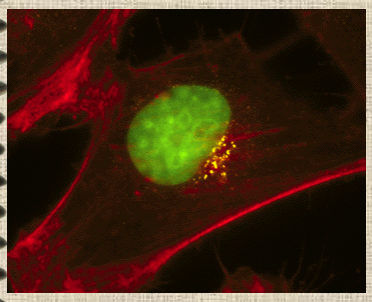
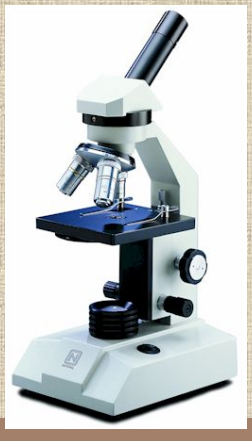
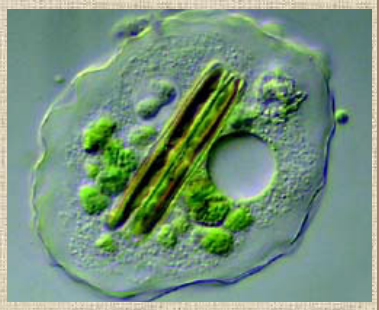
Cytology- study of cells

Cells - discovered in 1665 by Robert Hooke.







1. Cell Theory*** - 3 parts

a) All living things are made up of at least one cell
b) Cells are the basic units of structure and function in living things
c) Cells come from other cells (reproduction)

*** review of theory- if we discover an animal not made of cells, we'll revise this theory

2. Prokaryotic cells

a) Prokaryotes - simple cells - no membranes within their cell membrane.

b) Pro=before, karyote = nucleus

c) Nuclear region called nucleoid. It contains DNA*

d) cytoplasm* and ribosomes* and need for ATP* (ENERGY)

*=common to ALL cells

Visual Concept

3. Prokaryotes include bacteria only

(see also bacteria chapter!)

a) Basic shapes: bacilli (rod), cocci (round), spirilla (spiral)

b) Some bacteria are pathogens & make toxins

c) Antibiotics block cell wall or protein production in a bacterium

Visual Concept

3. Prokaryotes include bacteria only

d) Resistance is a problem because it transfers easily thru sex pilus

e) Some have chlorophyll (never a chloroplast)

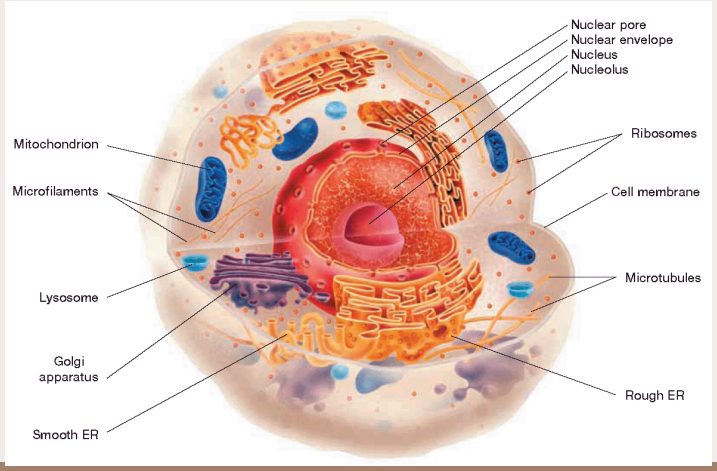
Fyi… there are more beneficial than harmful bacteria

Visual Concept

4. Eukaryotic cells

a) Eukaryotes -complex cells - many membrane bound organelles. Ex: plant, animal, fungi & protist cells.

