**Plant vs. Animal Cells**

*SC.912.L.14.2 AA* ***Relate structure to function for the components of plant and animal cells.*** *Explain the role of cell membranes as a highly selective barrier (passive and active transport).*

A prokaryote is a single-celled organism that lacks a nucleus and other internal compartments. Prokaryotic cells depend on a strong cell wall to give the cell shape.

Some prokaryotic cell walls are surrounded by a structure called a capsule, which is also composed of polysaccharides. The capsule enables prokaryotes to cling to almost anything, including teeth, skin, and food.

A eukaryote, such as a plant or an animal, is an organism whose cells have a nucleus. The nucleus is an internal compartment that houses the cell’s DNA. Other internal compartments, or organelles, enable eukaryotic cells to function in ways different from prokaryotes. An organelle is a structure that carries out specific activities in the cell. Specialized cells within a multicellular organism may contain more of one kind of organelle than another, depending on their function.

Many organelles—such as the endoplasmic reticulum, vesicles, Golgi apparatus, lysosomes, and mitochondria—are found in both animal cells and plant cells. However, plant cells have three additional structures that are not found in animal cells:

• The cell wall—composed of proteins and carbohydrates, including the polysaccharide cellulose—surrounds the cell membrane of plant cells.

• Chloroplasts are organelles that use light energy to make carbohydrates from carbon dioxide and water.

• The central vacuole is a large membrane-bound space that stores water and may contain many substances, including ions, nutrients, and wastes; when full, it makes the cell rigid.

1. List three (3) similarities and three (3) differences between eukaryotic cells and prokaryotic cells. (Give an example of each.)

Similarities:

Differences:

1. For each of the cell organelles listed below, create an analogy for its function. For instance: The nucleus manages and directs the cell, so it is like a principal managing a school. Then, choose if the organelle is found in a plant cell, animal cells or both.

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| --- | --- | --- | --- |
| **Structure** | **Function** | **Analogy** | **Plant, Animal or Both** |
| Nucleus | Command center of the cell; DNA in the form of chromosomes are located here. |  |  |
| Ribosome | Site of protein synthesis in prokaryotes and eukaryotes. |  |  |
| Endoplasmic Reticulum | Carries proteins and other materials from one part of the cell to another.  |  |  |
| Mitochondria | Supplies the cell with energy (ATP); conducts ‘respiration’ for the cell.  |  |  |
| Chloroplast | Conducts ‘photosynthesis’ for the cell.  |  |  |
| Golgi Apparatus | Collects, packages, and distributes proteins.  |  |  |
| Large Central Vacuole | Used for storage of water and other materials needed by the cell.  |  |  |
| Lysosome | Contains digestive enzymes to break down food, wastes and old cell parts.  |  |  |
| Nuclear Envelope | Surrounds & protects the nucleus; contains pores to allow substances in and out of the nucleus.  |  |  |
| **Structure** | **Function** | **Analogy** | **Plant, Animal or Both** |
| Nucleolus | Small organelle in the nucleus that makes ribosomes.  |  |  |
| Cilia | Hair like structure that assists in cellular movement |  |  |
| Microtubules | Provides structure for the cell; intracellular transport of organelles and vesicles.  |  |  |
| Flagella | Long whip-like structure that assists in cellular movement |  |  |
| Cell membrane | Encloses the cell, controls what enters and exits the cell.  |  |  |

1. Cells need to bring in molecules to carry out cellular processes. Often, this requires moving the molecules across the cell membrane against the concentration gradient. How do these molecules get into the cell?

A. passive transport by diffusion

B. active transport using ATP

C. passive transport by osmosis

D. phagocytosis

1. Which cell structure is correctly paired with its primary function?

A. ribosome - protein synthesis

B. mitochondrion - movement

C. vacuole - cell division

D. nucleus - storage of nutrients

1. Which of these best completes this concept map?



A. an animal cell C. a virus

B. a prokaryotic cell D. a plant cell