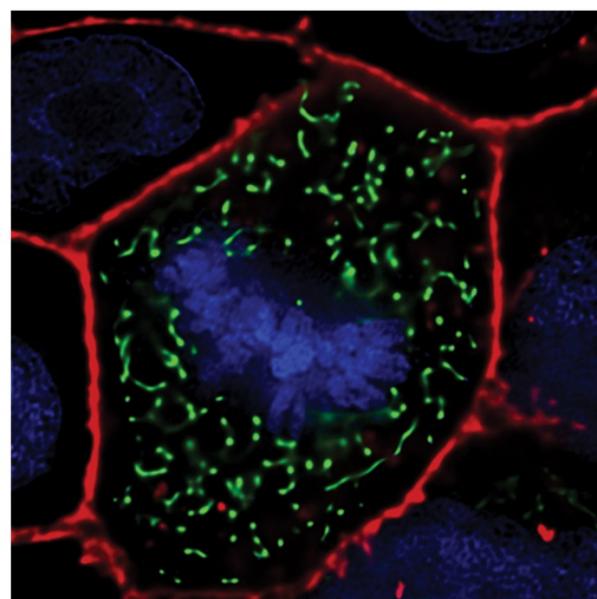


Kickoff:

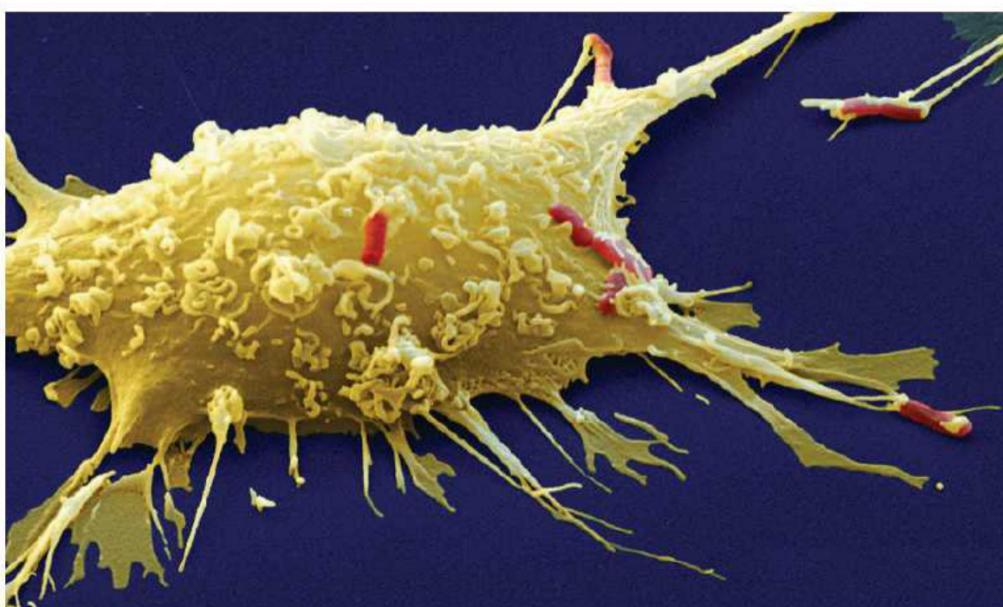
As observed in lab, many chemicals can stain certain compounds such as lipids with Sudan III. How could this process be helpful in terms of observing differences in cells?

What compound may have been targeted with the red stain?



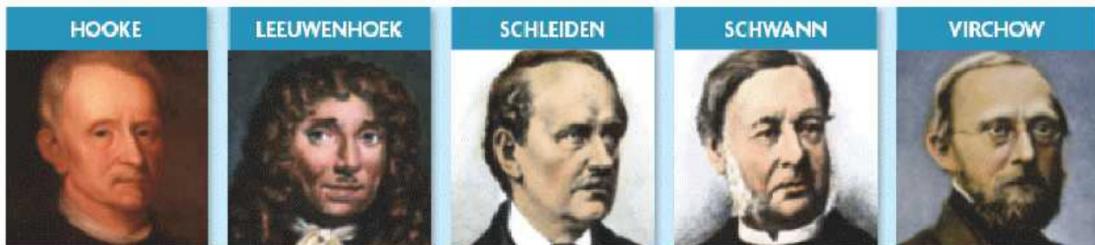
3.1 Cell Theory

KEY CONCEPT Cells are the Basic unit of life.



3.1 Cell Theory

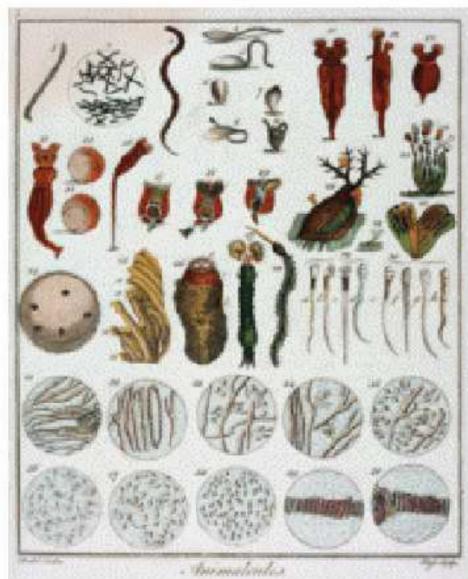
- ▶ The cell theory grew out of the work of many scientists and improvements in the microscope.
 - Many scientists contributed to the cell theory.



3.1 Cell Theory

- ▶ **The cell theory grew out of the work of many scientists and improvements in the microscope.**

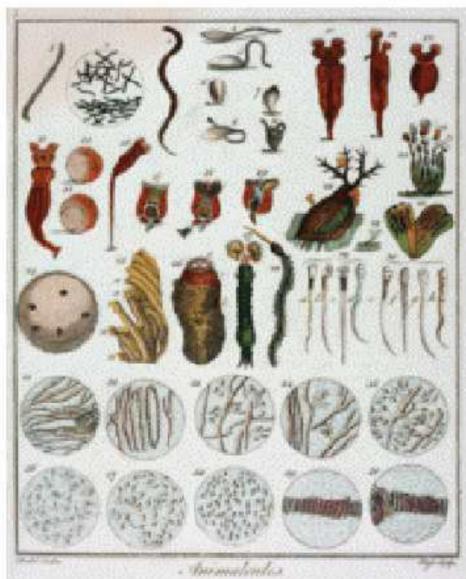
- Many scientists contributed to the cell theory.
- More was learned about cells as microscopes improved.



3.1 Cell Theory

- ➊ The cell theory grew out of the work of many scientists and improvements in the microscope.

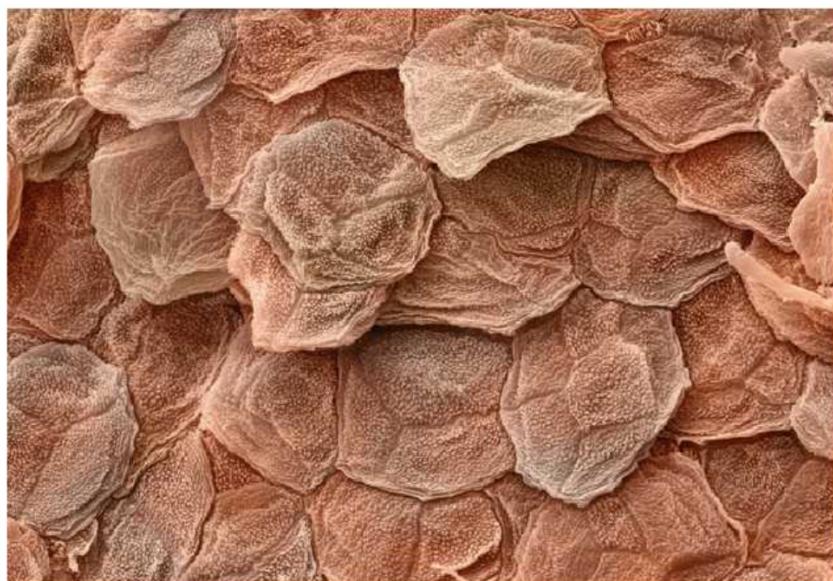
- Many scientists contributed to the cell theory.
- More was learned about cells as microscopes improved.
- The cell theory is a unifying concept of biology.



3.1 Cell Theory

► Early studies led to the development of the cell theory.

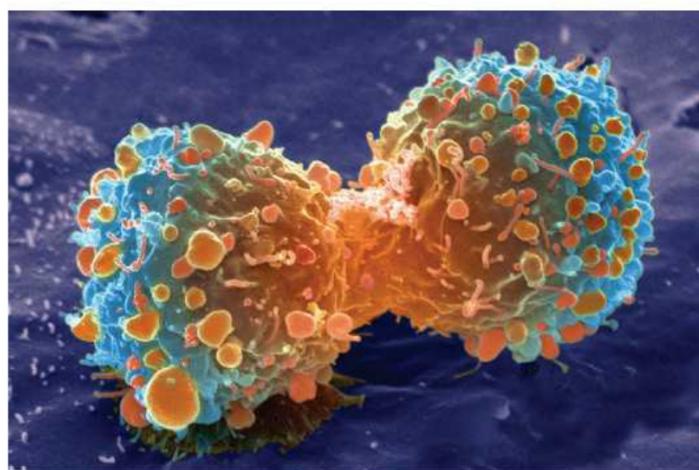
- The Cell theory has three principles.
 - All organisms are made of cells.



3.1 Cell Theory

► Early studies led to the development of the cell theory.

- The Cell theory has three principles.
 - All organisms are made of cells.
 - All existing cells are produced by other living cells.



3.1 Cell Theory

► Early studies led to the development of the cell theory.

- The Cell theory has three principles.
 - All organisms are made of cells.
 - All existing cells are produced by other living cells.
 - The cell is the most basic unit of life.



Plant^y
Animal^s
Fung^s:
Protist^s
~~Bacteri^s~~
Archae^a

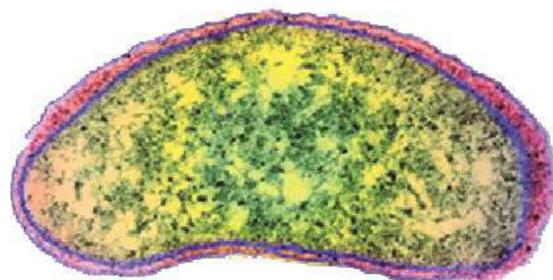
3.1 Cell Theory

- ➊ Prokaryotic cells lack a nucleus and most internal structures of eukaryotic cells.
 - All cells share certain characteristics.

3.1 Cell Theory

- ▶ **Prokaryotic cells lack a nucleus and most internal structures of eukaryotic cells.**

- All cells share certain characteristics.
 - Cells tend to be microscopic.



Bacterium
(colored SEM; magnification 8800x)

3.1 Cell Theory

- Prokaryotic cells lack a nucleus and most internal structures of eukaryotic cells.

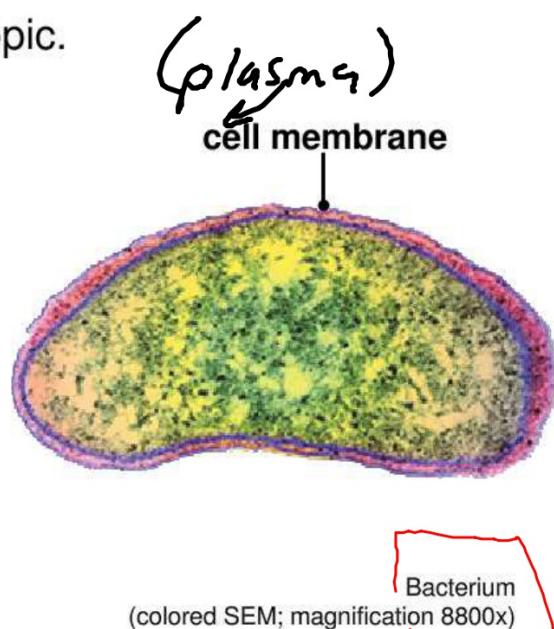
- All cells share certain characteristics.

- Cells tend to be microscopic.