b) Eu= true

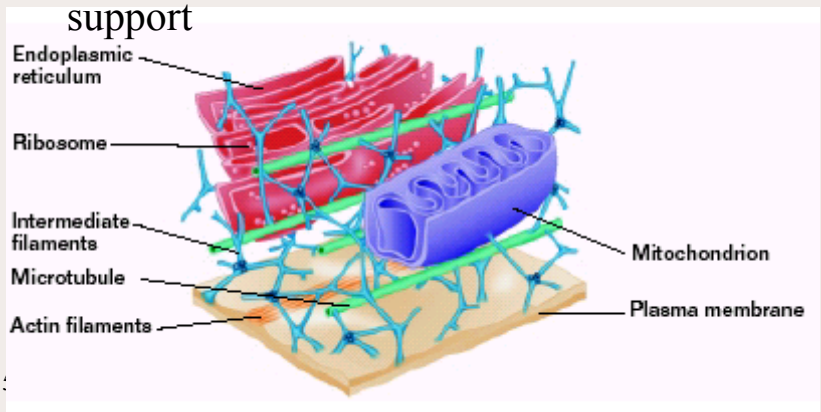


5. movement/protection (both pro- and eu-karyotes)

a) Cilia (pl) - short hairlike structures, cover surface
b) Flagella (pl)- longer than cilia, fewer in number

6. What's inside

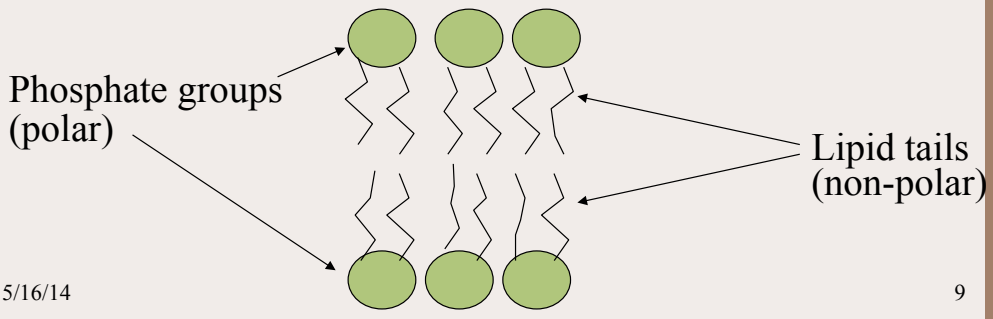
a) Everything inside the cell membrane but outside nucleus -cytoplasm
b) Cytosol is the fluid interior of the cell
c) Cytoskeleton- protein tubules and filaments for inside support



7. Plasma membrane -surrounds a cell & offers selective permeability

a) Selective permeability-the ability to determine what enters and leaves a cell REGULATION

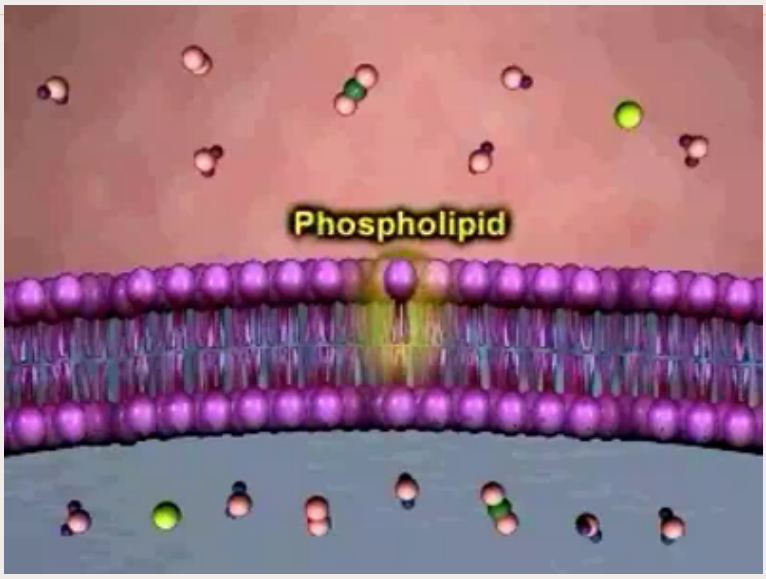
b) phospholipid- lipid made up of 1 phosphate & 2 FA's



