Cell Structure and Function

11/16/15

What are cells? What types are there?

Cell theory - cells are the basic structural unit for all living things

Prokaryotes - no nucleus, usually unicellular

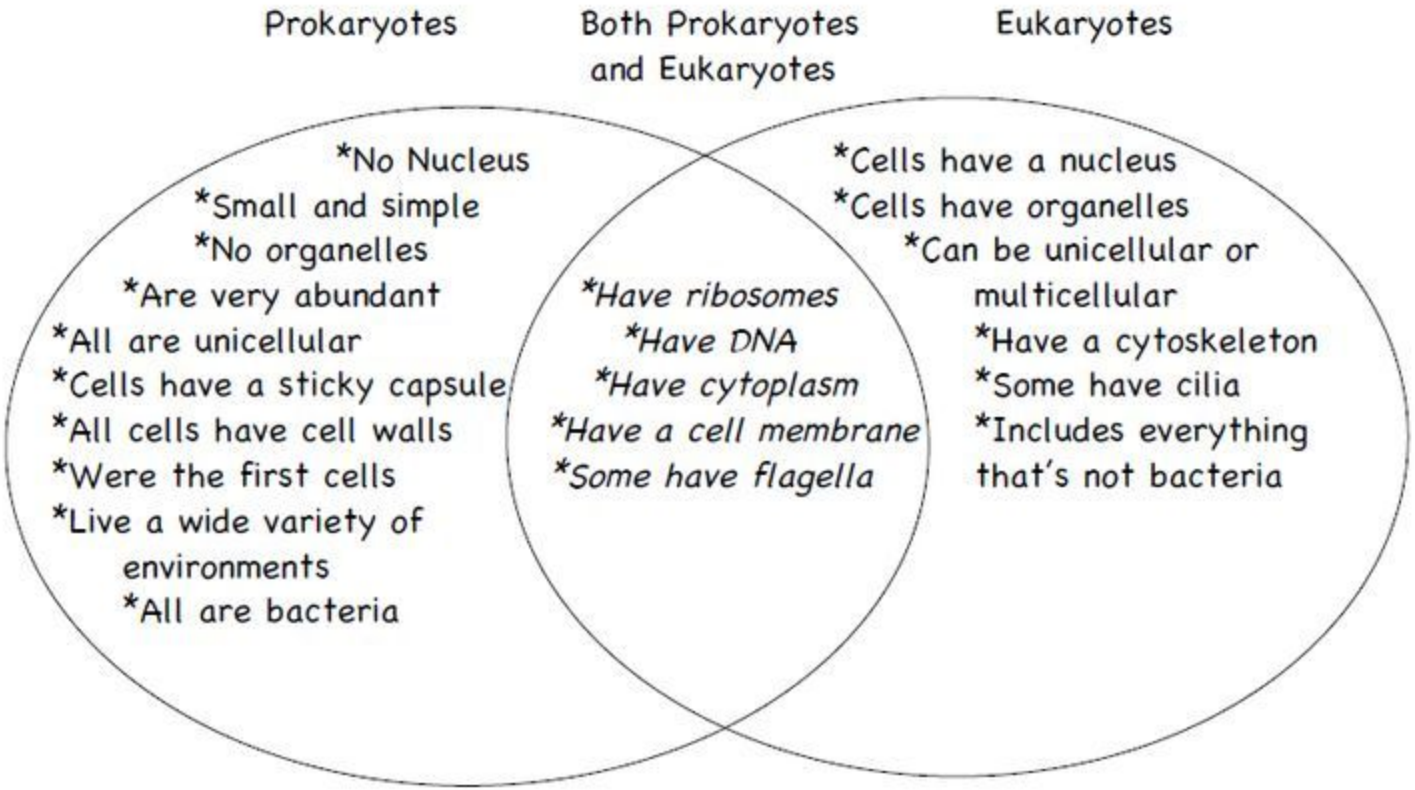
-Bacteria

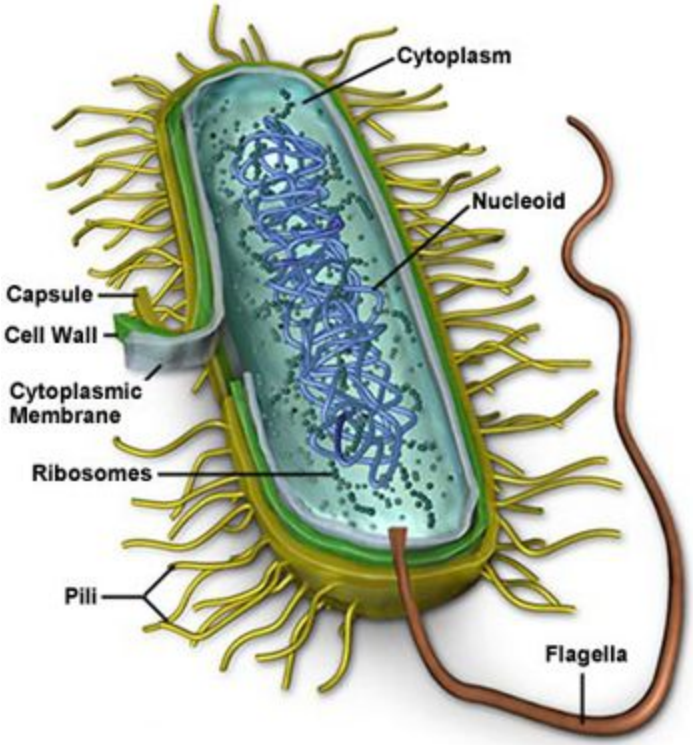