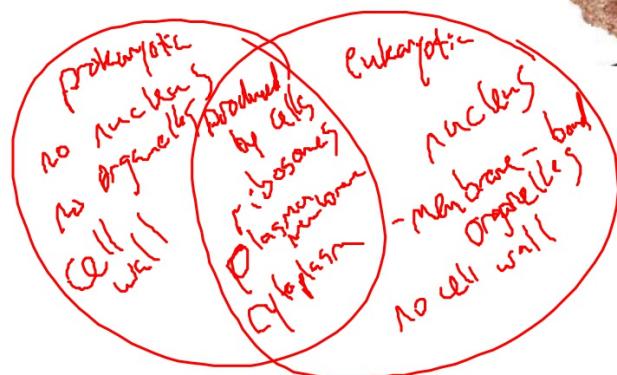
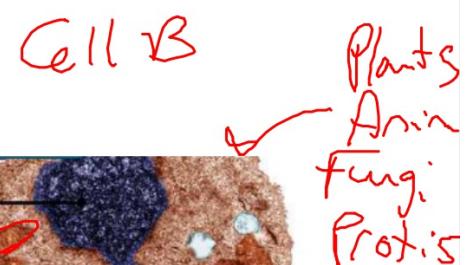
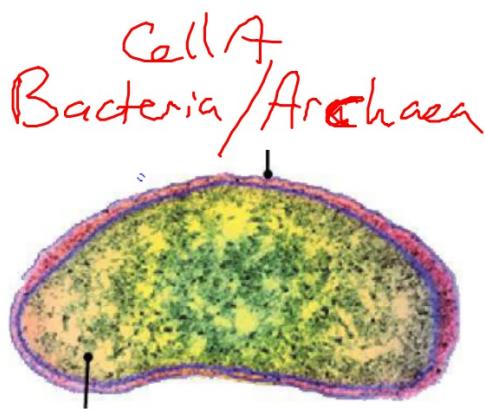
- All cells are enclosed by a membrane.

- All cells have cytoplasm

- Have ribosomes

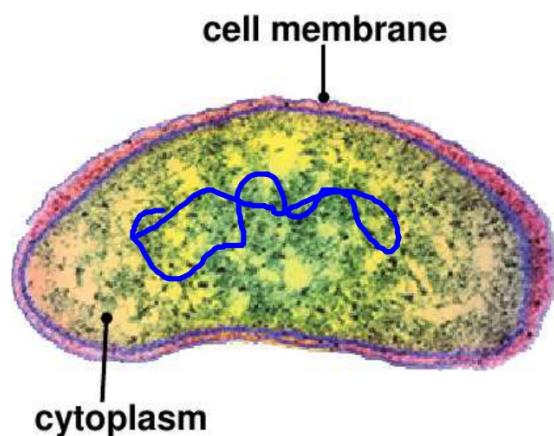


Kickoff: Describe some similarities and differences between these two cells.



3.1 Cell Theory

- Prokaryotic cells lack a nucleus and most internal structures of eukaryotic cells.
 - All cells share certain characteristics.
 - Cells tend to be microscopic.
 - All cells are enclosed by a membrane.
 - All cells are filled with cytoplasm.
 - Have ribosomes



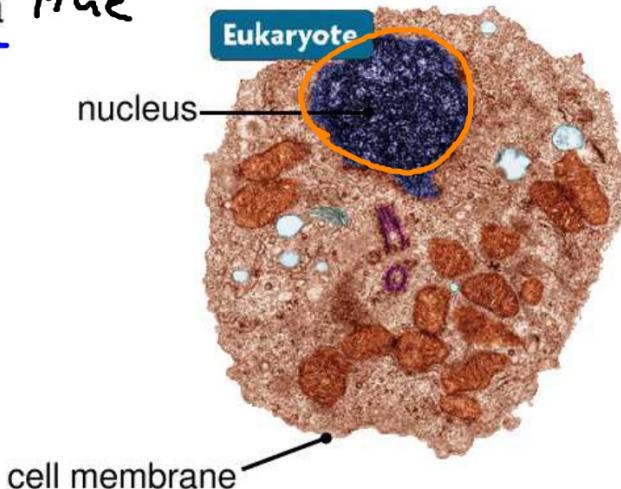
Bacterium
(colored SEM; magnification 8800x)

3.1 Cell Theory

- There are two cell types: eukaryotic cells and prokaryotic cells.
eukaryotes
prokaryotes

3.1 Cell Theory

- There are two cell types: eukaryotic cells and prokaryotic cells.
- Eukaryotic cells have a nucleus. *true*

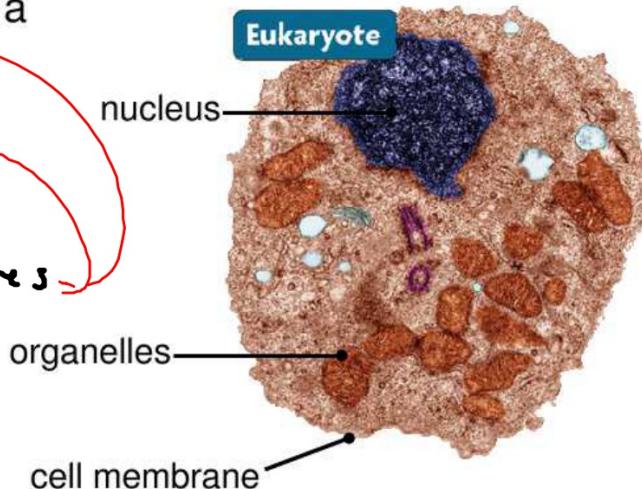


3.1 Cell Theory

- There are two cell types: eukaryotic cells and prokaryotic cells.

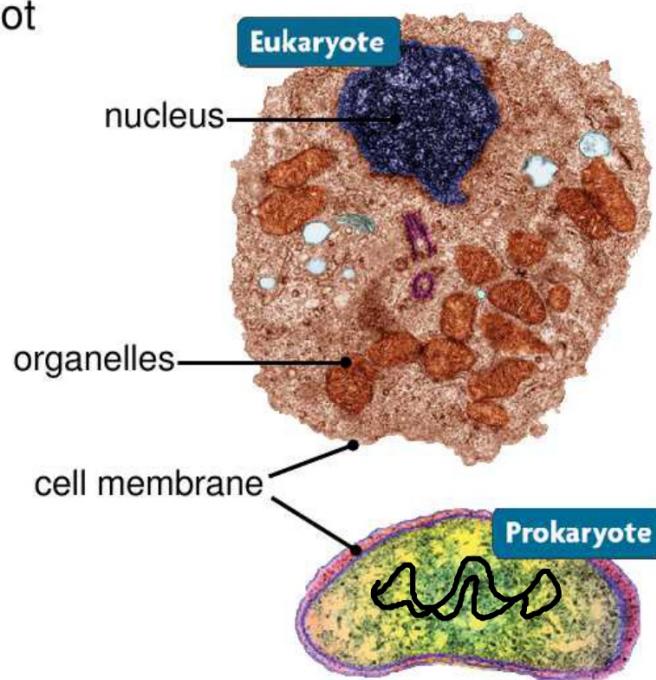
- Eukaryotic cells have a nucleus.
- Prokaryotic cells do not have membrane-bound organelles.

Except ribosomes



3.1 Cell Theory

- There are two cell types: eukaryotic cells and prokaryotic cells.
 - Prokaryotic cells do not have a nucleus.



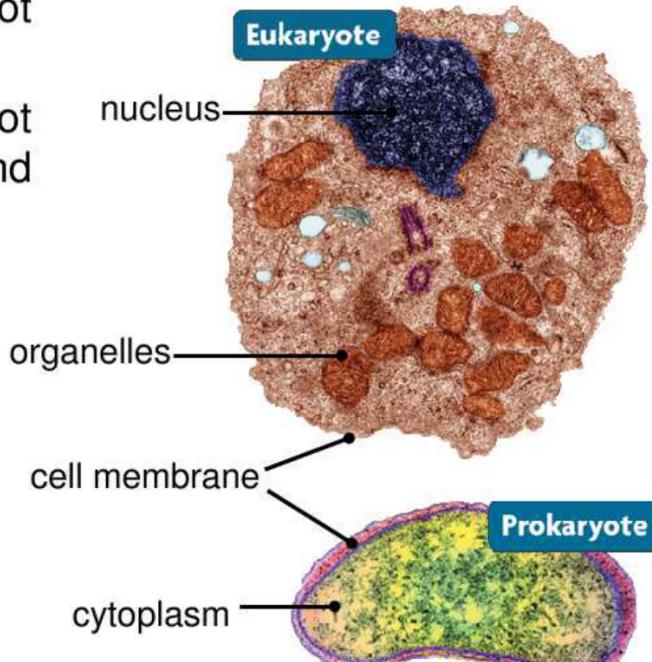
3.1 Cell Theory

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- Prokaryotic cells do not have a nucleus.
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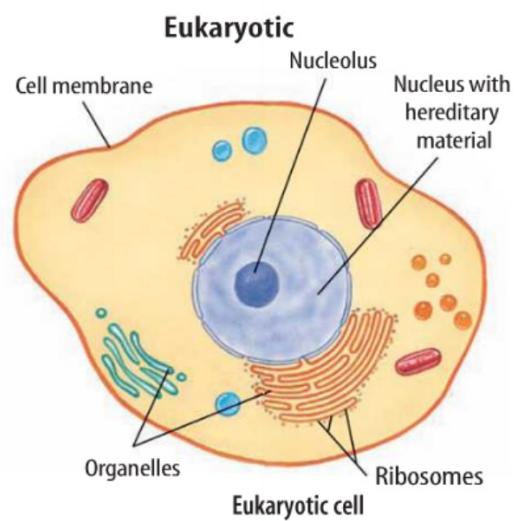
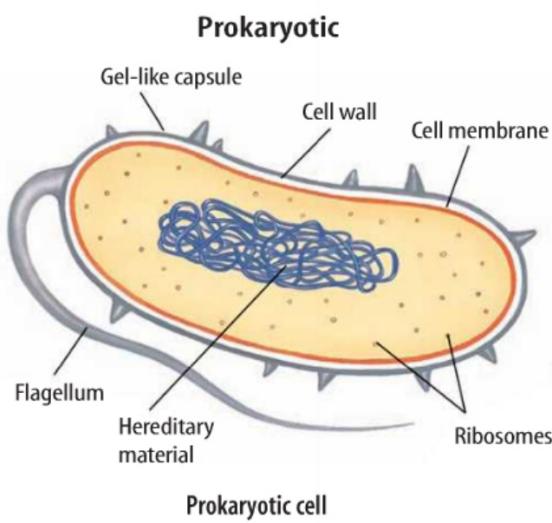
Except ribosomes

• much smaller



Eukaryotic cells- contain membrane bound organelles. Found in animals, plant, fungi and protists amoeba

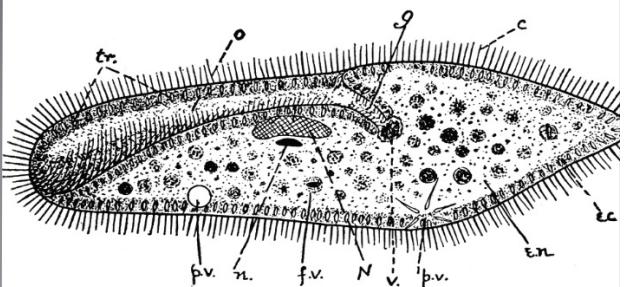
Prokaryotic- don't have organelles. no nucle
One-celled organisms: ~~like~~ bacteria, archa



Prokaryotes	Eukaryotes
<p><i>Types of organisms</i></p> <p>Bacteria Archaea</p>	<p>Plants Animals Fungi Protists</p>
No membrane-bound nucleus	Membrane-bound nucleus
No organelles	Has organelles

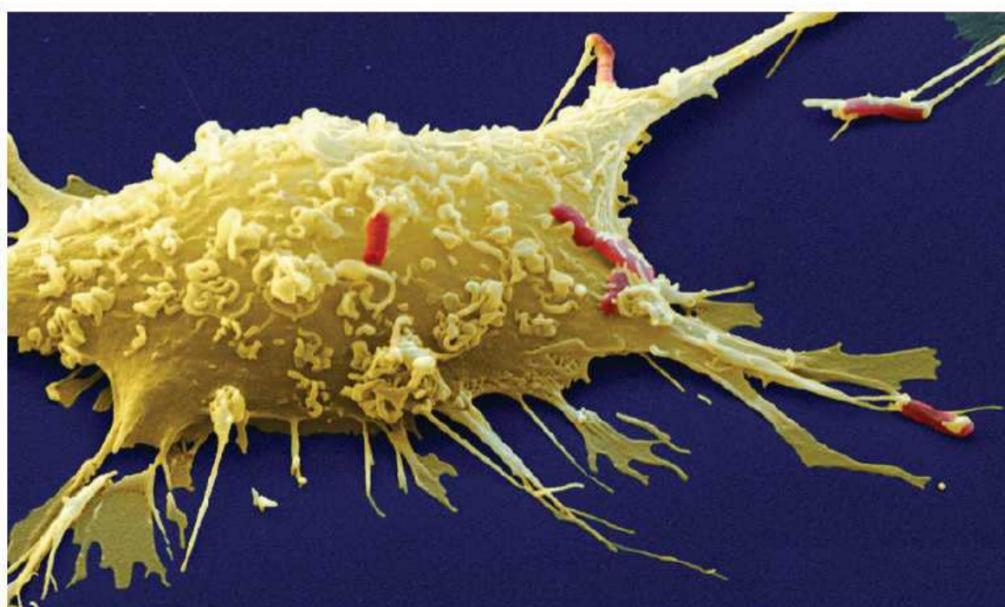
Kickoff:

A scientist viewed an unknown unicellular organism (0.2 mm in length) from a sample of pond water and sketched it out on paper. Is the organism prokaryotic or eukaryotic? Explain your reasoning.