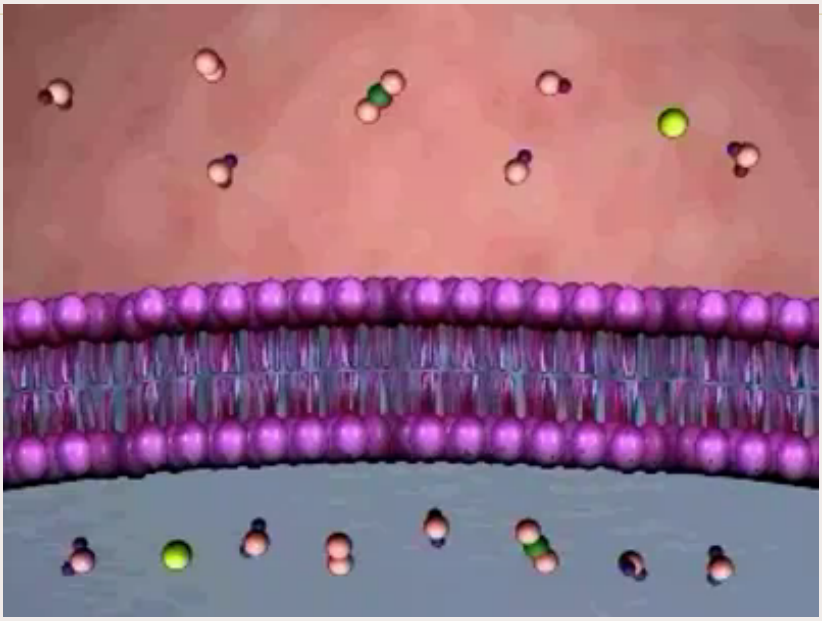
Soooooo. …. What's wrong with this commercial (an actual ad)

- Naturemade- actual commercial

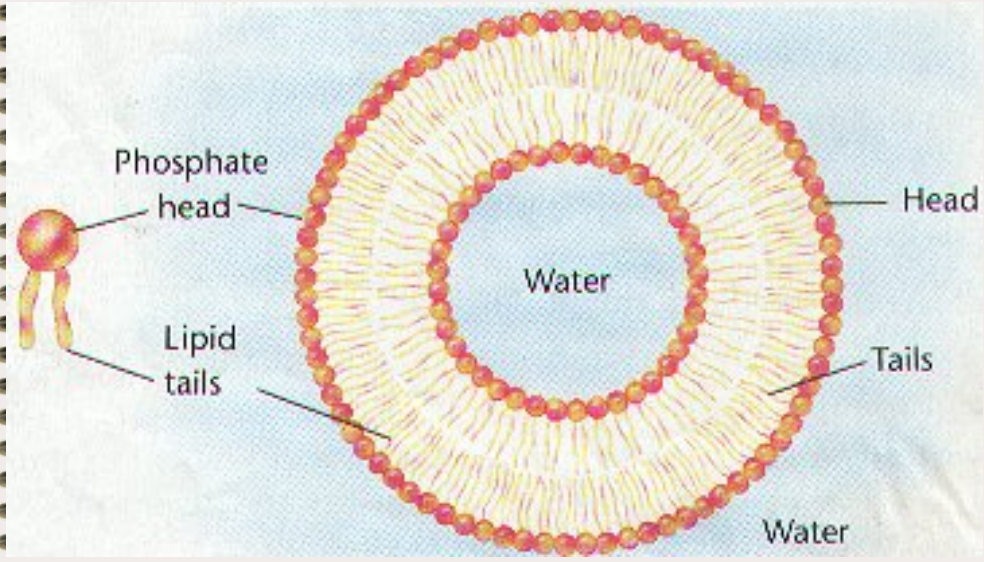
8. Polar heads hydrophilic, Nonpolar tails hydrophobic