Eukaryotes - have a nucleus, usually multicellular, have organelles

-Plant cells

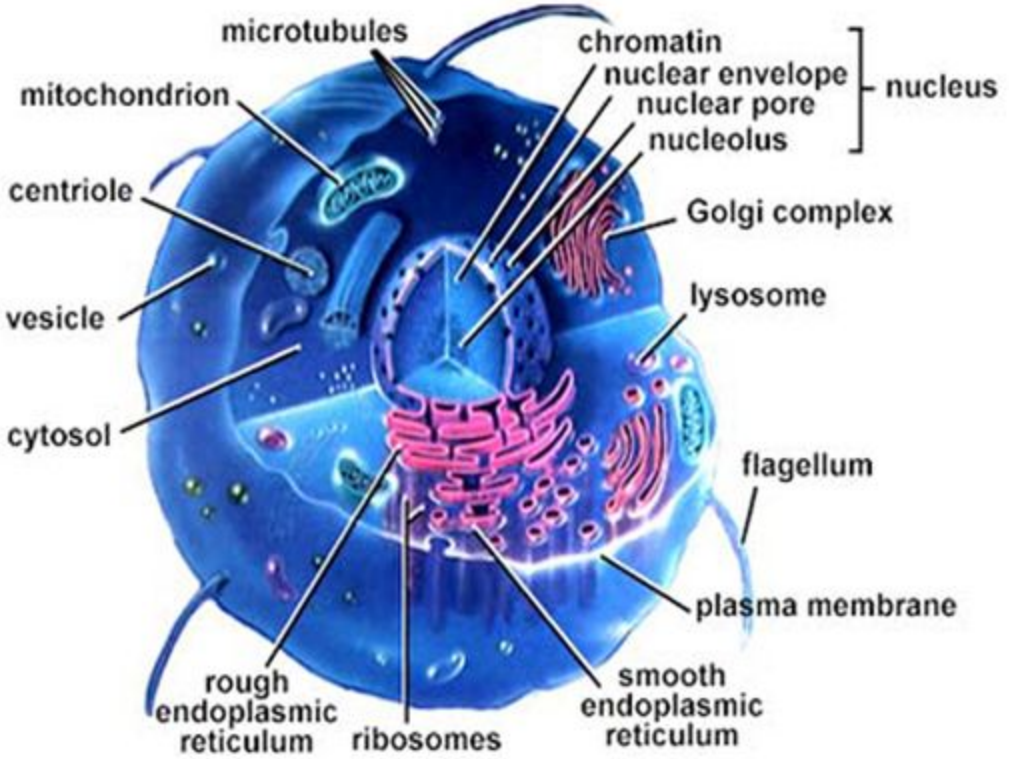
-Animal cells

Prokaryotes and Eukaryotes Venn Diagram





prokaryotic cell
(bacteria)



eukaryotic cell
(protists, fungi, animals, plants)

What are organelles?