3.2 Cell Organelles

KEY CONCEPT Eukaryotic cells share many similarities.

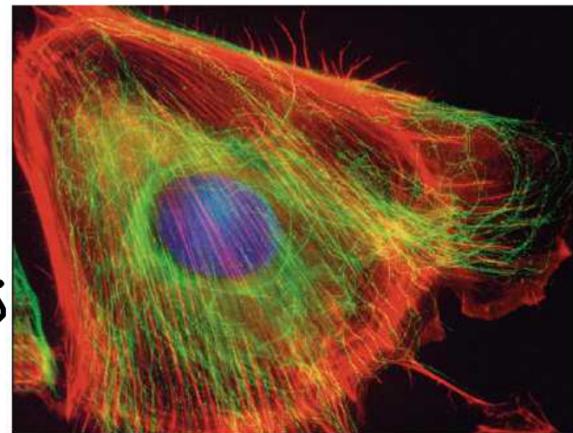


3.2 Cell Organelles

Cells have an internal structure.

- The cytoskeleton has many functions.
– supports and shapes cell
– helps position and transport organelles
– provides strength
– assists in cell division
– aids in cell movement
– include:
 - microfilaments
 - microtubules

(mostly animal cells)

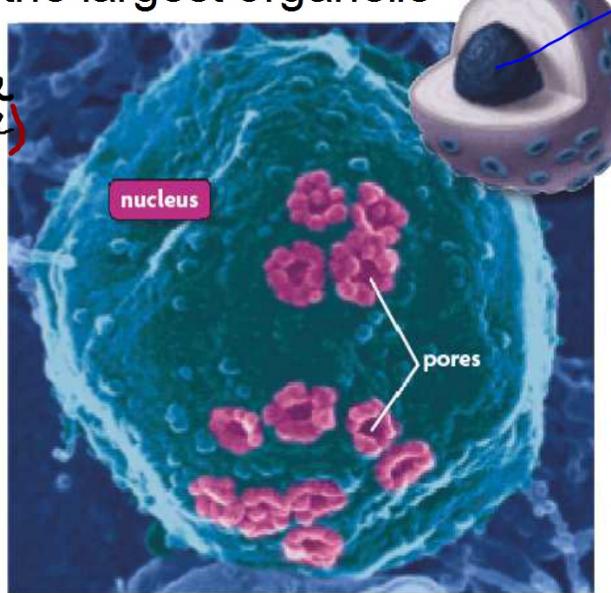


3.2 Cell Organelles

- ▶ Several organelles are involved in making and processing proteins.

- The nucleus stores genetic information.
Usually the largest organelle

nuclear envelope
(membrane)



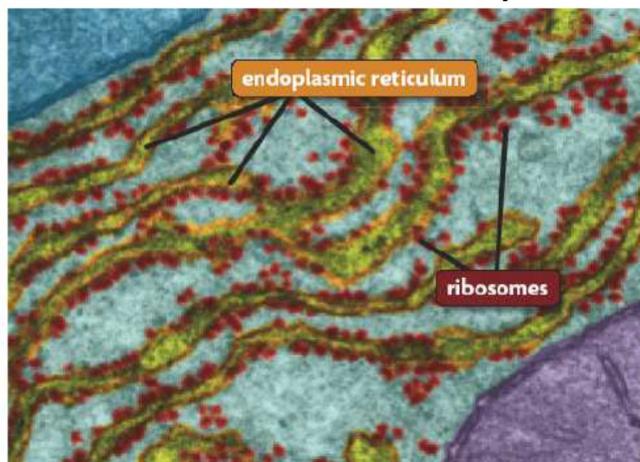
nucleolus
make rib

3.2 Cell Organelles

- Several organelles are involved in making and processing proteins.

- The nucleus stores genetic information.
- Many processes occur in the endoplasmic reticulum.

A series of folded membranes that process and package pro



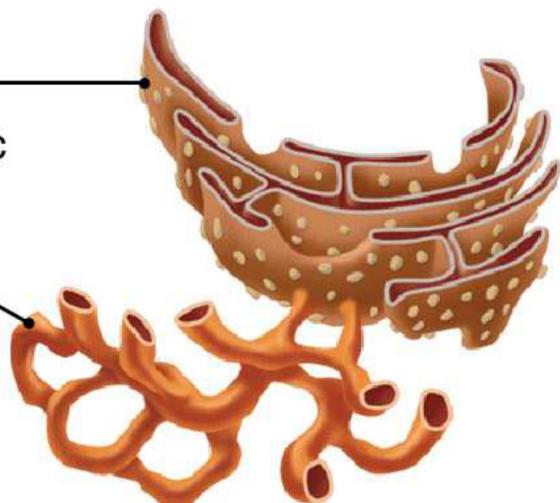
Transports protein throughout the ce

- Smooth ER packages proteins (lipids)

3.2 Cell Organelles

- ▶ Several organelles are involved in making and processing proteins.

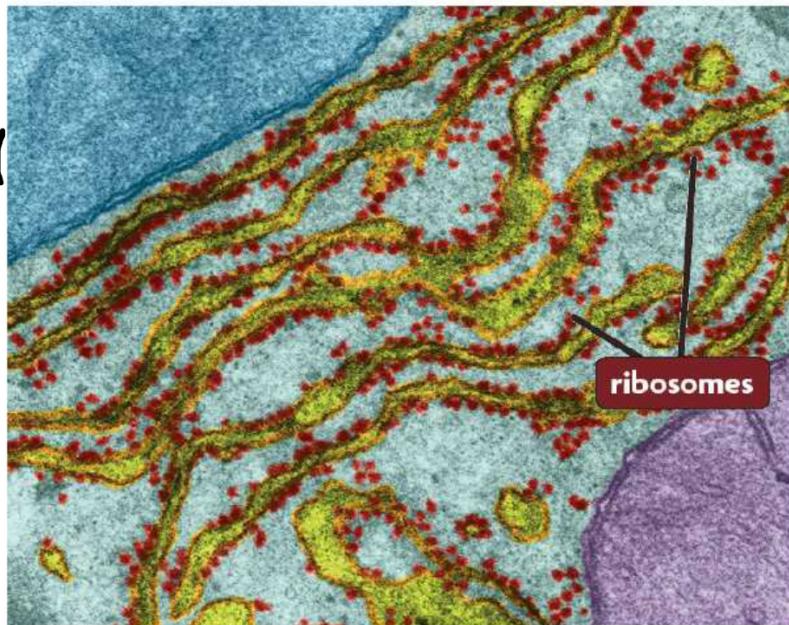
- The nucleus stores genetic information.
- Many processes occur in the endoplasmic reticulum.
- There are two types of endoplasmic reticulum.
 - rough endoplasmic reticulum
 - smooth endoplasmic reticulum



3.2 Cell Organelles

- ▶ Several organelles are involved in making and processing proteins. (continued) *smallest organelle*
- Ribosomes link amino acids to form proteins.

free or attached

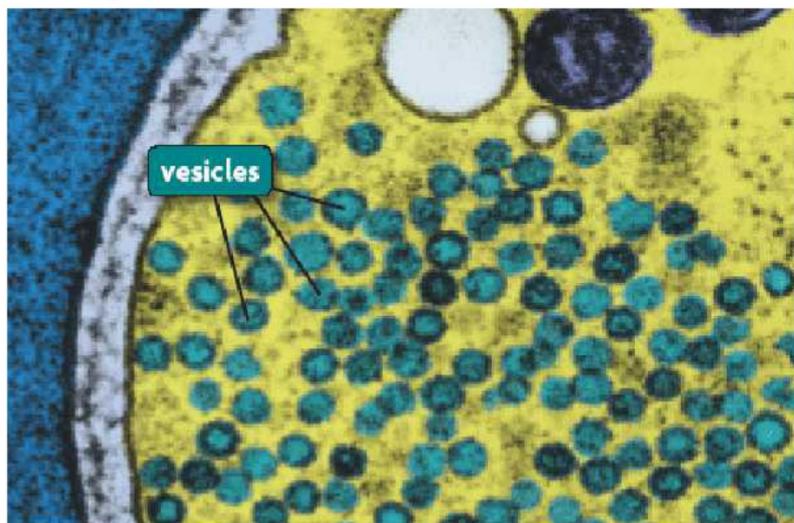


3.2 Cell Organelles

- ▶ Several organelles are involved in making and processing proteins. (continued)

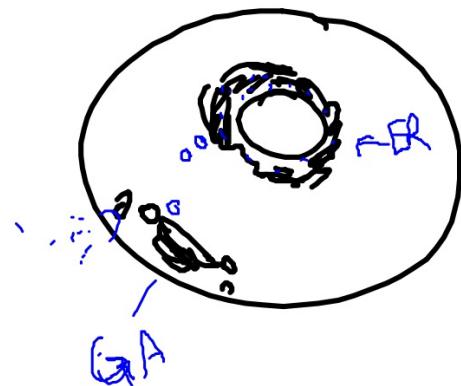
- Ribosomes link amino acids to form proteins
- Vesicles are membrane-bound sacs that hold materials.
(vesse!s)

proteins!
very



Golgi Apparatus -
(complex)
(body)

Series of folded
membranes that
finalize processing
of proteins; Packin
for transport out
of the cell



3.2 Cell Organelles

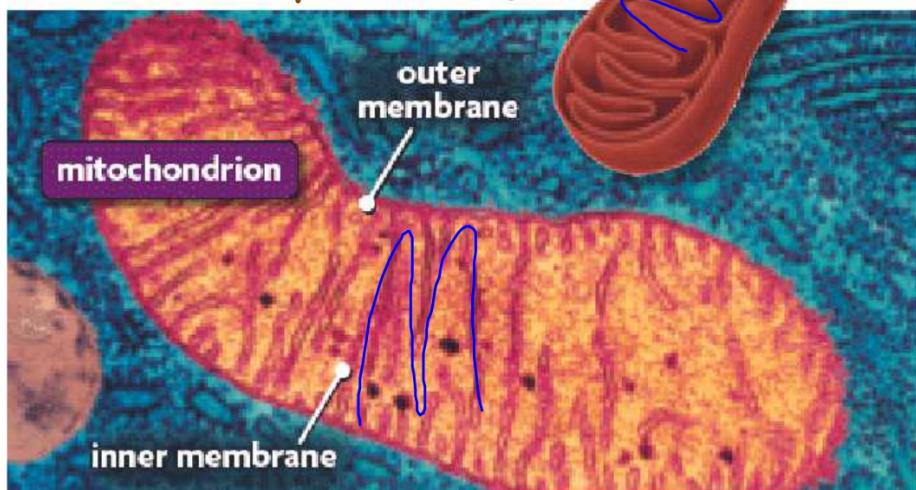
► Other organelles have various functions.

