Basic Cell Types & Organelles

Life Science Georgia Standards of Excellence

S7L2. Obtain, evaluate, and communicate information to construct scientific explanations to describe how cell structures, cells, tissues, and organs, and organ systems interact to maintain the basic needs of organisms.

a. Develop a model and construct an explanation of how cell structures (specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, and mitochondria) contribute to the function of the cell as system in order to obtain nutrients in order to grow, reproduce, make needed materials, and process waste.

Prokaryote

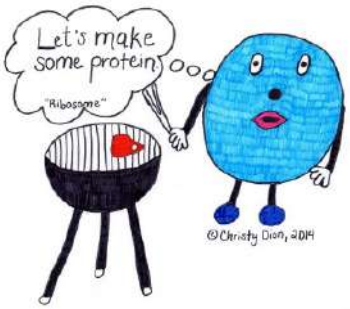
- Single-celled organism ***WITHOUT* a *nucleus.***
- Classified by shape – bacilli, cocci, spirilla.
- **Kingdoms –** Archaebactera & Eubacteria

Eukaryote

- Multi-celled organism that have a ***nucleus and many other membrane bound organelles.***
- Classification differs between Kingdoms.
- **Kingdoms –** Fungi, Protist, Plantae, and Animalia

Commonalities in Prokaryotes & Eukaryotes

- **Cell Membrane -** controls what goes in and out. It's like the skin around the cell.
- **Ribosomes -** makes proteins. It's like the protein shake stand where you can go get your extra protein.
- **Cytoplasm –** cell jelly or goo. Without the cytoplasm, all of the stuff inside would fall to the bottom of the cell. The cytoplasm supports all the stuff in the cell. It fills up all the space in the cell.



What makes Eukaryotes different from Prokaryotes?

- Eukaryotes have a NUCLEUS!
- Eukaryotes have many other organelles.
- Eukaryotes are larger.

Eukaryotic Organelles:

- **Nucleus -** contains DNA, instructions for making proteins and controls the ell. Is inside the cell – not always in the middle.
- **Nucleolus –** makes ribosomes. Inside the nucleus.
- **Nuclear enevelope -** controls what goes in and out of the nucleus. A membrane around the nucleus.

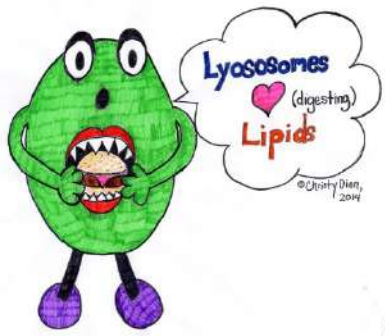
Genetic Information Inside Nucleus

- **Chromosomes** – contain DNA & store information, found inside the nucleus.
- **Chromatin** – made of DNA, this is what chromosomes are made of.
- DNA → Chromatin → Chromosomes → Nucleus

Eukaryotic Organelles:

- **Golgi Apparatus** – packages proteins & lipids, modifies proteins (to be transported) found in the cytoplasm.
- **Lysosomes** – breaks things down (wastes, bacteria, etc.) found in the cytoplasm, found only in animal cells.
- **Ribosomes** – makes proteins, found in the cytoplasm
- **Vacuole** – stores stuff (i.e., water, waste, etc.), found in the cytoplasm.

Plant cells have a LARGE central vacuole which helps maintain turgor pressure, animal cells have a smaller one.



Eukaryotic Organelles: Only in Plant Cells

- **Cell Wall** – provides support & protection (Also in fungi, bacteria, and some protists) found on the very outside of the cell
- **Choloroplasts**

Eukaryotic Energy Producing Organelles

- **Mitochondria** – makes energy through cellular respiration. Found in the cytoplasm, ALL eukaryotic cells have these!
- **Chloroplasts** – makes energy through photosynthesis. Found in the cytoplasm, ONLY plants have these!

Classroom Cell Analogies	
Nucleus – teacher	Nucleolus – student computer
Cell Membrane – classroom door	Lysosome – pencil sharpener
Cytoplasm – student desk	Mitochondria – lights
Ribosome – printer	Endoplasmic Reticulum – aisles
Chloroplast – classroom window	Golgi Apparatus – Biology book
	Cell Wall – classroom wall