

ORGANELLES THAT BOTH PLANT AND ANIMAL CELLS CONTAIN

Cell Nucleus

- ★ Area of central control – directs cell activities
- ★ Separated from the rest of the cell by a double membrane – the nuclear envelope
 - Selective permeability
 - Contains nuclear pores – shallow pits which provide passageways for molecules to enter and exit
- ★ Inside the nucleus is a dense material called chromatin-composed of individual chromosomes
- ★ The chromosomes consist of protein and DNA
- ★ Many of these chromosome parts can be seen inside the nucleus and we call them nucleoli (more than one) or nucleolus (one).

Cell Mitochondria

- ** Provides the energy needed for cells to perform all of their tasks
- ** Powerhouse of the cells
- ** Convert energy stored in food
 - ➔ Organic molecules are broken down to release energy
- ** Largest organelles of the cell
- ** Consist of a double membrane
 - ➔ Highly folded inner membrane within the fluid-filled central cavity
 - ➔ These many folds increase the surface area so that more reactions can occur (and more energy can be release)
 - ➔ Final reactions in cellular respiration take place on the inner membrane.
- ** Number of mitochondria varies depending on the cell type

Endoplasmic Reticulum (ER) and Ribosomes

In order for cells to function properly, supplies must be manufactured and transported from one part of a cell to another.

- ☞ Network of interconnected , flattened, or tube like structures
- ☞ Creates a series of channels that act like a highway system through the cytoplasm
- ☞ Proteins and lipids are made on the surface of the ER
 - ➔ Proteins are made from amino acids on the ribosomes. Some ribosomes are attached to the surface of the ER. Some are located freely in the cell cytoplasm
 - ➔ Once made, these proteins enter channels in the ER and are transported to other parts of the cell
- ☞ Two types of ER
 - Rough ER – contains ribosomes
 - Smooth ER – lacks ribosomes

Golgi Bodies

- ☑ Sorting, packaging and distribution center of the cell
- ☑ Located close to the ER
- ☑ Sets of flattened, slightly curved sacs
- ☑ More disk like and smaller than the ER

There is interaction between the Ribosomes, ER, and Golgi bodies:

- ☺ Ribosomes make proteins
- ☺ Proteins enter channels of the ER
- ☺ When they reach the end of the ER they are surrounded by small sacs (vesicles)

- ☺ **Then the vesicle breaks away from the ER**
- ☺ **The vesicle moves toward the Golgi body**
- ☺ **Once there, the vesicle fuses with the Golgi body**
- ☺ **It then empties its protein molecules in the Golgi body**
- ☺ **Then the proteins move from one sac to another in vesicles formed by the Golgi bodies**
- ☺ **Here the proteins are sorted and delivered to their proper destination either inside or outside the cell**

The Golgi body forms another type of organelle,

the LYSOSOME

- **Contains digestive enzymes that break down food**
- **Digest worn out cell parts**
- **Encased by a membrane**

VACUOLES

Cells often produce substances that are stored for later use. They are stored in the VACUOLES.

- ☺ **Fluid-filled membrane bound structures**
- ☺ **Act as cellular reservoirs for food, water, and minerals**

CYTOSKELETON

Long, thin structures that give shape and support to the cell – different types

➔ Microfilament

- **Composed of the proteins actin and myosin**
- **Found in many types of eukaryotic cells**

- Assist in cell movement
- Involved in changing the shape s of cell

➔ **Microtubule**

- Usually longer and thicker than the microfilament
- Help certain organelles move from place to place – mitochondria and vesicles travel along microtubule “tracks”

CENTRIOLES

- Composed of sets of microtubules arranged to form a cylinder
- Play an important role in cell reproduction –assist in cell division

CILIA AND FLAGELLA

- ➔ Flexible projections made of microtubules
- ➔ Involved in motion of the cell
- ➔ Extend outward from the cell, though still within the cell membrane
- ➔ Flagella are longer and fewer in number

The arrangement of microtubules in centrioles, cilia, and flagella is very similar.

ORGANELLES FOUND ONLY IN PLANT CELLS

CHLOROPLASTS

- ☺ Pigment containing plastid
- ☺ Contain chlorophyll and other pigments required for photosynthesis
- ☺ Consists of a double membrane surrounding an interior filled with liquid and many internal membranes

CELL WALL

- ➔ Thick outer layer
- ➔ Contains the carbohydrate CELLULOSE and protein
- ➔ Gives strength and rigidity to the cell