- Mitochondria supply energy to the cell.

Site for cellular respiration



ATP energy (Co₂)



3.2 Cell Organelles

► Other organelles have various functions.

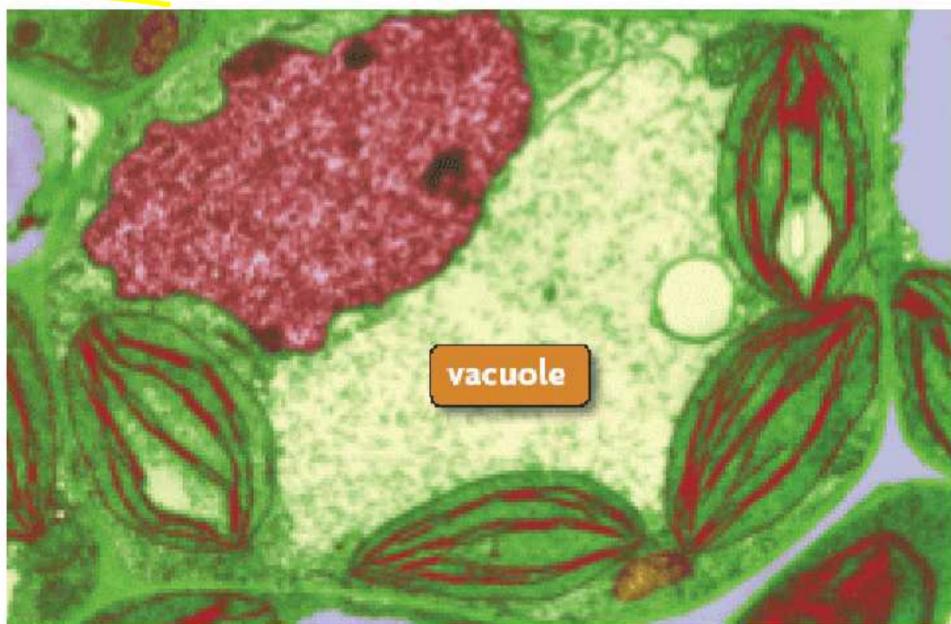
- Mitochondria supply energy to the cell.
- Vacuoles are fluid-filled sacs that hold materials.

Contractile vac

Storage org

water

Sugars
Salts
wastes



3.2 Cell Organelles

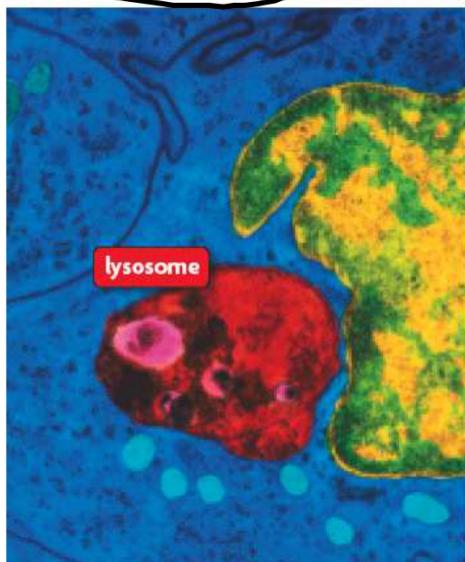
Other organelles have various functions.

Both

- Mitochondria supply energy to the cell.
- Vacuoles are fluid-filled sacs that hold materials.

Both

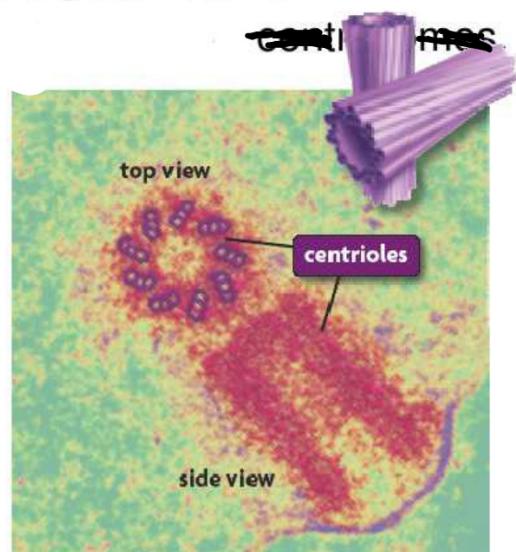
Lysosomes contain enzymes to digest material. digestive org



3.2 Cell Organelles

► Other organelles have various functions.

- Mitochondria supply energy to the cell.
- Vacuoles are fluid-filled sacs that hold materials.
- Lysosomes contain enzymes to digest material.
- Centrioles are tubes.
 - Centrioles help divide DNA. during mitosis

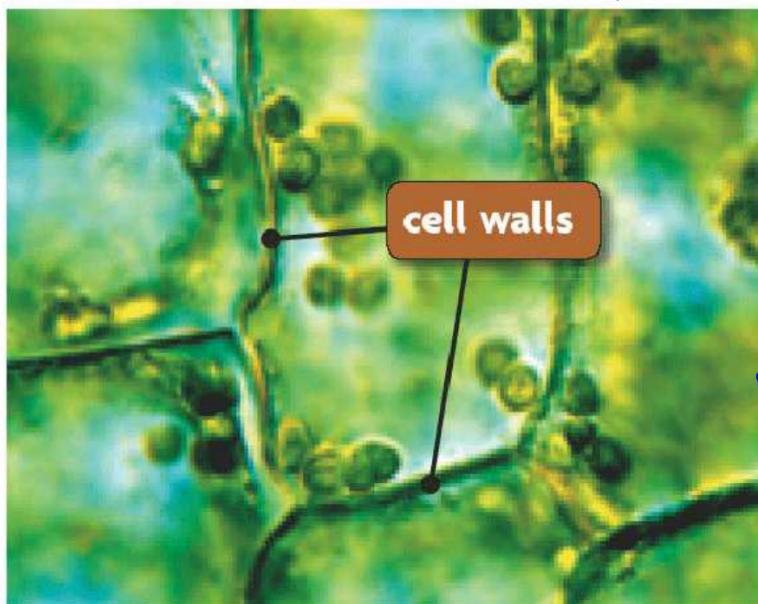


3.2 Cell Organelles

- Plant cells have cell walls and chloroplasts.

- A cell wall provides rigid support.

cellulose / chitin



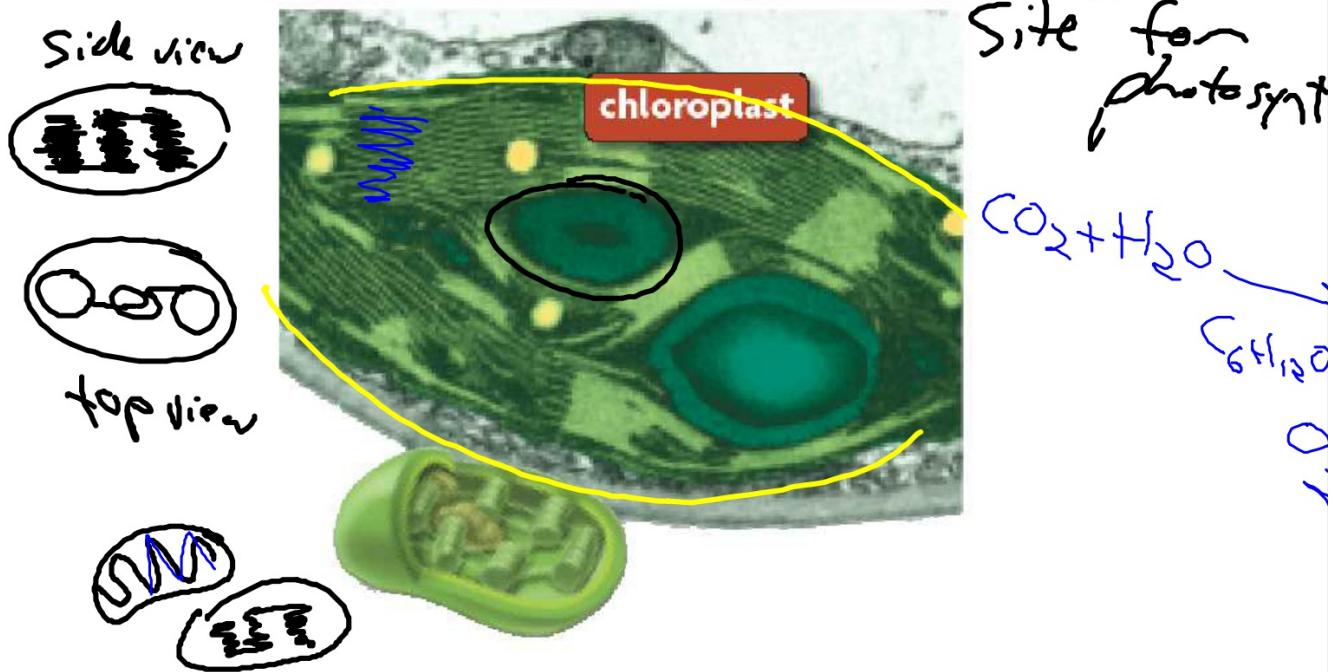
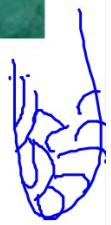
p.74

3.2 Cell Organelles

- Plant cells have cell walls and chloroplasts.

Plants A cell wall provides rigid support.

Plants Chloroplasts convert solar energy to chemical energy.



Cytoplasm - jelly-like substance
that fills the cell
All Site for enzymatic reaction
Supports organelles

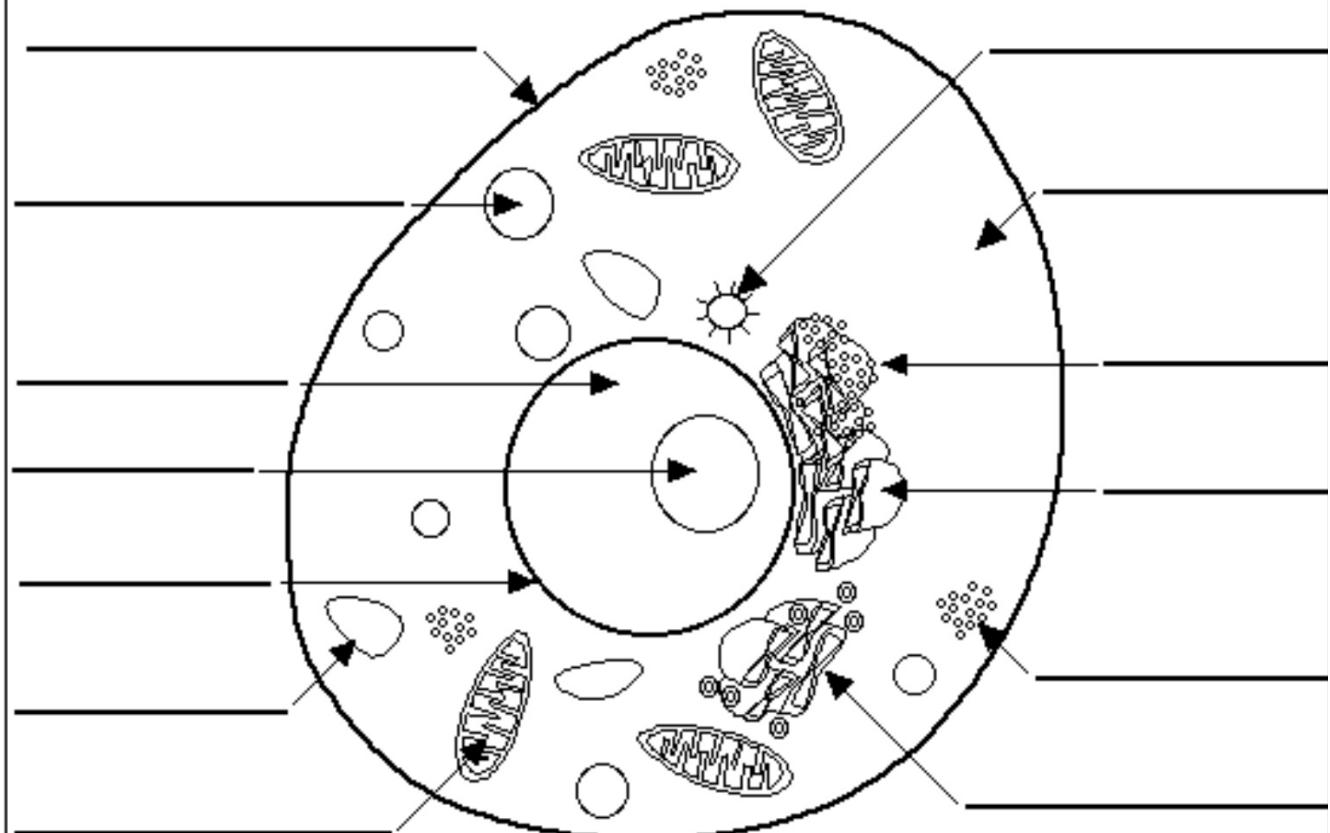
Nucleolus - makes ribosomes (found inside nucleus)

