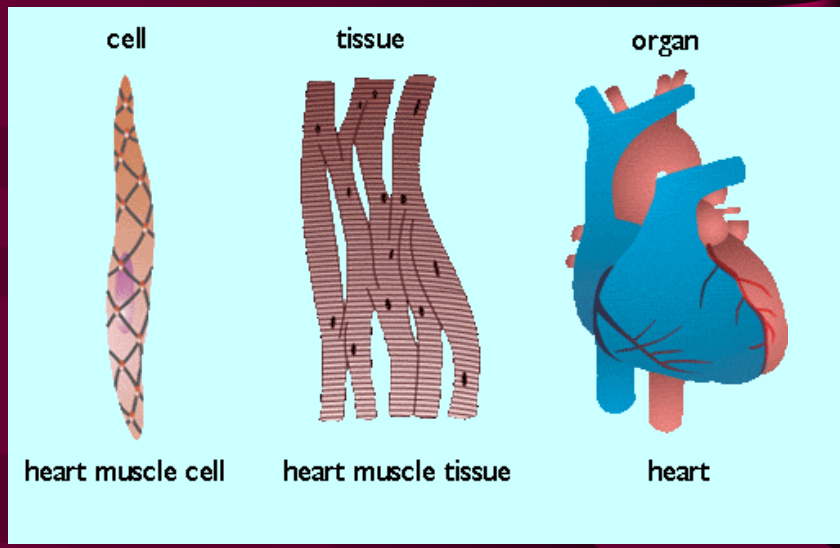
Cell Organelles

Take hand-written notes over all slides. Don't forget to sketch drawings of the organelles. Then answer the questions on the last 4 slides. I will collect the notes and answers to questions. Due date is on the website.

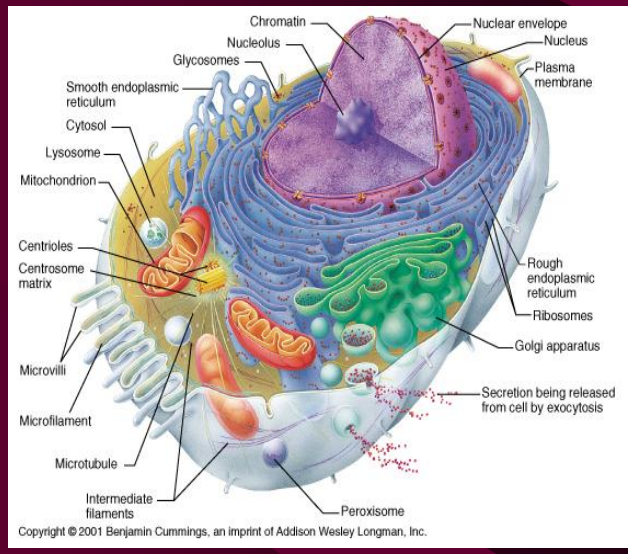
Cell Theory

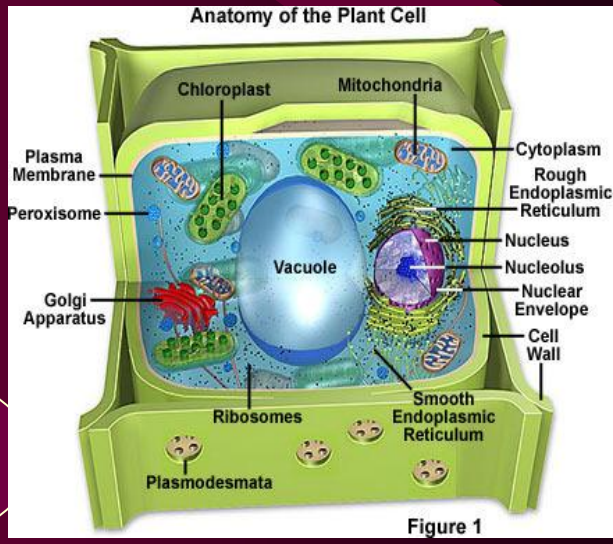
- Cells are the basic unit of life
- All organisms are made of one or more cells
- All cells arise from pre-existing cells

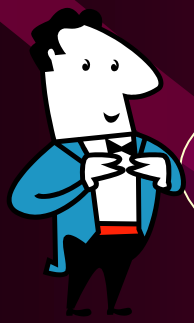


The Organelles

- "Little organs"
- Organelle function:
  - Produce energy
  - Build cellular material
  - Remove wastes
  - Transport materials.
- Plants have CHLOROPLAST. It contains CHLOROPHYLL. This is essential for PHOTOSYNTHESIS.

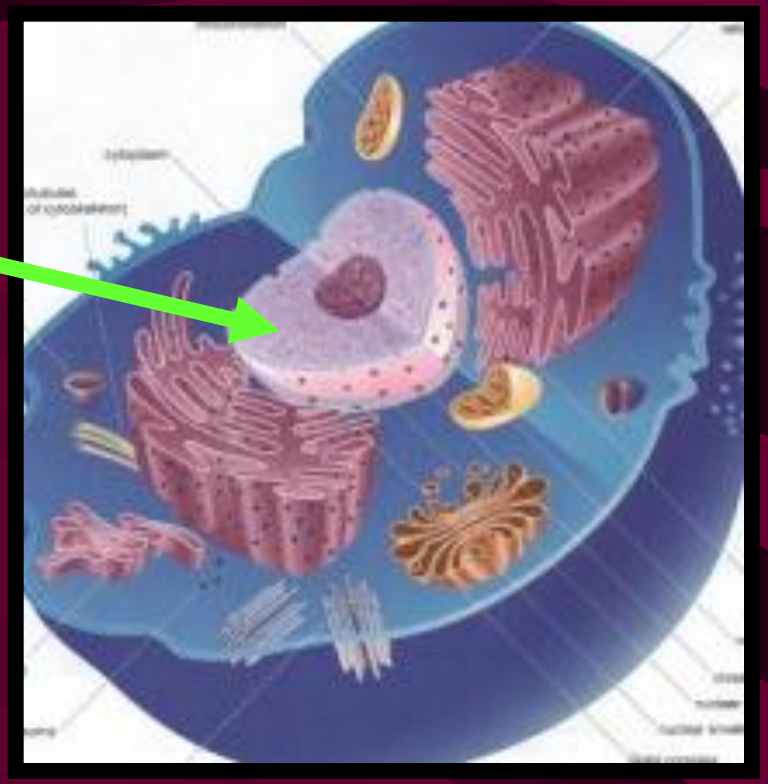






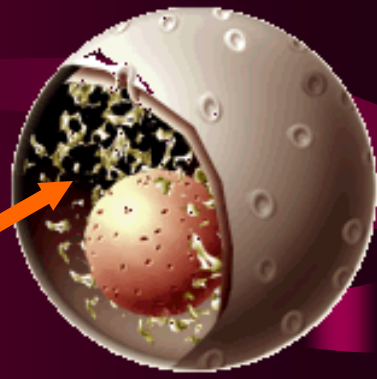
The ORGANELLES are the workers of the city. They clean, repair & build structures to help the city grow.