Organelles are tiny structures in a cell that perform specific functions that are essential to the success of the cell

- Like how our **organs** each have a specific function in our body

Nucleus

The **nucleus** is like the brain of the cell
It is the “control center” and tells the other organelles what to do and when to do it
The nucleus also holds the cell’s DNA (genetic material)

- DNA holds instructions to making important molecules, like protein

The **nucleolus** is located inside of the nucleus, and is the site of ribosome formation

-**Ribosomes** are small pieces of RNA found throughout the cytoplasm and on some other organelles. Their only job is to assemble proteins.

-**Cytoplasm** is the jelly-like substance that all the organelles reside in inside of the cell; it is mostly water and dissolved salts

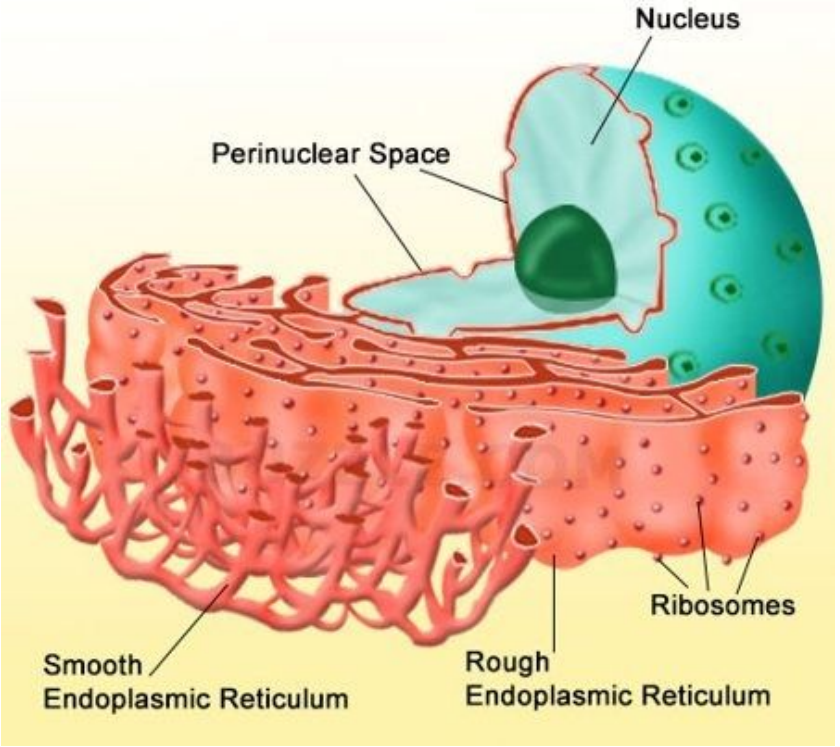
Endoplasmic Reticulum

Manufacturing and packaging system
Cells that synthesize and release **a lot of proteins** would need a large ER (liver or pancreas cells)

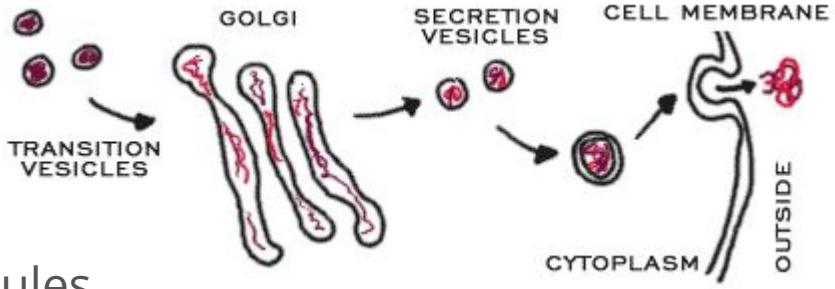
Rough Endoplasmic Reticulum - **ribosomes** are attached to its surface (hence, rough) and produces polypeptides
Smooth Endoplasmic Reticulum - helps with protein folding and transport of synthesized proteins

-protein molecules are synthesized and collected in the **lumen**

-when enough protein is synthesized, they collect together and pinch off into **vesicles** which then go to the **Golgi Apparatus**