Golgi apparatus - Series of folded membranes
(complex)
(body) finalize processing of proteins and package for transport

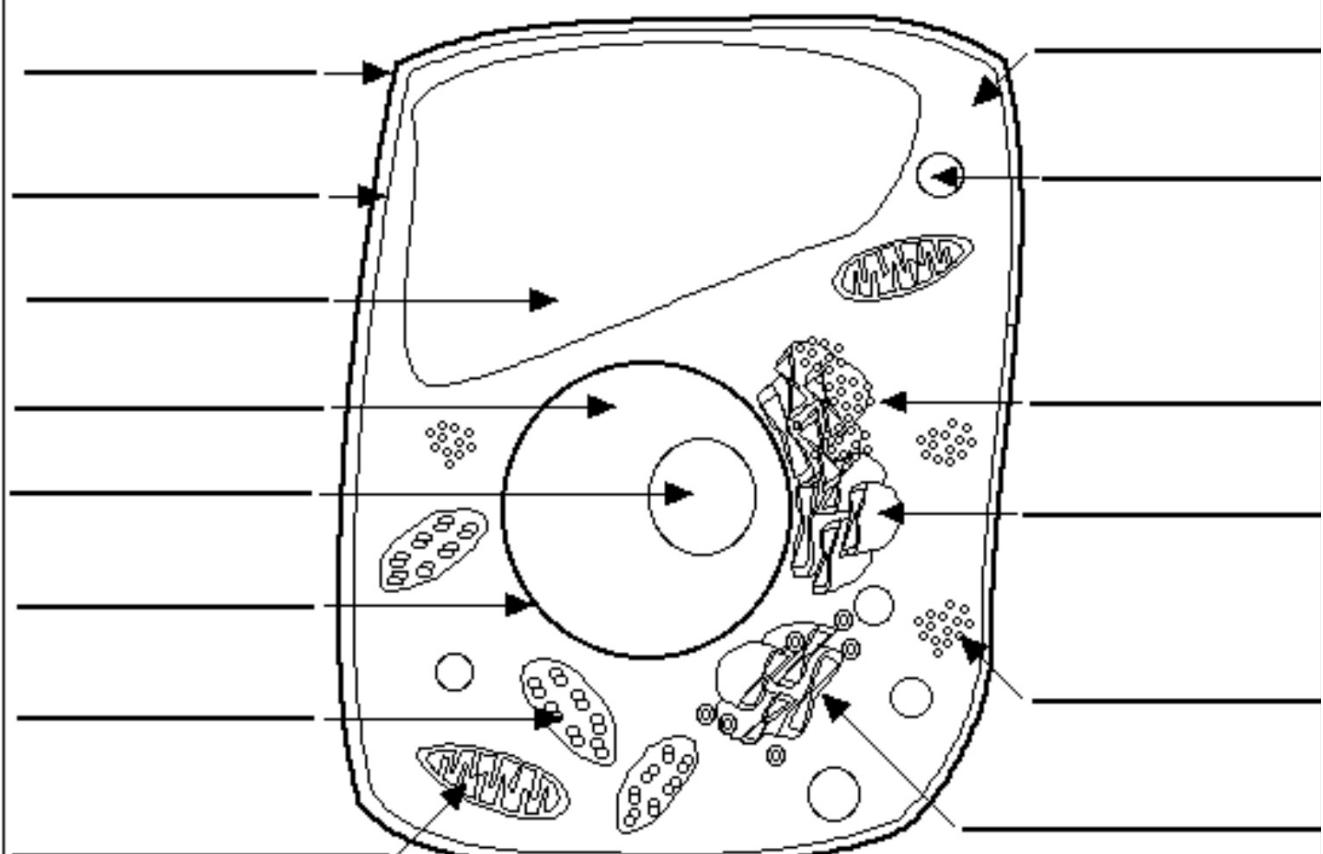
Cell membrane -
All protective layer found near cell membrane
Controls what goes in/out the cell

Outside the cell

Cross-Section of an Animal Cell

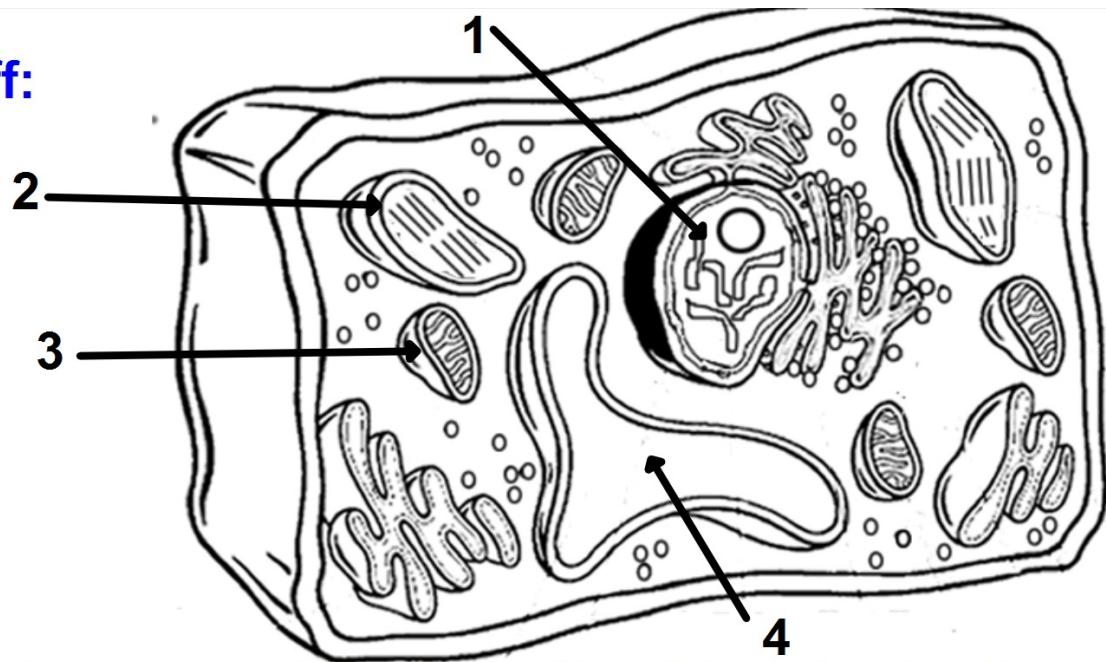


Cross-Section of a Plant Cell



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Kickoff:



1. Which organelle is the site of respiration for making energy? (Write the name and the number from above)
2. What type of cell is this, prokaryotic or eukaryotic? If eukaryotic, is it a plant or animal cell?

Subway

What is a Cell?

Cells are the basic unit of life for all living organisms.

Animal's
Plant's
Protist
Fungi



Animal Cell



Plant Cell

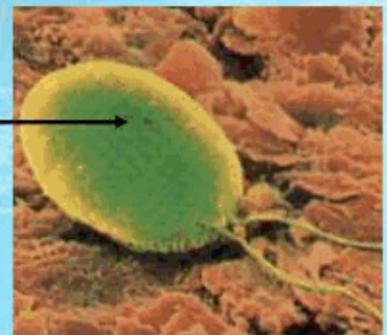
P
Bacteria
Archae



Bacterial Cell

Number of Cells

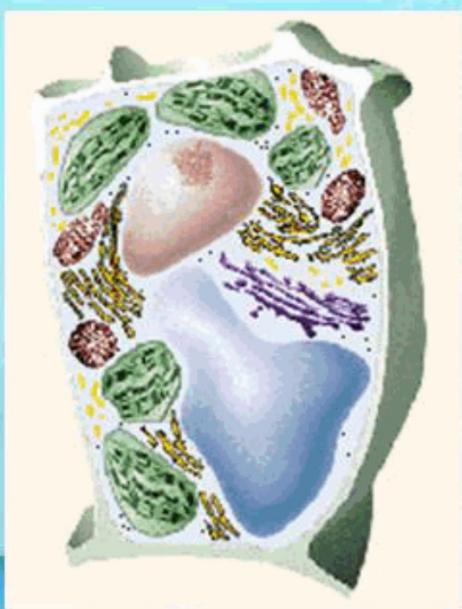
1. Unicellular organisms-
composed of one cell



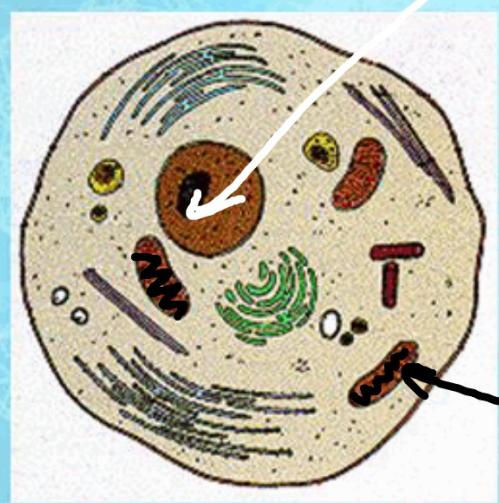
2. Multicellular organisms-
composed of many cells



Two Main Types of Eukaryotic Cells



Plant Cell



Animal Cell

nucleus

mitochondria

Organelles

- ↗ **Specialized parts of the eukaryotic cell that have specific functions within the cell.**

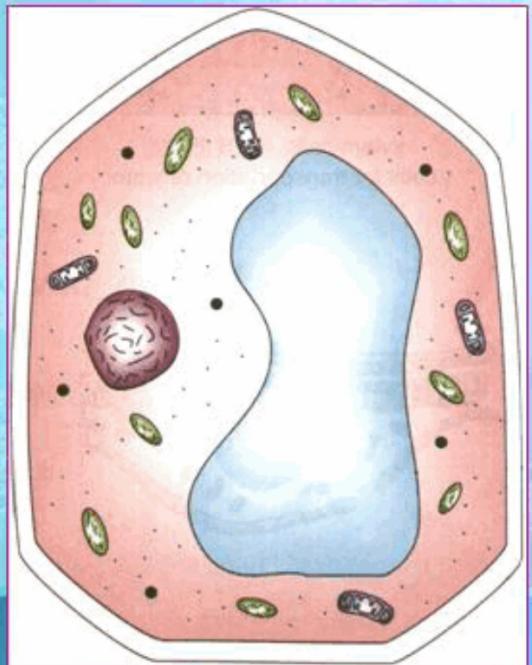
PARTS OF THE EUKARYOTIC CELL

Organelle | function

(Plasma)