Nucleus



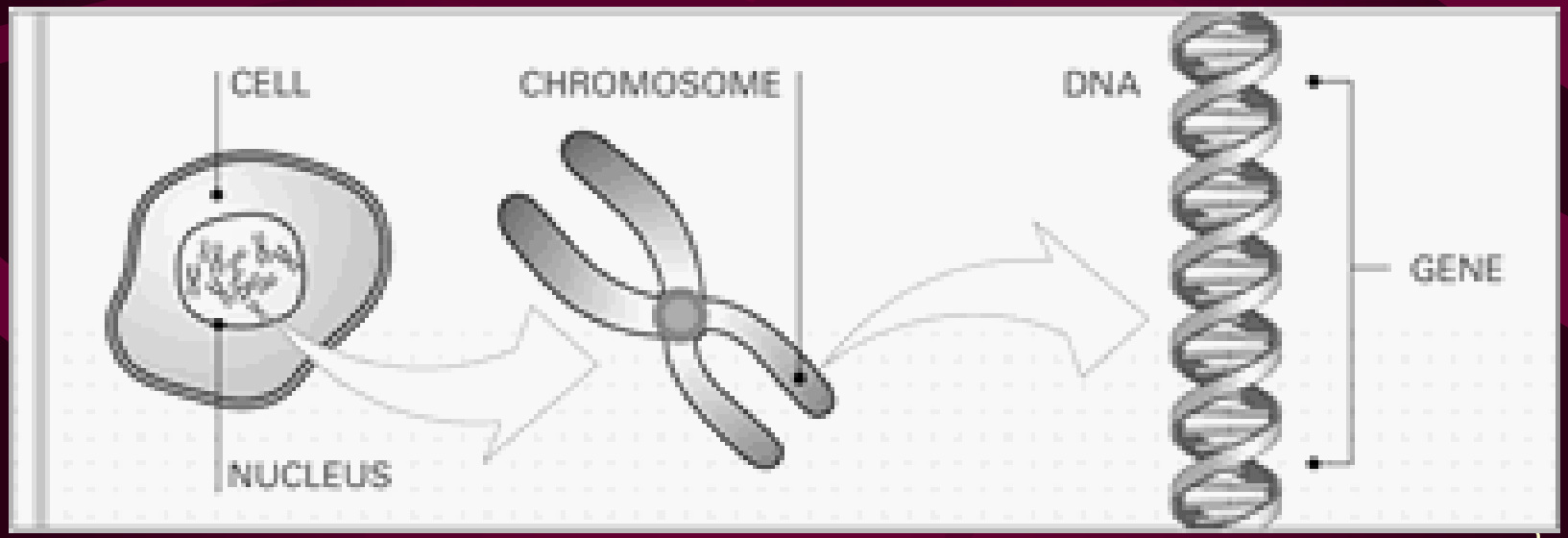
- The "brain" of the cell
- Controls all of the cellular activities
- DNA is inside the nucleus

Nucleus



CHROMOSOMES- *are found inside the nucleus*

Chromosomes - carry the information that determines what traits a living thing will have



NUCLEOLUS

- The dark area in the nucleus
- Like a tiny nucleus inside the nucleus.

PLASMA MEMBRANE

- holds the cell together
- keeps all of the pieces (like the organelles and the cytoplasm) inside the cell
- controls what goes in and out of the cell

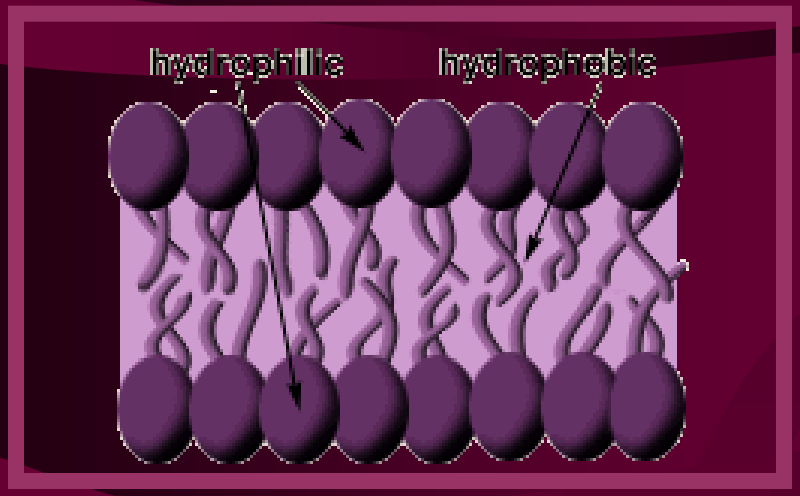
Example: like a big plastic bag with tiny holes in it

How does the cell membrane work?