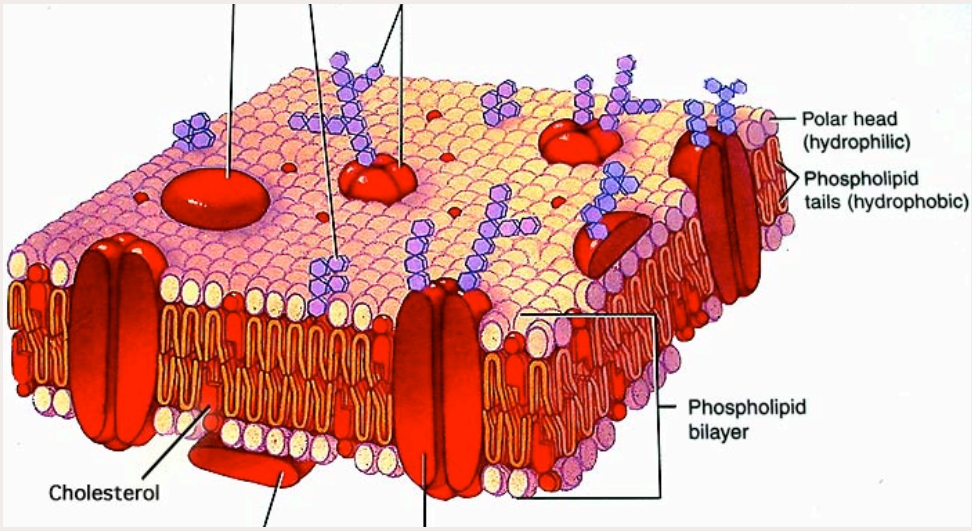
Holding it together!!



Another view of Cell Membrane



Another view: Plasma Membrane

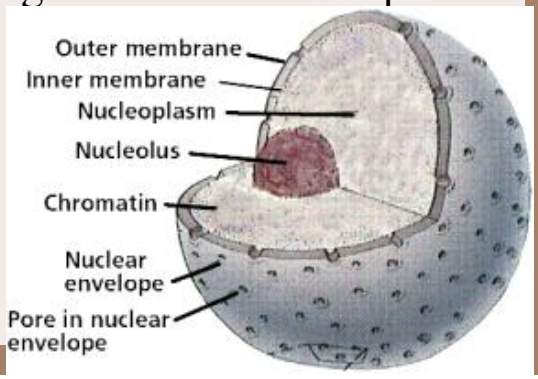


Common cell parts (no need to write them, they are in the book)

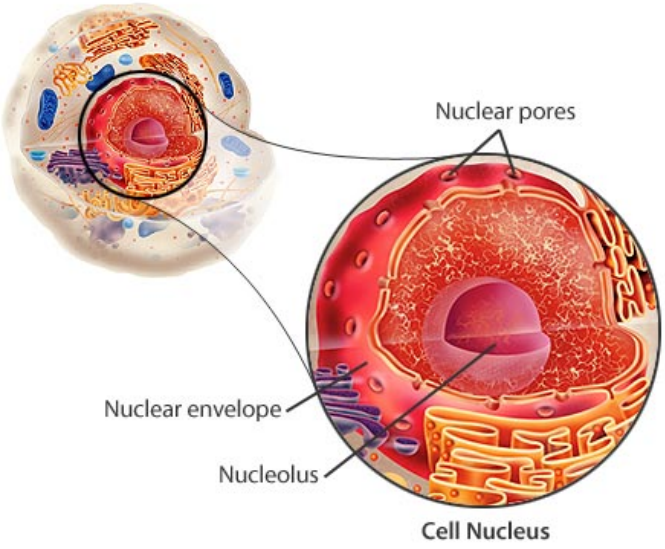
a) Nucleus/nucleolus
b) Chromosomes
c) Ribosomes
d) RER, SER
e) Golgi apparatus
f) Lysosomes
g) Mitochondria
h) cytoplasm
i) Cell wall
j) Chloroplasts
k) Central vacuole