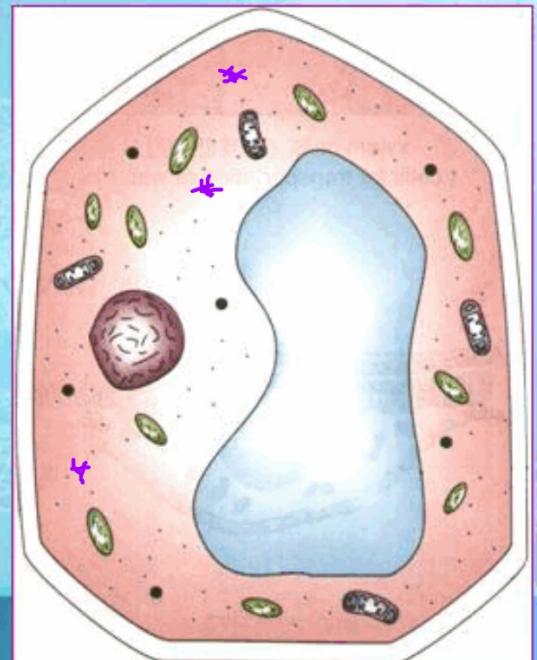
1. CELL MEMBRANE

- Phospholipid bi-layer
- Selectively permeable
- Controls the movement of materials into and out of the cell



2. Cytoplasm

- **Jelly-like substance fills up the cell & suspends the organelles.**
- **Site of Many metabolic reactions**
enzymatic



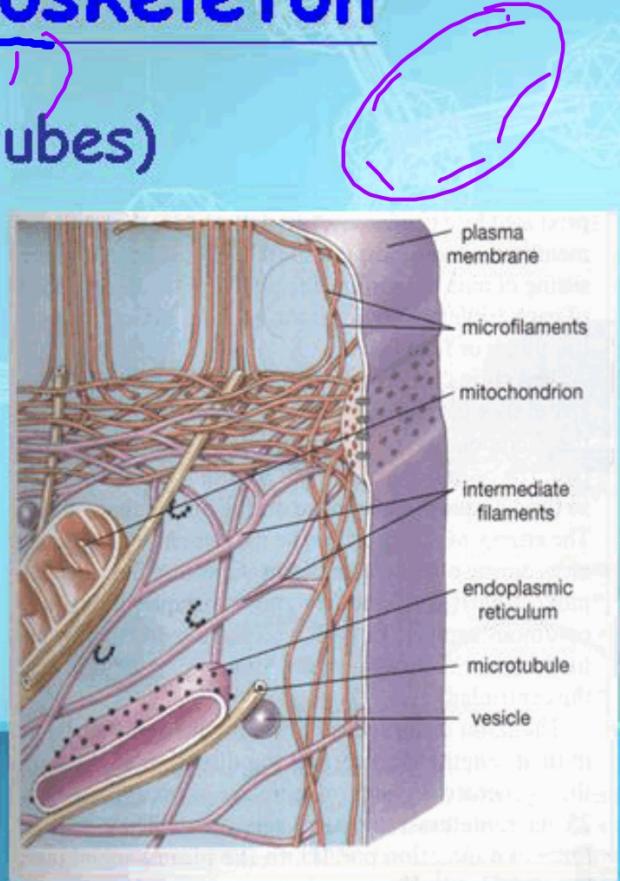
3. Cytoskeleton

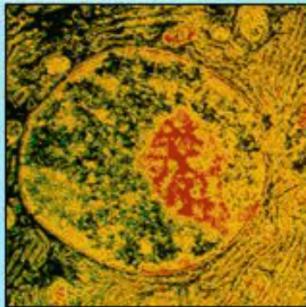
(animal)

Microtubules (hollow tubes)

& microfilaments
(solid fibers) that
form a framework
for the cell.

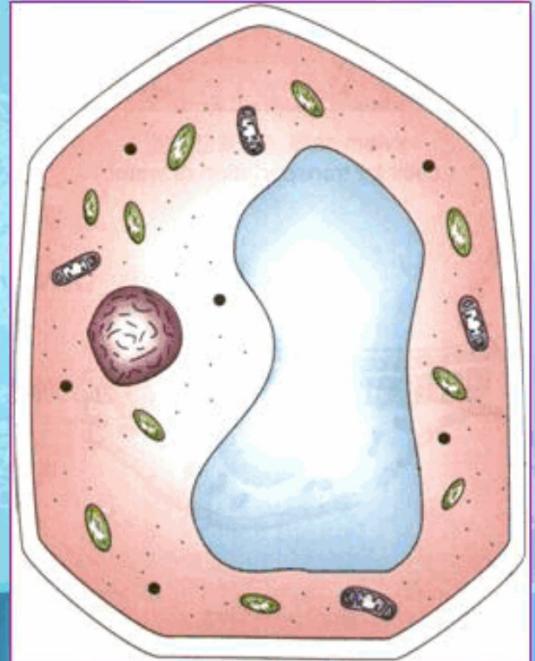
- helps in movement
- gives shape
- especially important
during cell division





4. Nucleus

- Controls cell processes.
- Bounded by a nuclear membrane
With nuclear pores



5. DNA

- Chromatin – long, tangled strands of DNA
- Chromosomes – tightly coiled DNA & protein.

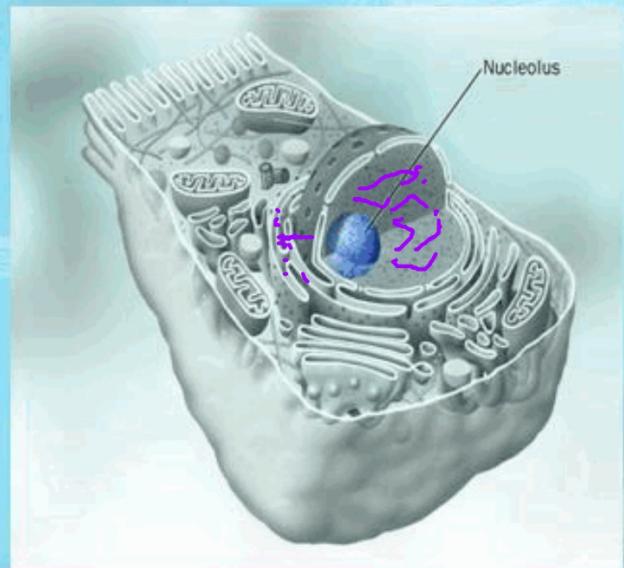


DEOXYRIBONUCLEIC ACID

6. Nucleolus

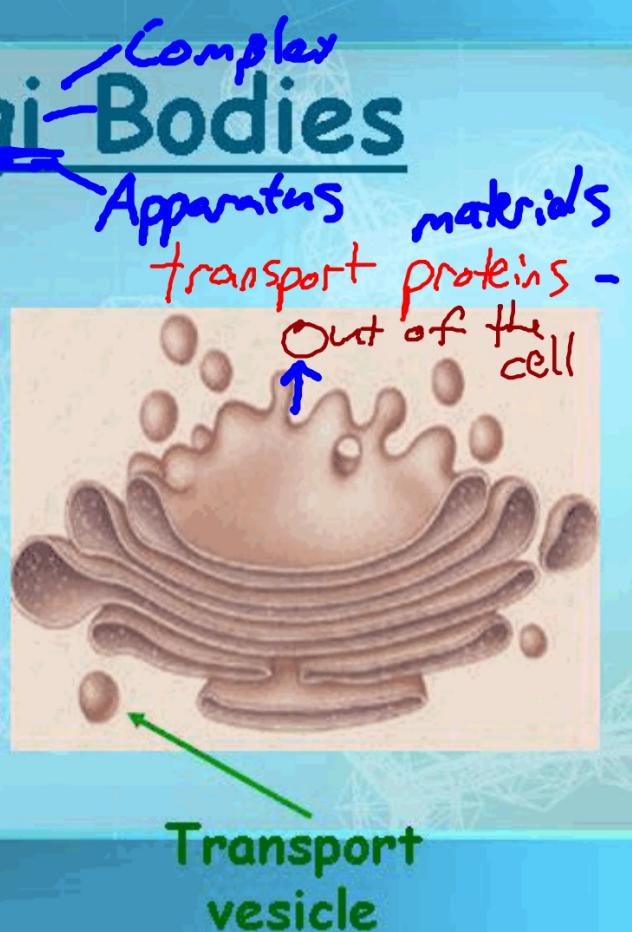
Makes ribosomes

- Cell may have 1 to 3 nucleoli
- Inside nucleus
- Disappears when cell divides
- Makes ribosomes that make proteins



7. Golgi Bodies

- Stacks of flattened sacs
- Receive, modify, and ship proteins made by the cell
- **Vesicles** - small membrane bound sacs that pinch off the Golgi & transport proteins out of the cell

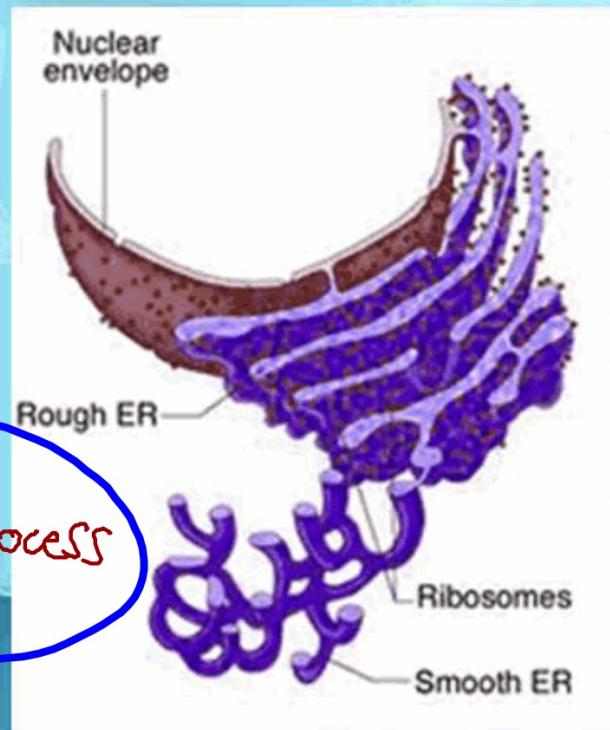


8. Smooth & Rough Endoplasmic Reticulum

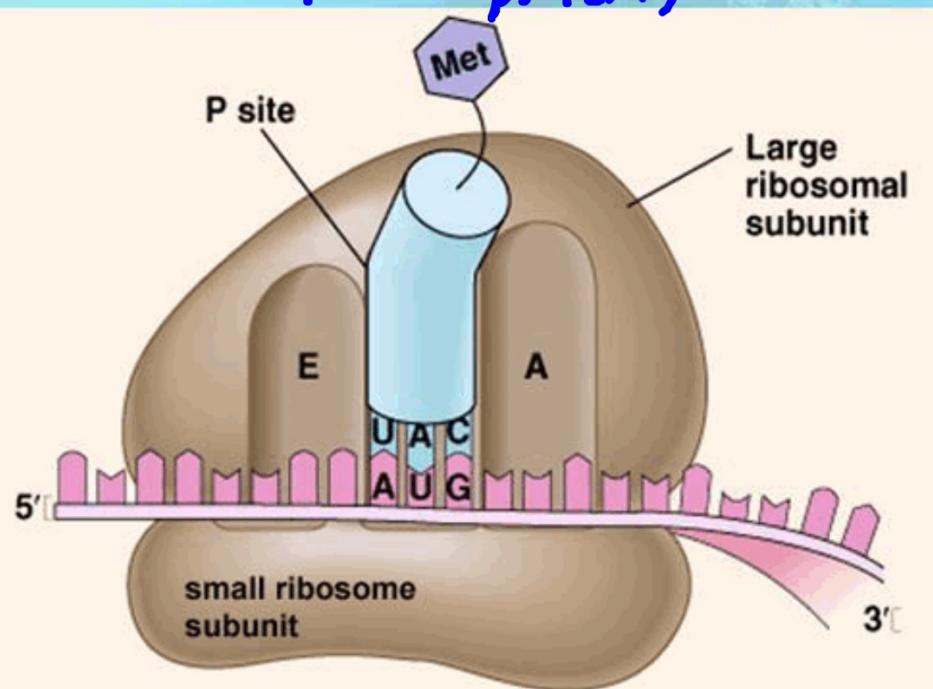
- **Smooth ER** lacks ribosomes & makes lipids

- **Rough ER** has ribosomes & makes proteins

~~Transport~~ Package/process
proteins "Cell Highway"

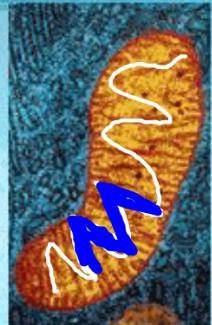


Ribosomes – site of making proteins *make proteins*

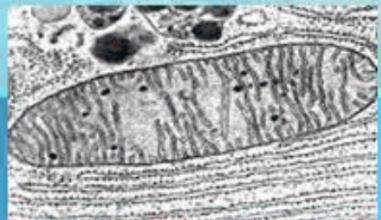


9. Mitochondria

*pl.
(ON) sing.*

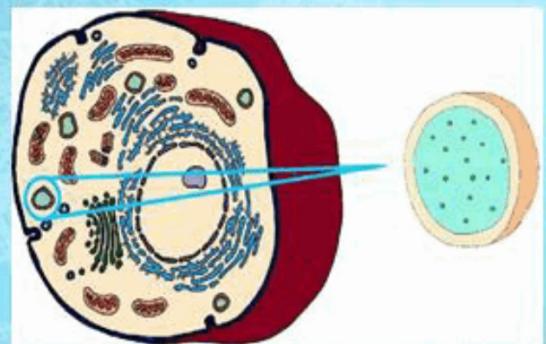


- Site of Cellular respiration
- "Powerhouse"
- Uses glucose to make energy/ATP
- Has an outer membrane & a folded inner membrane (cristae)
- Active cells have many mitochondria.