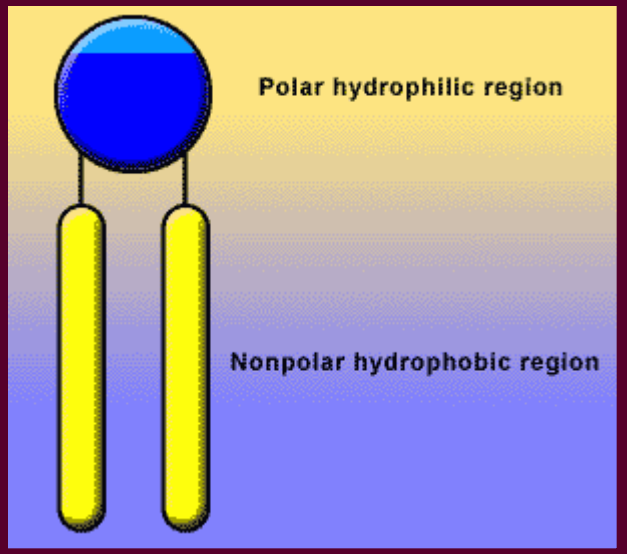
- Has 2 layers of MOLECULES = BILAYER
- Bi means two
- The layers are made up of molecules called **phospholipids**

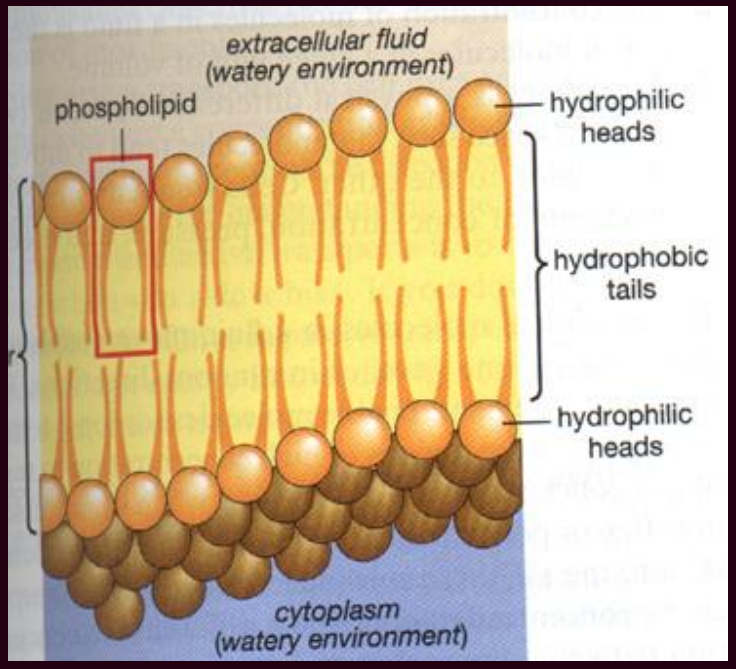
**THINK OF a sandwich with two pieces of bread and some stuffing on the inside

Cell Membrane: PHOSPHOLIPIDS



❖Each phospholipids has a **HYDROPHOBIC** and **HYDROPHILIC** end





- HYDRO = means water
- PHOBIC = means afraid
- PHILIC = means loving

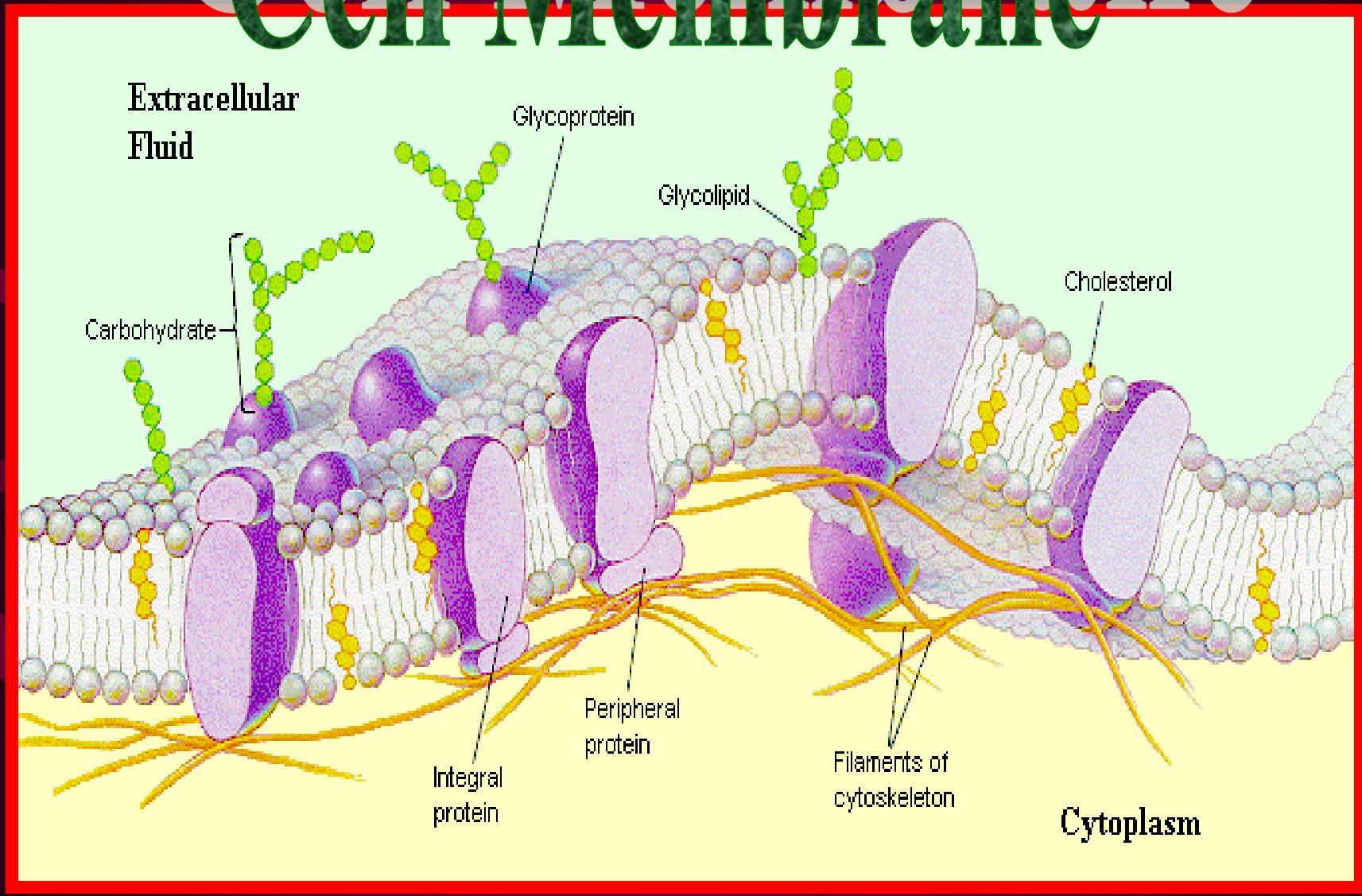
Cell Membrane: PHOSPHOLIPIDS

- One end of the molecule is "**afraid**" of the water and one end "**loves**" being in the water.