9. Nucleus- controls most functions of the cell

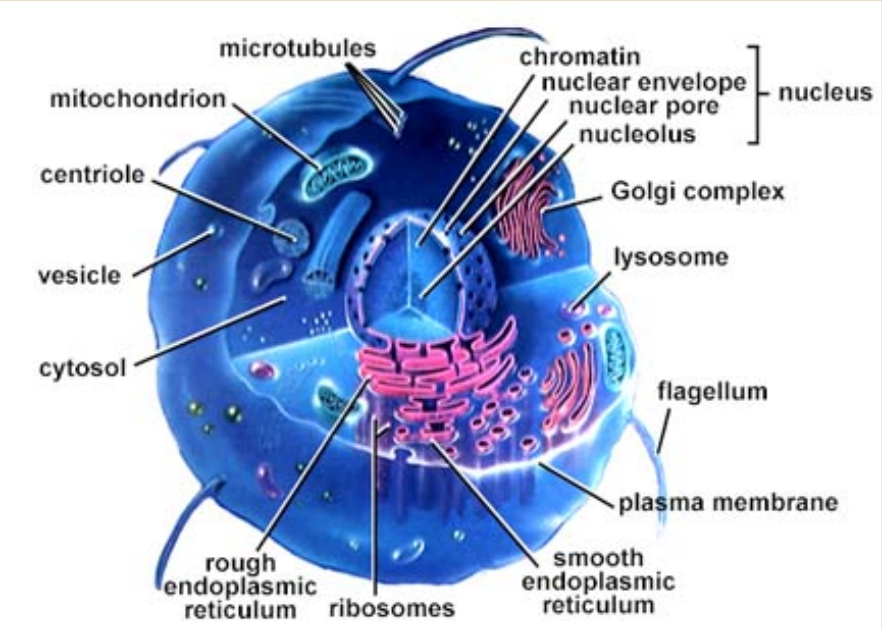
a) Contains Chromosomes aka chromatin (made of DNA and proteins)
   I. Chromosomes are divided into genes
b) Nucleolus makes ribosomes
c) nuclear pores/ openings in nuclear envelope
d) Nucleoplasm-- the cytoplasm of the nucleus



Nucleus



10. Organelles- perform a specialized function & allow eukaryotes to function efficiently



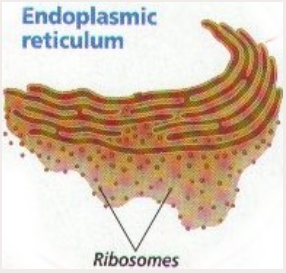
11. Endoplasmic reticulum (ER) - tubes that transport proteins.

a) Rough ER has ribosomes. Smooth doesn't.

b) RNA travels from the nucleus to the ribosomes. Ribosomes make proteins that travel through the ER.

