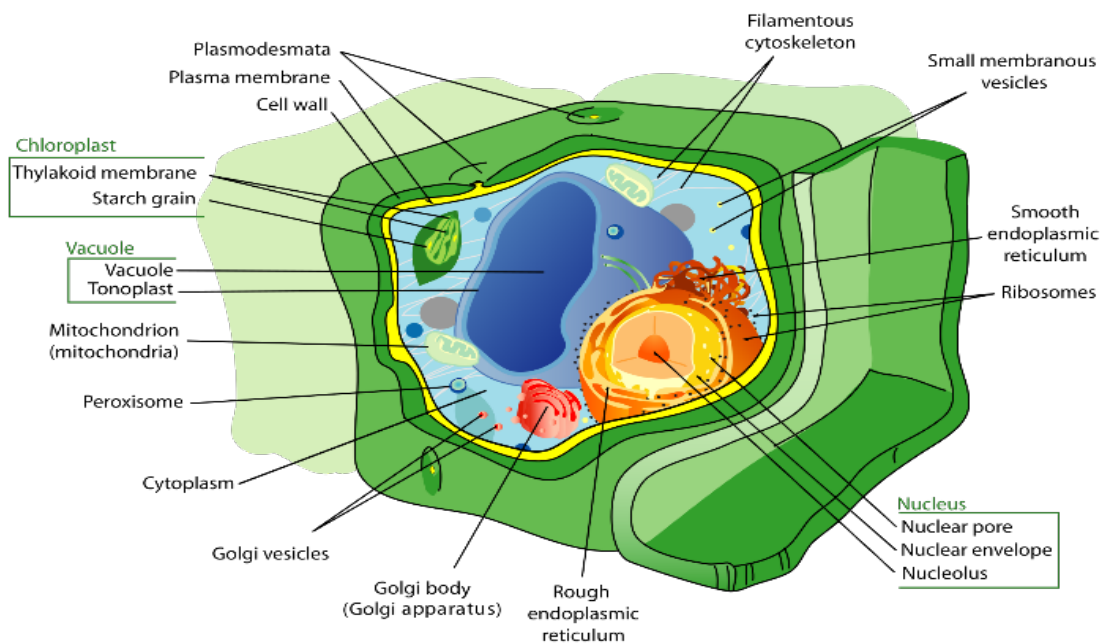
- e.g. all cells except bacteria and cyanobacteria
- Larger than prokaryotes
- More complex than prokaryotes
- Contain certain cellular components that are enclosed in membranes
- Distinct nucleus
- Contain ribosomes

ORGANELLES IN EUKARYOTIC CELLS

ANIMAL CELL



PLANT CELL



Nucleus (Plural: nuclei)

- Control centre of cell
- Roughly _____ in shape
- Contains most of the cell's DNA (Deoxyribonucleic Acid) on chromosomes
- When the cell is not undergoing cell division (meiosis and mitosis), the chromosomes are less distinct strands called chromatin. Also during cell division, the nuclear membrane breaks down and reforms after cell division.
- Nuclear membrane has pores to control movement of large molecules into and _____ of nucleus

Nucleoli (Singular: nucleolus)

- Small bodies in the nucleus
- Make RNA (Ribonucleic _____)

Cytoplasm

- Jelly-like material making up _____ of the cell

Cell Membrane

- Surrounds cell and allows certain substances to pass _____ and out of the cell

Cell Wall

- Found in _____ cells only
- Made of cellulose
- Situated on the _____ of the cell membrane

Mitochondria (Singular: mitochondrion)

- Sites of cellular _____ in the cytoplasm ('Powerhouses' of the cell)
- Found at sites of highest metabolism (e.g. muscle cells) to produce energy-rich molecules of ATP (_____ Triphosphate)
- Mitochondria have a double membrane – the outer membrane around the entire mitochondrion, and the inner membrane folded back and forth for large surface area for chemical reactions
- It is thought that mitochondria in eukaryotic cells may have evolved from ancient symbiotic prokaryotic bacteria that lived inside other larger prokaryotic cells. They have their own DNA and ribosomes, and can reproduce on their own.

Ribosomes

- Small organelles containing RNA that are found in the cytoplasm
- Not surrounded by _____
- 'Workbenches' on which the cell's proteins (e.g. hormones, enzymes) are made

Endoplasmic Reticulum

- A system of membranes that help to transport chemicals such as proteins through the cell
- Consist of interconnected, flattened sacs whose contents include newly-made proteins
- ER sometimes buds off to form small sacs called vesicles
- Rough ER has ribosomes attached

- Smooth ER has no _____ attached

Golgi Bodies (also called Golgi Apparatus)

- Serve as collecting, sorting, processing and distribution centres for proteins and carbohydrates
- Particularly numerous in cells that secrete hormones or material to produce plant cell walls
- Contain stacks of membranes
- Various substances move into Golgi Bodies from vesicles formed from ER. Other vesicles pinch off from Golgi Bodies and carry their contents to other parts of the cell.

3 Types of Vacuoles

- Mostly found in _____ cells and protozoans
- Plant vacuoles may contain dissolved starch
- Food vacuoles in protozoa may contain food undergoing digestion
- Contractile vacuoles in aquatic organisms may pump excess _____ out of the cell

4 Types of Plastids

- Mostly found in plants
- Chloroplasts contain chlorophyll for photosynthesis. Chloroplasts also have a double membrane.
- Amyloplasts contain starch
- Chromoplasts contain _____ pigments of flowers and fruits
- Elaioplasts contain oils
- Like mitochondria, plastids contain their own DNA and ribosomes, and may have once been symbiotic bacteria living inside a larger cell.

Centrioles

- Found in animal cells and certain lower plants
- At the time of cell _____, these tubular structures play a role in separating the contents of the cell to aid in the division of the cell.

Cilia and Flagella

- Found in many eukaryotic cells to aid in 'swimming' movement
- Formed by microtubules that _____ side to side
- Cilia (Singular: cilium) are hair-like (e.g. in protozoans such as *Paramecium*)
- Flagella (Singular: flagellum) are whip-like (e.g. in protozoans such as *Euglena*)

Lysosomes

- Found in _____ cells only
- Digest unwanted substances within the cell by releasing _____ enzymes
- Enzymes in lysosomes are responsible for the lysis of dead or dying cells, and the resorption of cells in a tadpole's tail during metamorphosis to the adult frog
- Formed from Golgi Bodies that form vesicles

Cytoskeleton

- Maintains cell shape and provides 'anchoring' for organelles

- The cytoskeleton is a complex network of both long contractile protein fibres and microtubules in the cytoplasm
- Contractile proteins are responsible for movement within cells, cell contraction and cell motility.
- Shortening of the microtubules is responsible for movement of chromosomes during cell division.