- Proteins are stuck inside the membrane

- Proteins are across the bilayer and make the holes that let ions and molecules in and out of the cell

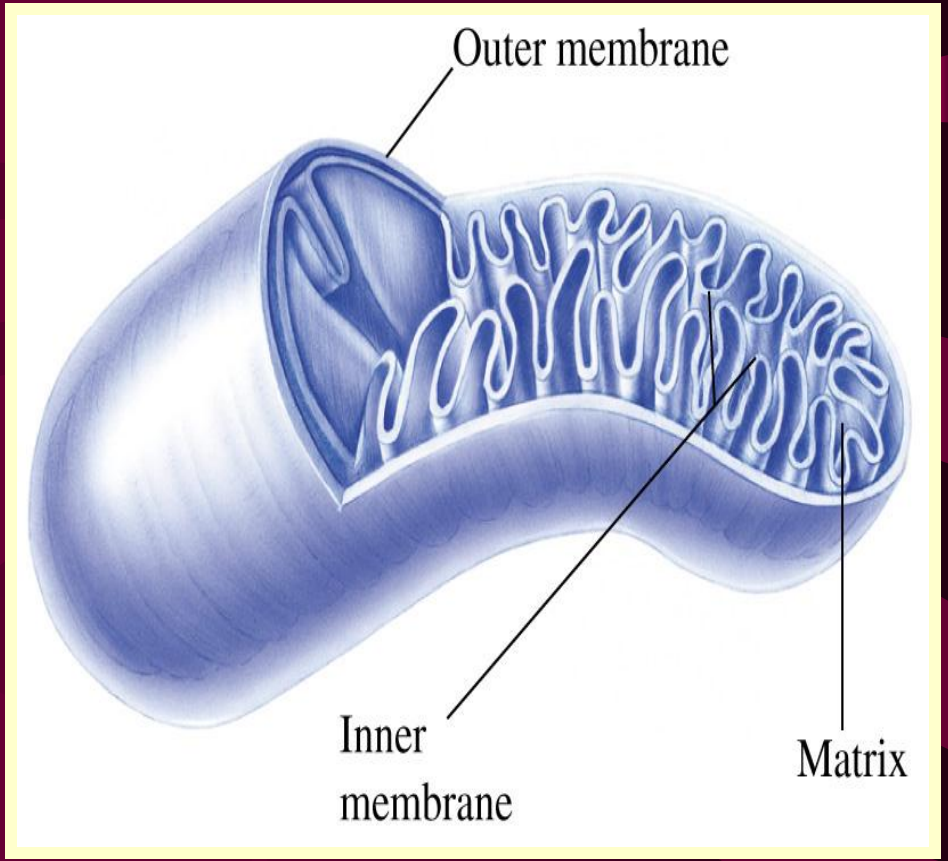
Cell Membrane



Mitochondria

- Mito = Mighty / Power
- The Power-House of the cell
- They break down food molecules so the cell has the energy to live
- If a cell needs a lot of energy…it will have more mitochondria

The Mitochondria structure has three main parts:



INNER MEMBRANE:
folds many times to increase the surface area because chemical reactions occur here

So…the more space it has the more energy it can create

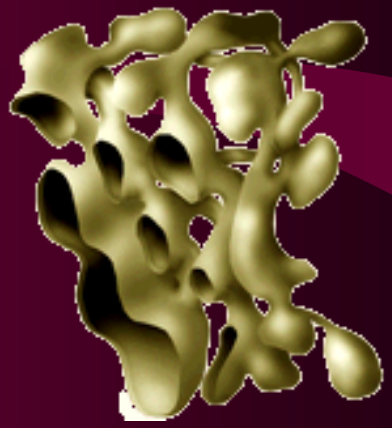
Ribosomes

- small dot-like structures in cytoplasm or on the rough ER
- site of protein synthesis in cells
- they are made in the nucleolus of the cell

Endoplasmic Reticulum

- also known as the "ER"
- made up of membranes that are in the
- There are two different
  - ✓Smooth ER
  - ✓Rough ER

Smooth ER



- Main function is to collect, maintain & transport things
- Shaped slightly tubular
- Creates steroids
- Stores Ions for the cell to keep nutrients balanced