c) SER builds lipids, helps detoxify

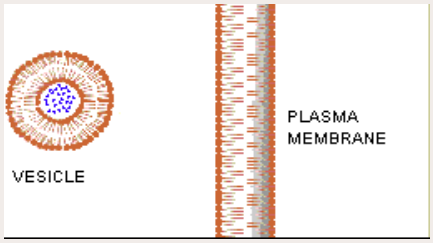
Visual Concept

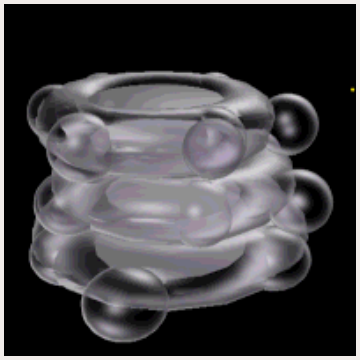


12. Golgi Apparatus - customizing, packaging and releasing materials.

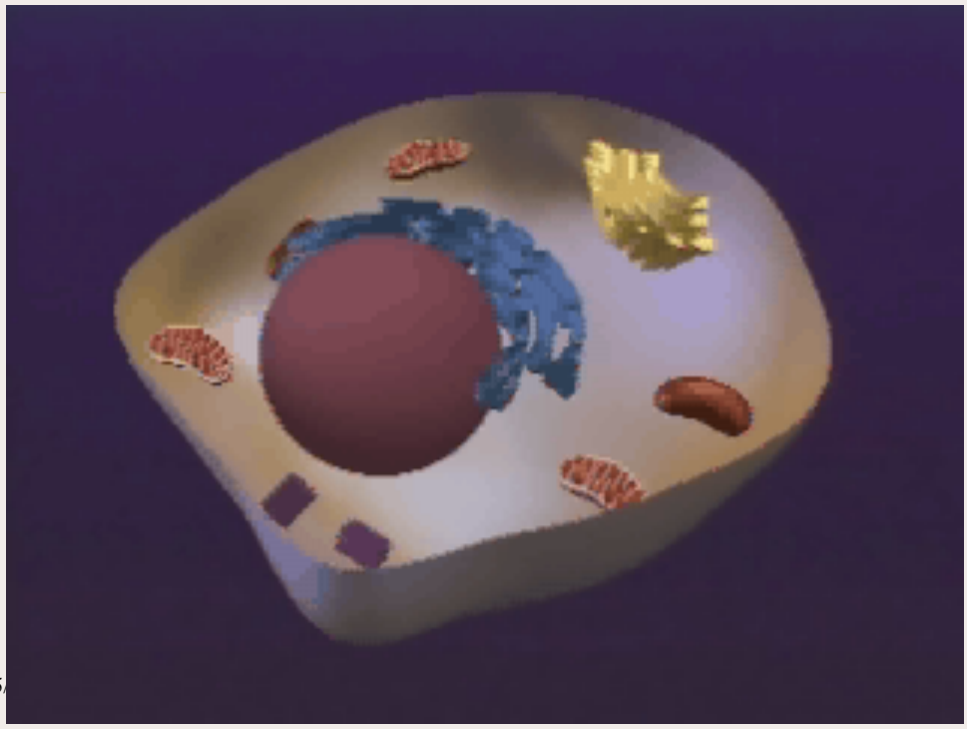
a) Processes proteins that leave in vesicles with an "address label"

It follows that cells that release a lot of protein have a lot of Golgi





ER and Golgi work together



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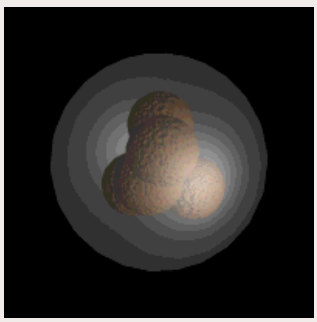
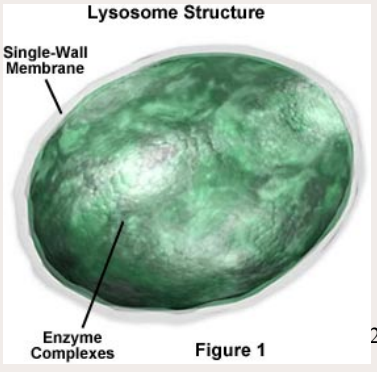
13. Lysosomes -sacs filled with digestive enzymes.

a) Site of food digestion

b) Used to break down old, or non-functional cell parts (autophagy)