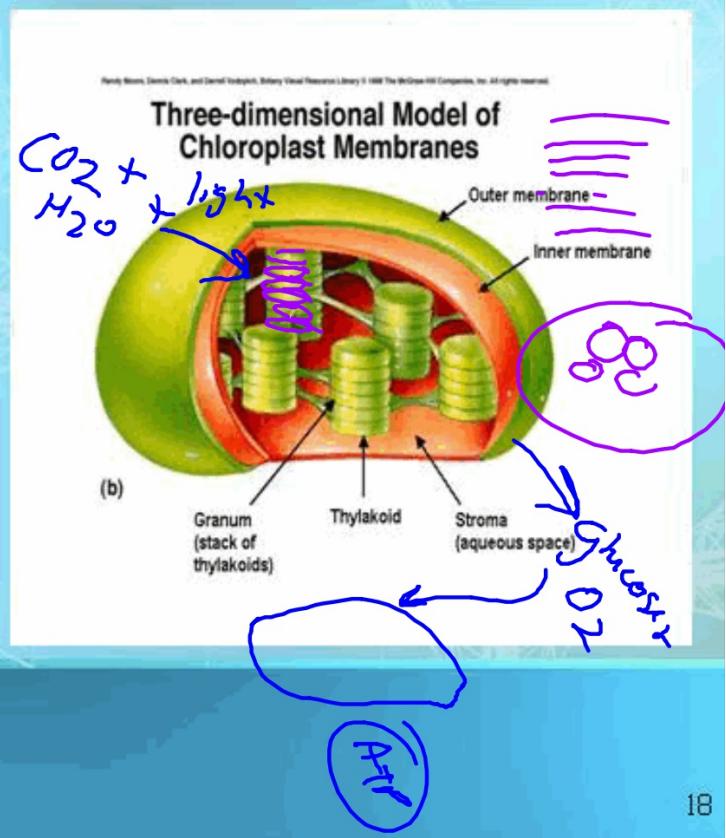
10. Lysosome

- Contains digestive enzymes
- Breaks down food and worn out cell parts
- Programmed for cell death (lyse & release enzymes to break down & recycle cell parts)



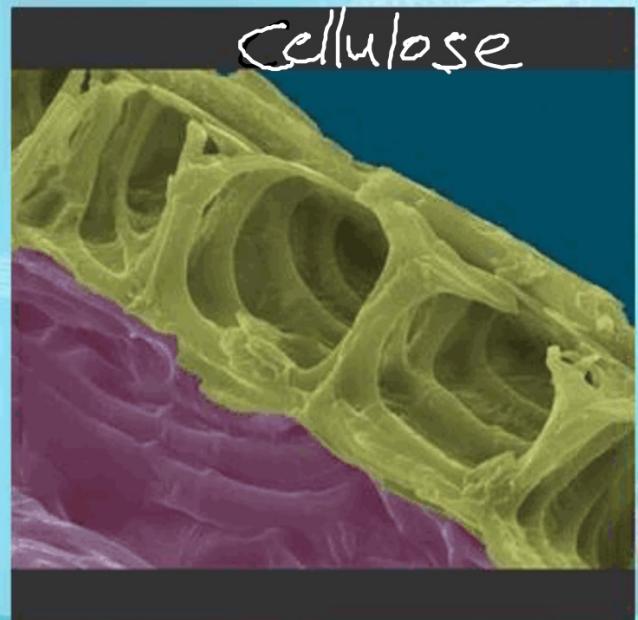
11. Chloroplast

- Contains green pigment **chlorophyll**
- Traps sunlight to make to make **glucose sugar (food)**
- Photosynthesis
- Only found in plant cells



12. Cell Wall

- Found in plants and fungus
- Provides shape and support; strong & rigid
- Protects the plants
- Made of cellulose



13. Vacuole

- Plants have a large central vacuole
- Stores water, sugar, salts, nutrients & wastes

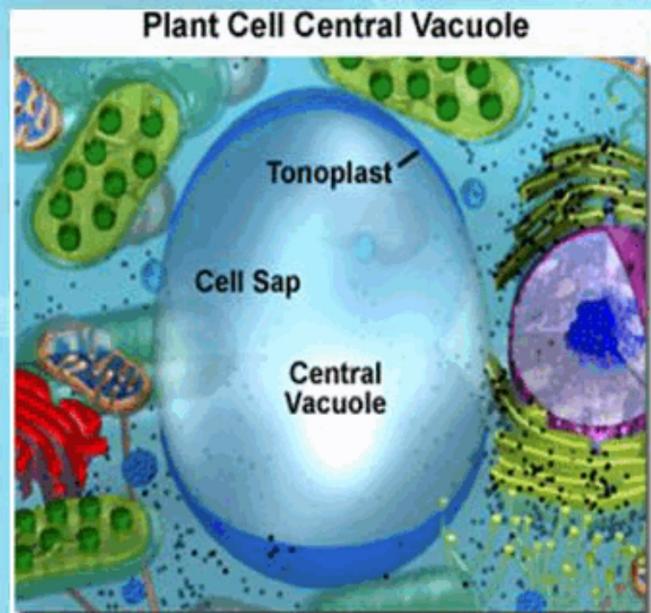
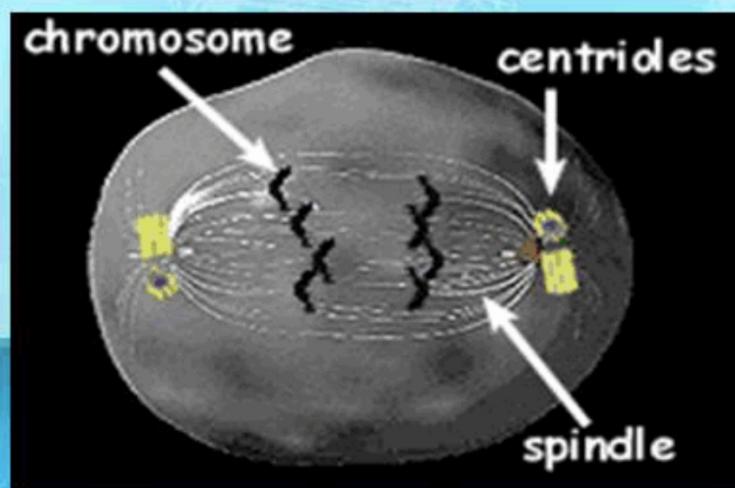


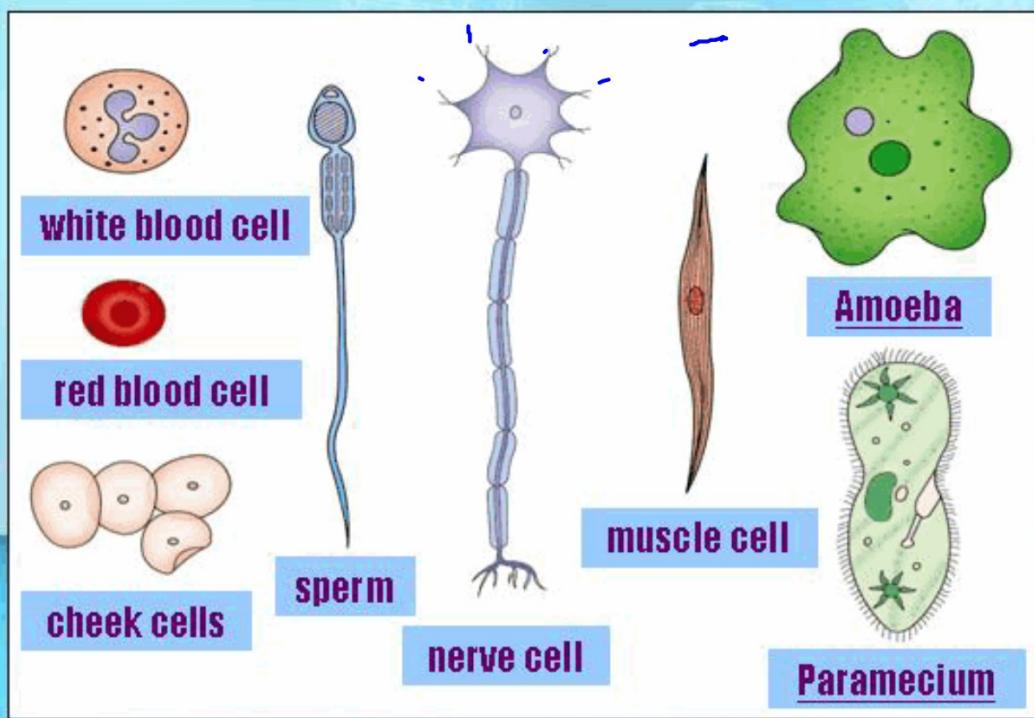
Figure 1

14. Centrioles

- Only found in animal cells
- Paired structures made of microtubules
- Helps the cell divide



Different kinds of animal cells



<u>organelle</u>	<u>function</u>
1. cell membrane	protects, controls what goes in or out of the cell
2. cytoplasm	fills the cell, holds organelles
3. nucleus	control center, holds DNA
4. endoplasmic reticulum	packages materials (smooth, rough)
5. ribosomes	make proteins
6. Golgi body {complex apparatus}	exports materials OUT

<u>Organelle</u>	<u>function</u>
7. mitochondria	makes energy 
8. Lysosome	digestive organelle (break down materials)
9. chloroplast	site of photosynthesis makes sugar
10. Cell wall	structural + support protection 
11. vacuole	storage organelle