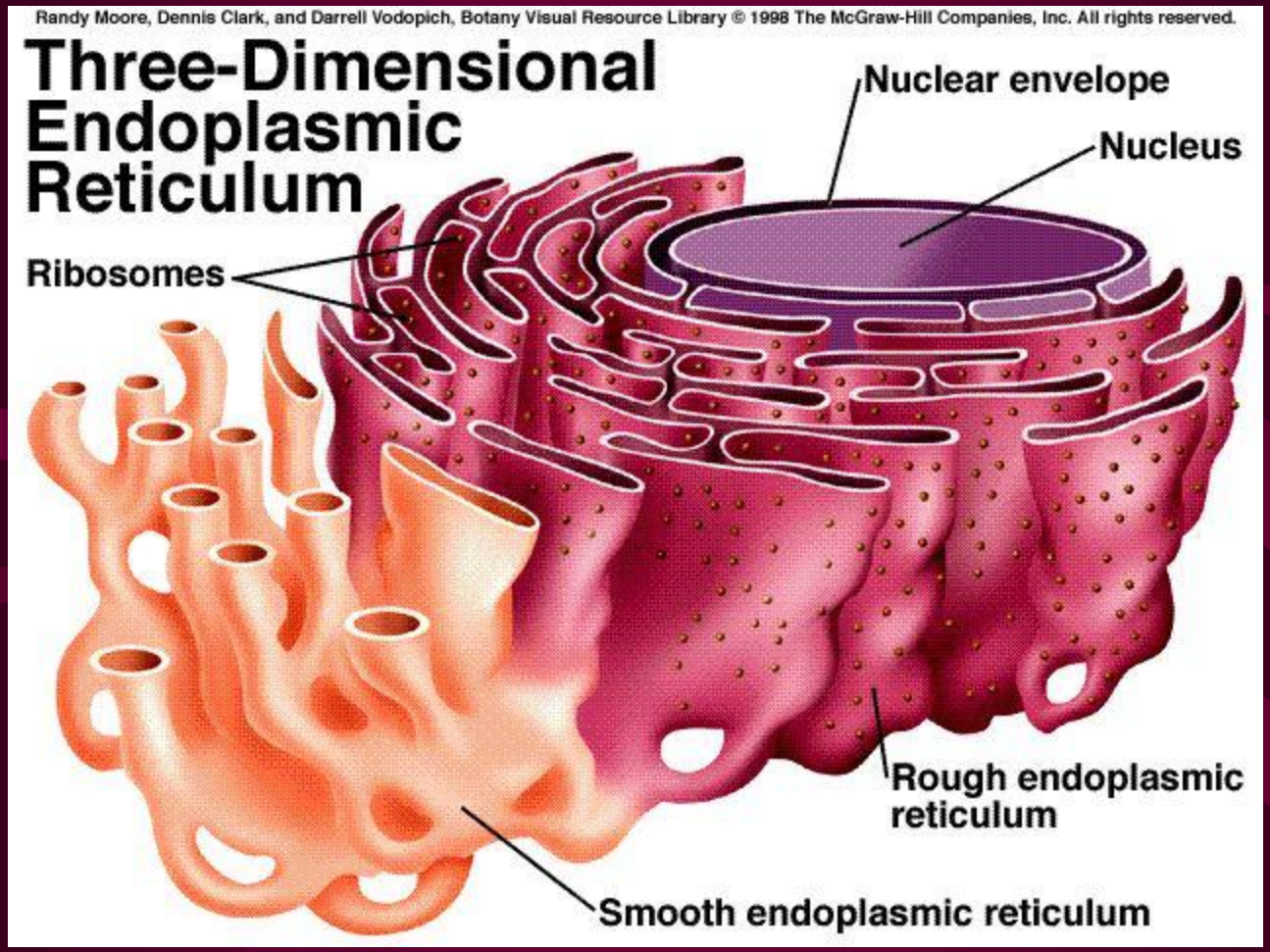
Rough ER

- It has bumps all over it giving it a "rough" appearance

- Bumps are called RIBOSOMES

- ER collects the proteins (built by the ribosomes) and creates a bubble around them

- VESICLE- is formed when the ER pinches off a part of its membrane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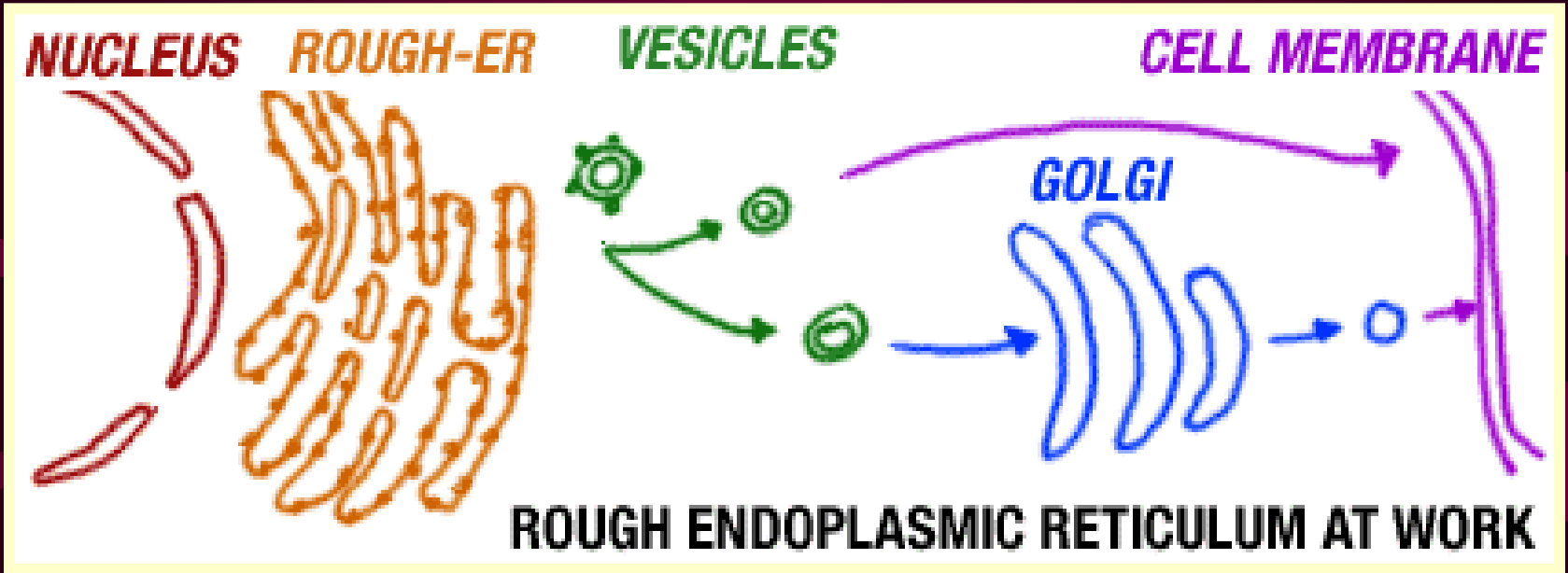
Three-Dimensional Endoplasmic Reticulum
Nuclear envelope
Nucleus
Ribosomes
Rough endoplasmic reticulum
Smooth endoplasmic reticulum

Secretion

Secretion

Exocytosis

Exocytosis



EXOCYTOSIS- The **release** of intracellular molecules (hormones or proteins)