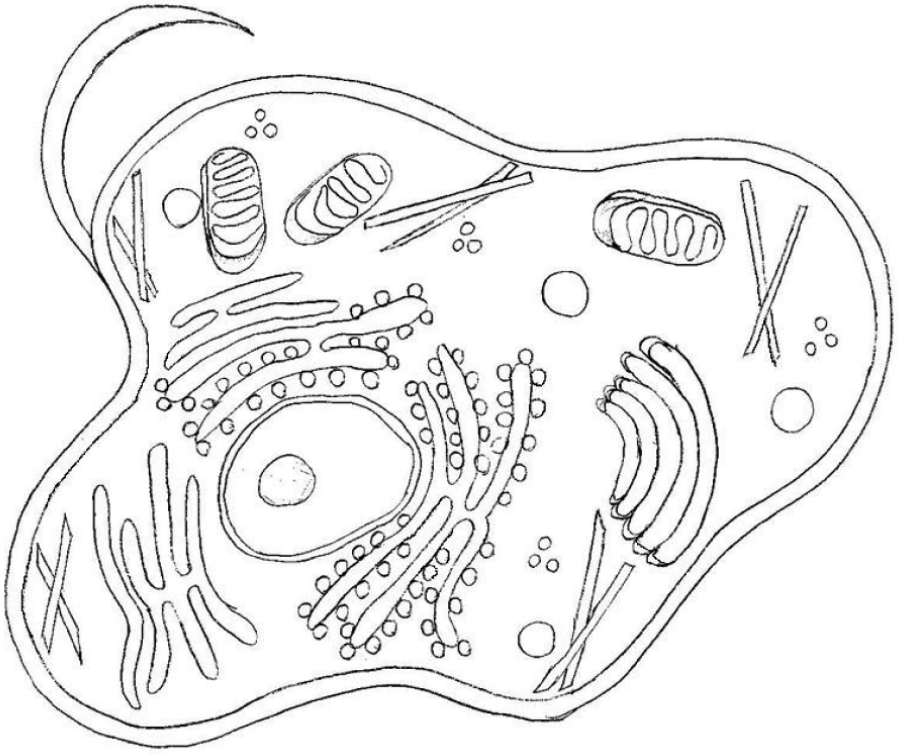


14. Mitochondria - power generators that convert food to ATP (ENERGY)

a) High energy cells- (heart muscle) may have hundreds.
b) Folded- extra surface area.

15. Were mitochondria independent prokaryotes?

a. Endosymbiont Hypothesis
b. Have their own DNA & ribosomes
c. Phospholipid bilayer
d. Make energy



Cell membrane
Cytoplasm
Nucleoplasm
Nuclear membrane
Nucleolus
Golgi
Flagella
Ribosome
SER, RER
Mitochondria
Lysosome
Microtubules

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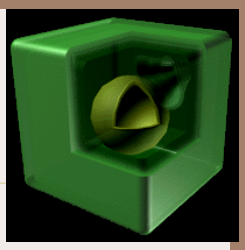
16. Plant cells - 3 differences



a) Cell wall- support and shape (all except animal)

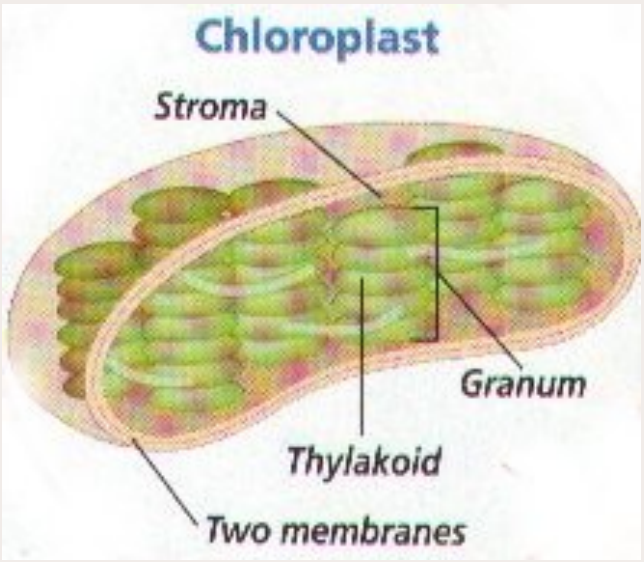
b) Large central vacuoles for storage (vacuole = storage bin in plant or animal)

c) Plastids store food and pigments

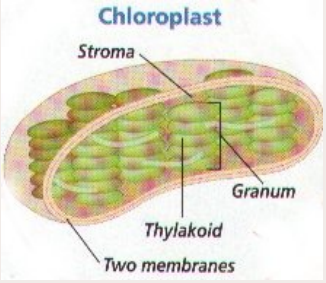
i. leucoplast stores food- potato starch

ii Chloroplast- stores pigment –chlorophyll- uses sunlight to make food

Chloroplasts have a tremendous amount of internal surface area. This allows for the maximum number of energy producing reactions.