Similarities between plant cells and animal cells

Both have a cell membrane surrounding the cytoplasm

Both have a nucleus

Both contain mitochondria

Differences between Plant Cells and Animal Cells

Animal cells

NO Chloroplast

Small
vacuole/vacuole
absent

NO CELL WALL

Plant cells

chloroplast

Large Central
Vacuole

Cell Wall

Differences between Plant Cells and Animal Cells

Animal cells

Has Centrioles

Glycogen as food storage

Nucleus at the center

Plant cells

No Centrioles

Starch as food storage

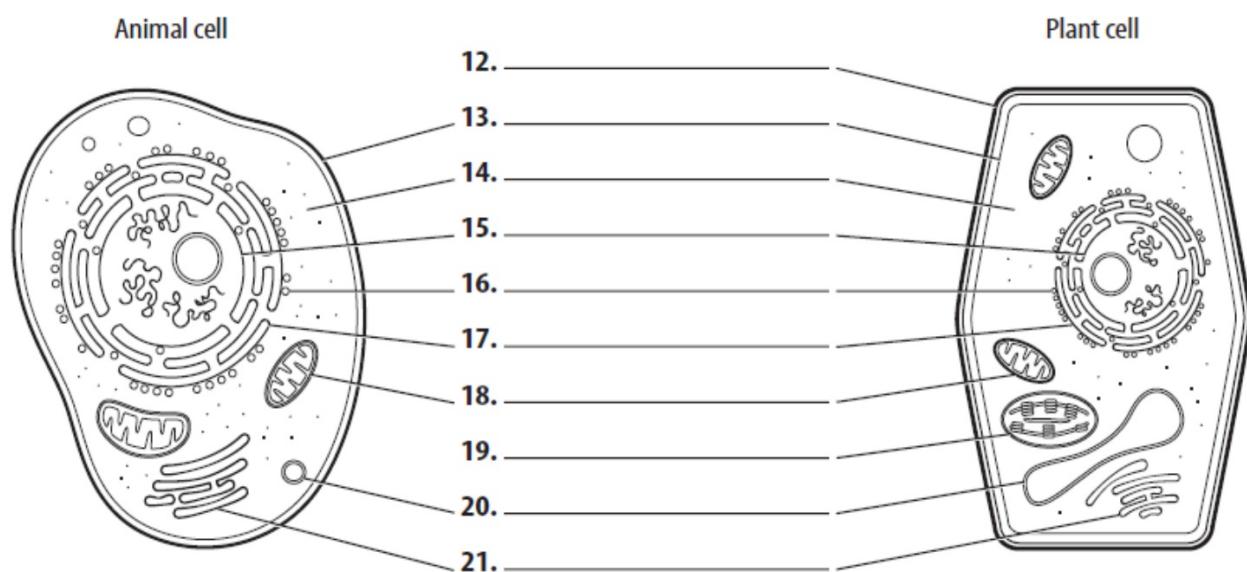
Nucleus near cell wall

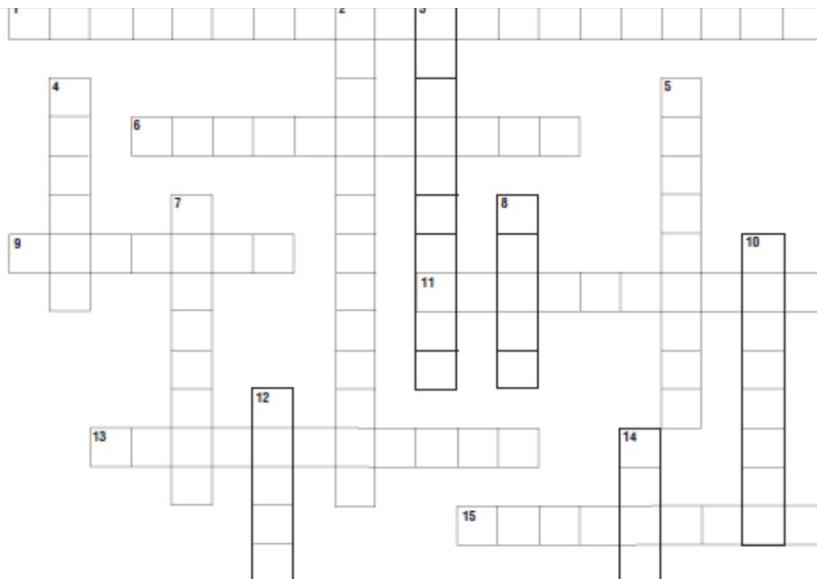
<u>Structure</u>	<u>Function</u>
cytoplasm	- gives shape, support cytoskeleton, helps cell move contains all organelles
cell membrane	- protects cell, controls what goes in/out
cell wall	- provides support/protection for plants, fungi, algae + bacterial cells
nucleus	- has all instructions for cell processes, has DNA
chloroplast	- makes food from sunlight (photosynthesis)
mitochondria	- makes energy from food (respiration)
ribosomes	- makes proteins
endoplasmic reticulum	- packages proteins
Golgi bodies	- transports proteins
vacuole	- storage organelle
lysosome	- digestive organelle (enzymes)

Directions: Complete the following table using the correct cell part or function.

Cell part	Function
1.	gelatinlike mixture that flows inside the cell membrane
cell membrane	2.
3.	directs all cell activities
endoplasmic reticulum	4.
5.	makes protein
6.	releases energy stored in food
chloroplast	7.
cell wall	8.
9.	stores water, waste products, food, and other cellular materials
Golgi bodies	10.
11.	breaks down food molecules, cell wastes, and worn-out cell parts

Directions: Study the following diagrams. Then identify each part by filling in the blanks in the center.



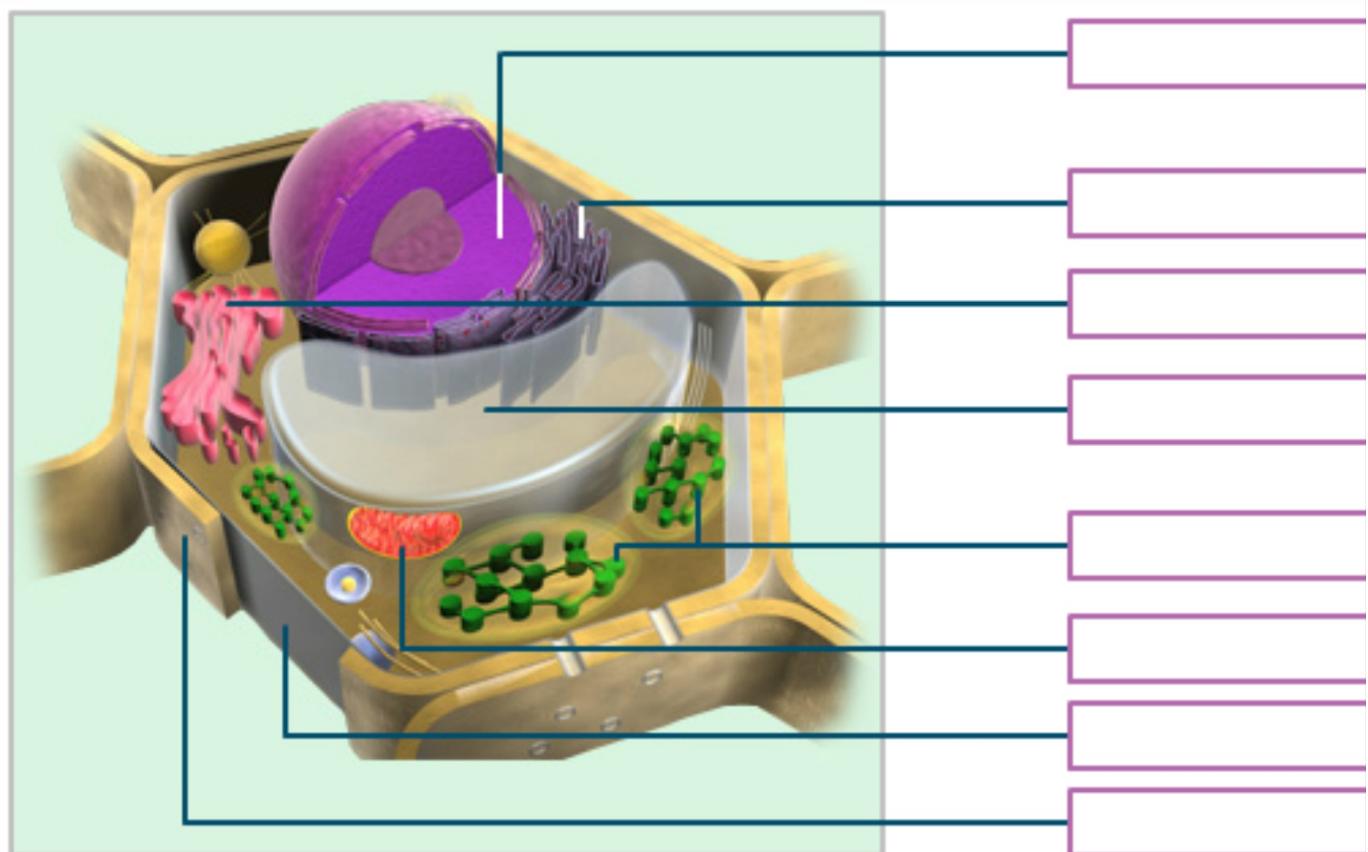


Across

1. A series of folded membranes that move materials around in the cell
6. Green organelles in the cytoplasm of plant cells
9. Directs all the activities of the cell
11. Structures within the cytoplasm of eukaryotic cells
13. Flattened membranes that package cellular substances for export
15. Small, two-part structures in cells that make proteins
3. Summary of scientists' observations and conclusions about cells
4. A group of similar cells that work together to do one job
5. Gelatinlike mixture inside the cell membrane
7. Encloses the cells of plants, algae, fungi, and most bacteria
8. A structure made up of different types of tissues that work together
10. Protective outer covering around all cells
12. A strand of hereditary material surrounded by a protein coating
14. Cell in which a virus multiplies itself

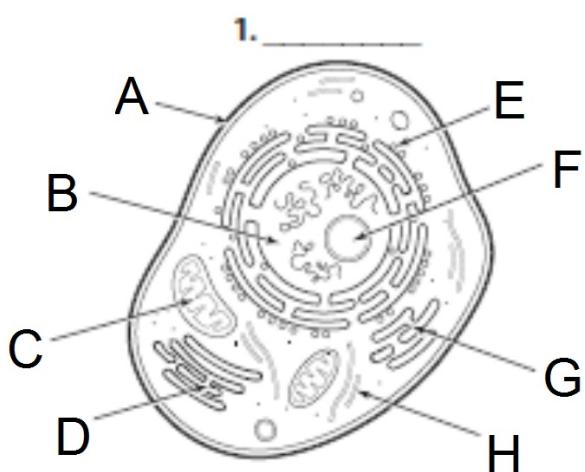
Down

2. Organelle where energy is released from broken-down food molecules

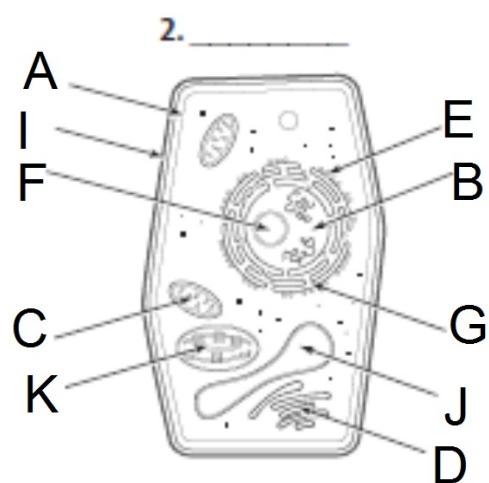


- | | |
|-------------------------------|---|
| 1. _____cell wall | A. cell's control center |
| 2. _____cell membrane | B. stores water and other materials |
| 3. _____nucleus | C. makes food using sunlight |
| 4. _____mitochondria | D. hooks amino acids together to make proteins |
| 5. _____chloroplast | E. packages proteins, makes lipids |
| 6. _____Golgi complex | F. breaks down food molecules to make ATP (energy) |
| 7. _____endoplasmic reticulum | G. provides strength and support for plant cell |
| 8. _____ribosome | H. digests food particles, wastes, old cell parts, and foreign invaders |
| 9. _____lysosome | I. processes and transports materials out of the cell |
| 10. _____vacuole | J. acts as a barrier between the cell and its environment |
| 11. _____vesicle | K. functions to aid in animal cell division, structure and shape |
| 12. _____cytoskeleton | L. transporting organelle that carries proteins and other materials |

Directions: Study the following diagrams. Write **P** above the plant cell and **A** above the animal cell. Then label the cells using the numbers of the correct terms from the list.



- 3. nucleus
- 4. cell membrane
- 5. vacuole
- 6. ribosomes
- 7. mitochondrion
- 8. cell wall



- 9. cytoskeleton
- 10. endoplasmic reticulum
- 11. chlorophyll
- 12. Golgi body
- 13. nucleolus

What is the difference between the endoplasmic reticulum and the Golgi body?

- 8. cell note-taking
on the worksheet
- 1. Lab packet
- 9. pop quiz
- 10. your book
- 2. Cell model /key
- 3. T-chart
- 4. card game
- 5. cell color sheet
- 6. graphic organizer
- 7. Study guide packet