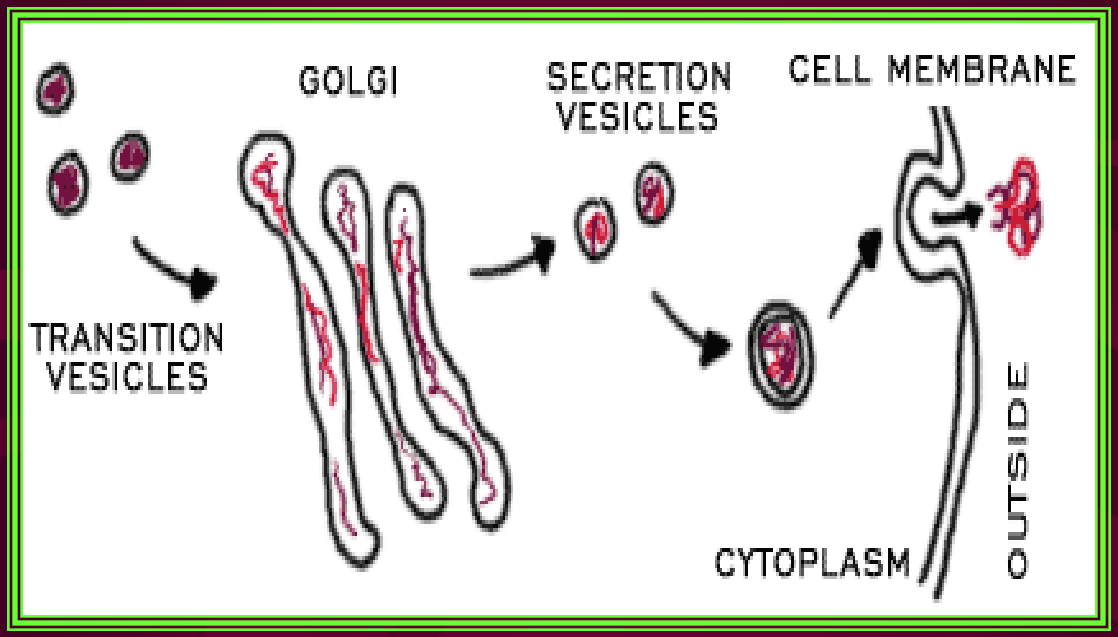
GOLGI APPARATUS

WHAT DOES IT DO?

1) it takes simple molecules and combines them to make larger molecules.

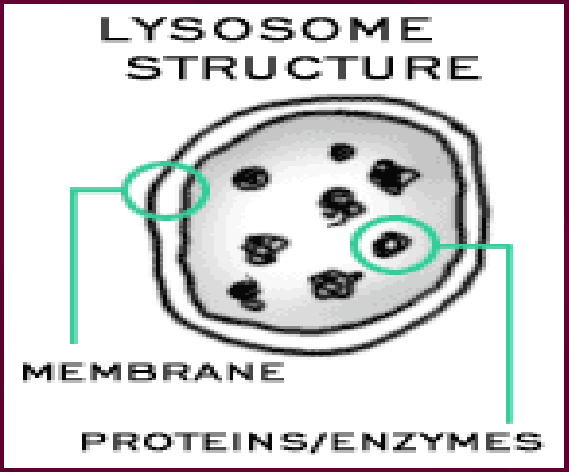
2) takes those larger molecules and puts them into packs called GOLGI VESICLES

GOLGI APPARATUS



LYSOSOMES (primarily animal)

- Contain enzymes that bond to food & digest it (acidic interior)



CYTOPLASM

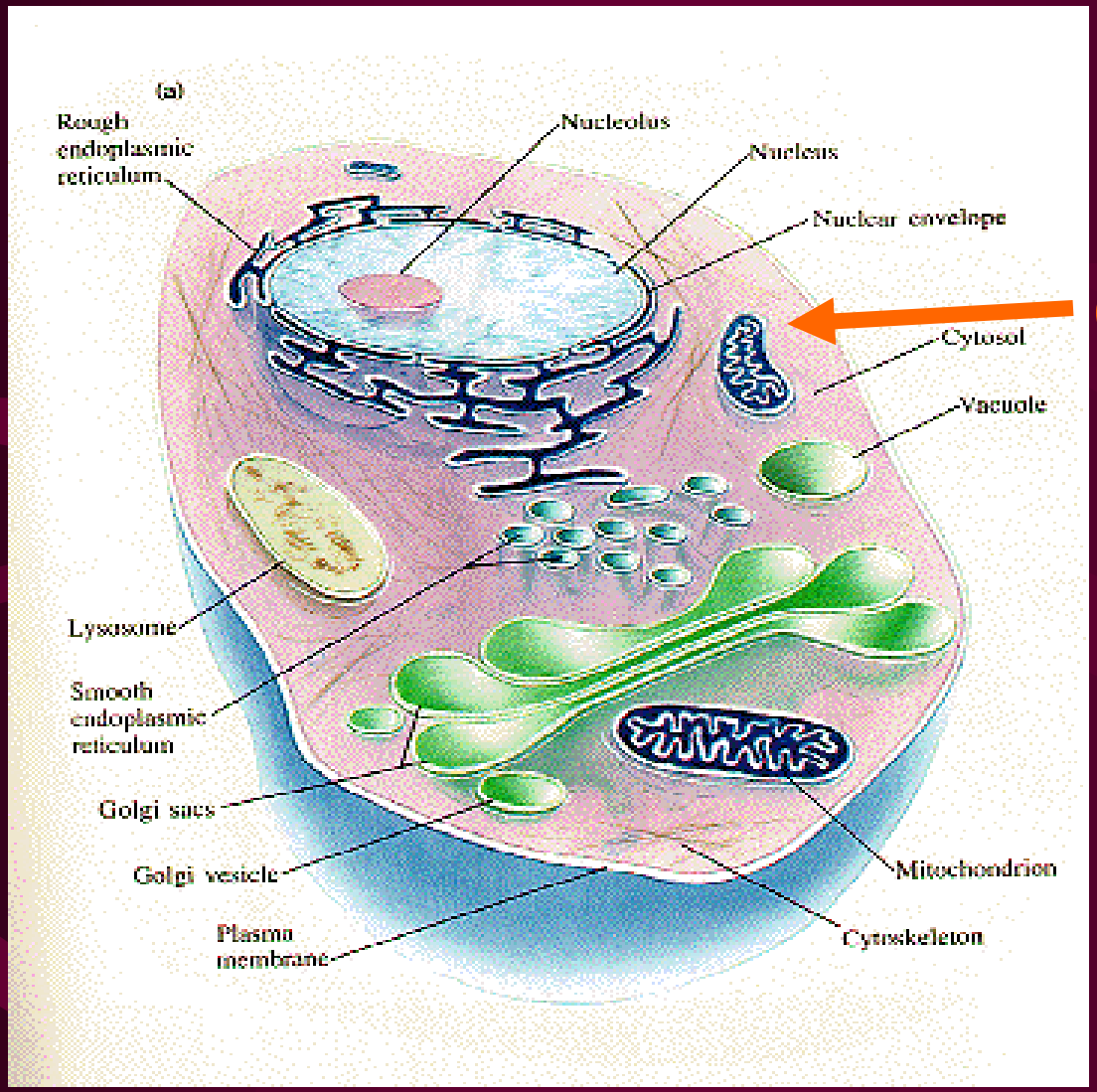
Protoplasm- everything inside the cell membrane

Cytoplasm- everything inside the cell membrane & outside of the nucleus except the cell's nucleus

Cytosol:

- Mostly H_2O
- Contains organelles
- Contains salts, dissolved gasses & nutrients

CYTOPLASM



cytoplasm

CYTOSKELETON

- **Chief functions include:**

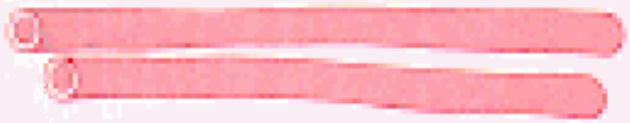
  - movement of material within the cell (not diffusion or osmosis). Responsible for cytoplasmic streaming.