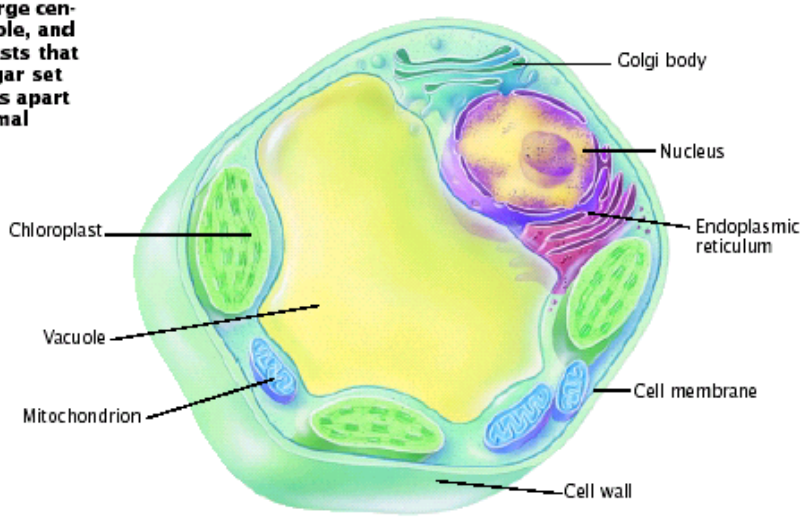
Question: What similarity do you see between mitochondria and chloroplasts?

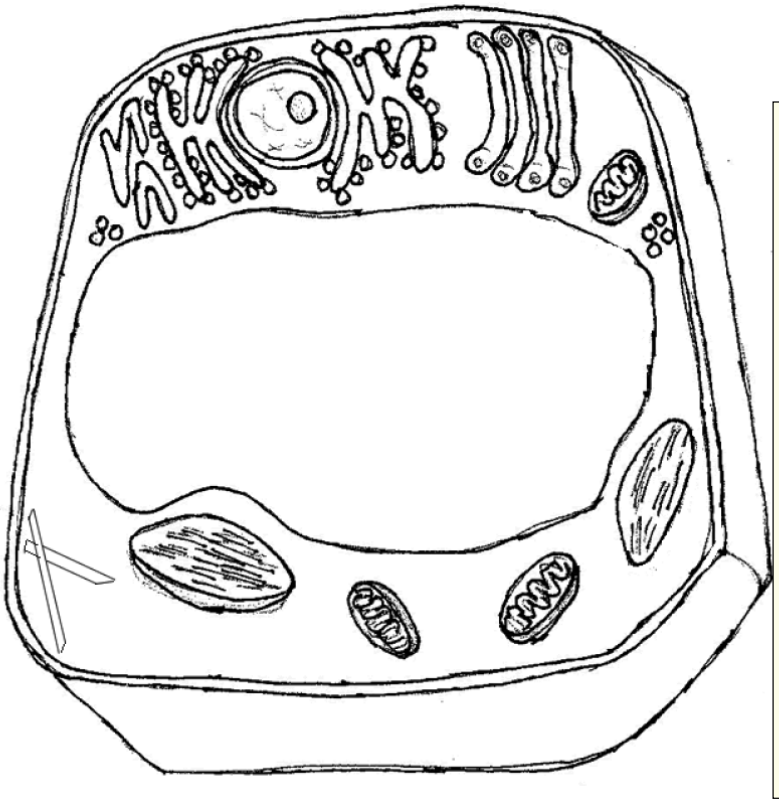


They both have a tremendous amount of internal surface area, to maximize the number of reactions that take place there.

Typical Plant Cell

A strong cell wall, a large central vacuole, and chloroplasts that make sugar set plant cells apart from animal cells.





Cell membrane
Protoplasm
Cytoplasm
Nuclear membrane
Nucleolus
Golgi
Vacuole
Ribosome
SER, RER
Mitochondria
Chloroplasts
Microtubules
Cell wall