Golgi Apparatus



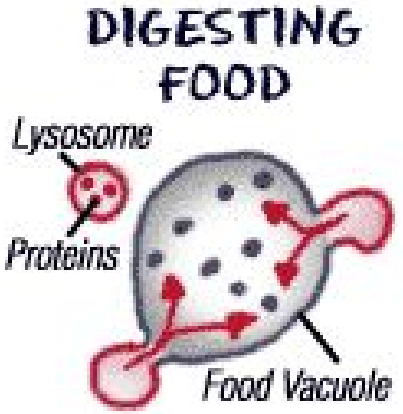
The **Golgi apparatus** gathers simple molecules (proteins and lipids from Rough ER) and combines them to make molecules that are more complex

-takes those big molecules, packages them in vesicles, and either stores them for later use or sends them out (secretes) of the cell

-also the organelle that builds **lysosomes**

-lysosomes are in nearly every animal-like cell

-hold digestive enzymes; when “food” material enters the cell, lysosomes attach and release enzymes



Mitochondria

Why is mitochondria called “the powerhouse of the cell”?

-mitochondria main function - to synthesize ATP to produce energy for the cell

Muscle cells need a lot of energy, so they have a lot of mitochondria

Plant cell only

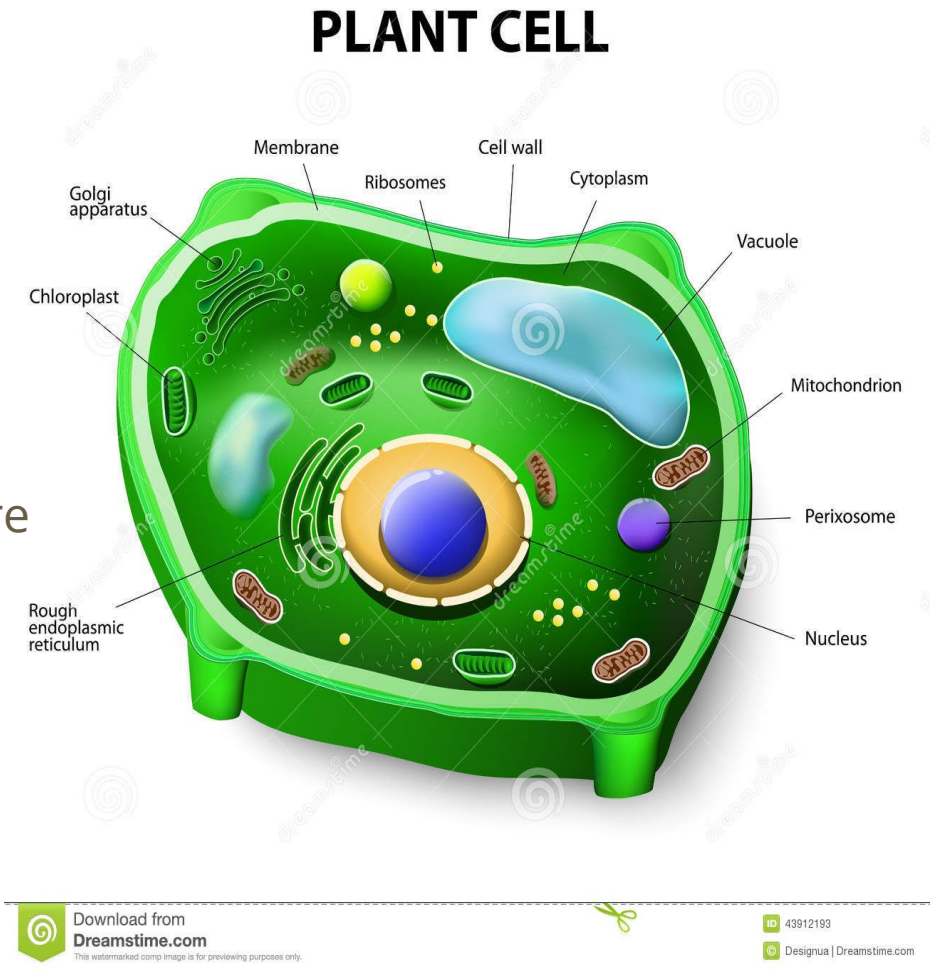
Chloroplasts - site of photosynthesis

Cell wall - gives structure and shape to plant cell

Vacuole - help maintain turgor pressure within the plant cell

-plants need turgidity to maintain **rigidity**

-Think of wilting plants



Compare and Contrast