  - maintaining the shape of the cell

  - keeping the cell from getting smashed

CYTOSKELETON

1. **Microtubules**



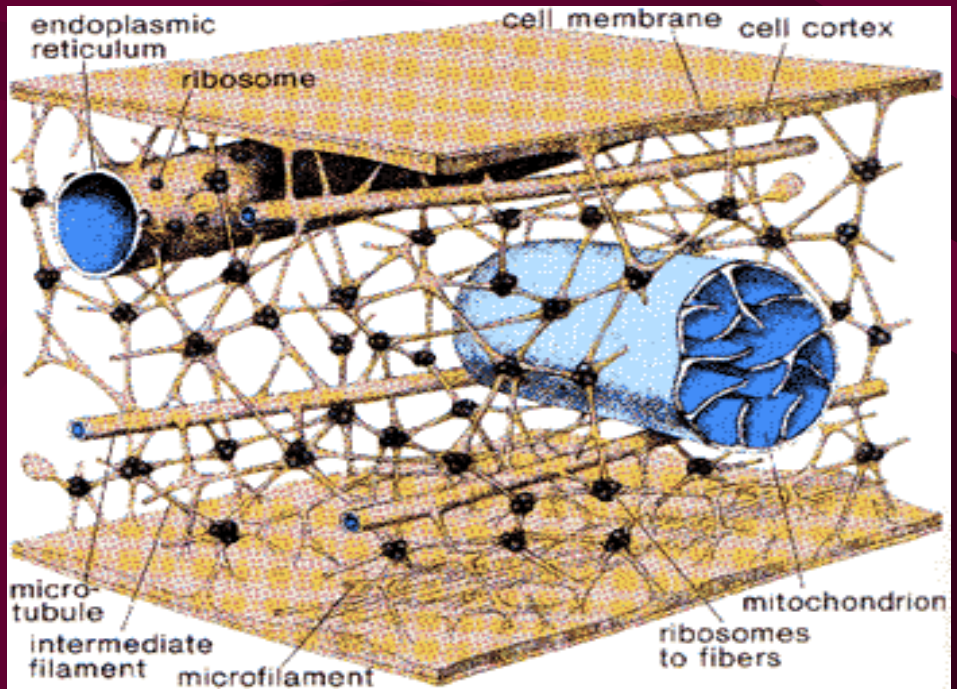
25-nm diameter

2. **Actin filaments**

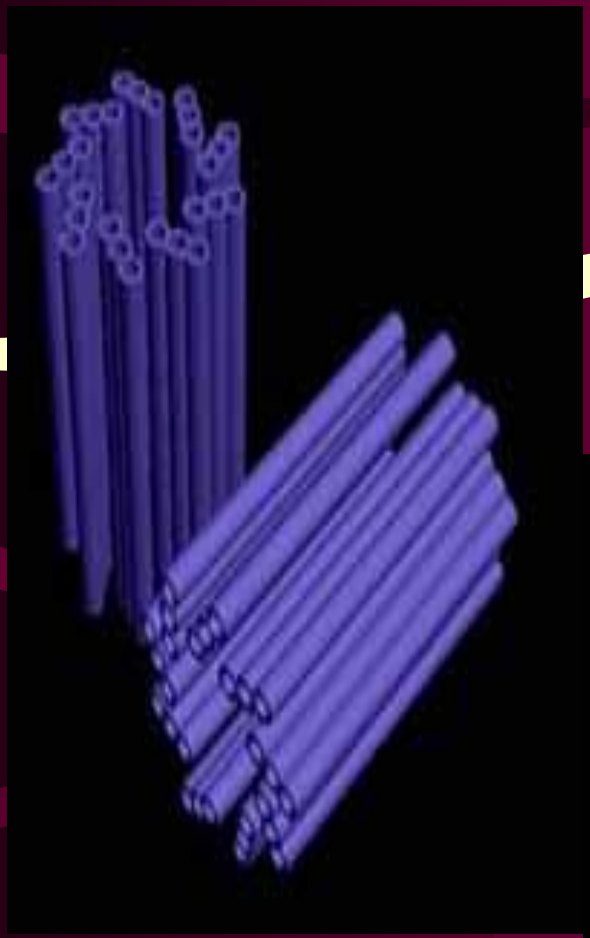
8-nm diameter

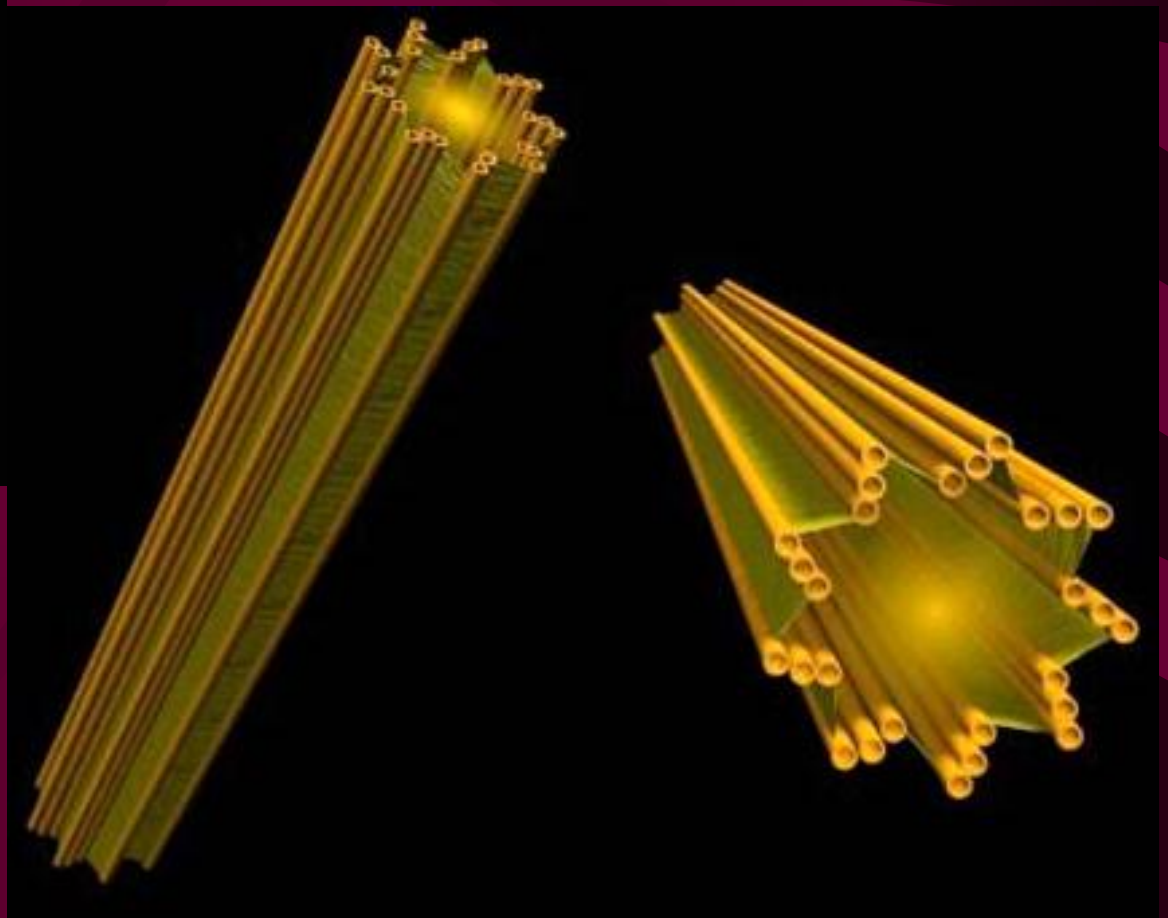
3. **Intermediate filaments**

10-nm diameter



Centrioles





Centrioles:

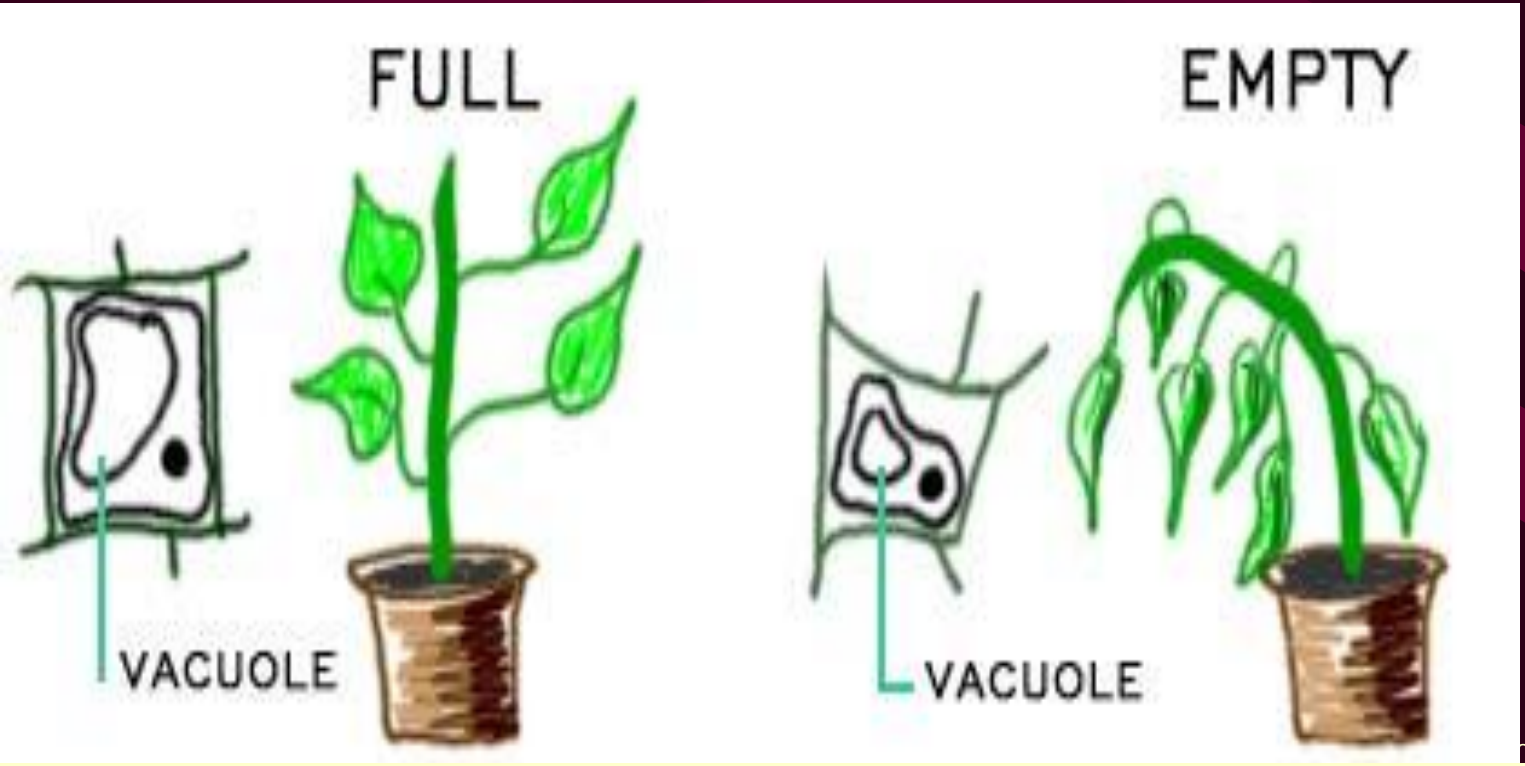
- animal cells
- they look like two cylinders at right angles to one another
- when viewed with an electron microscope, the cylinders show up as nine bundles of tiny microtubules arranged in a circle
- they help to form the fibers that move chromosomes around when the cell is dividing
- as animal cells prepare for cell division these two centrioles separate and go to opposite ends of the cell.

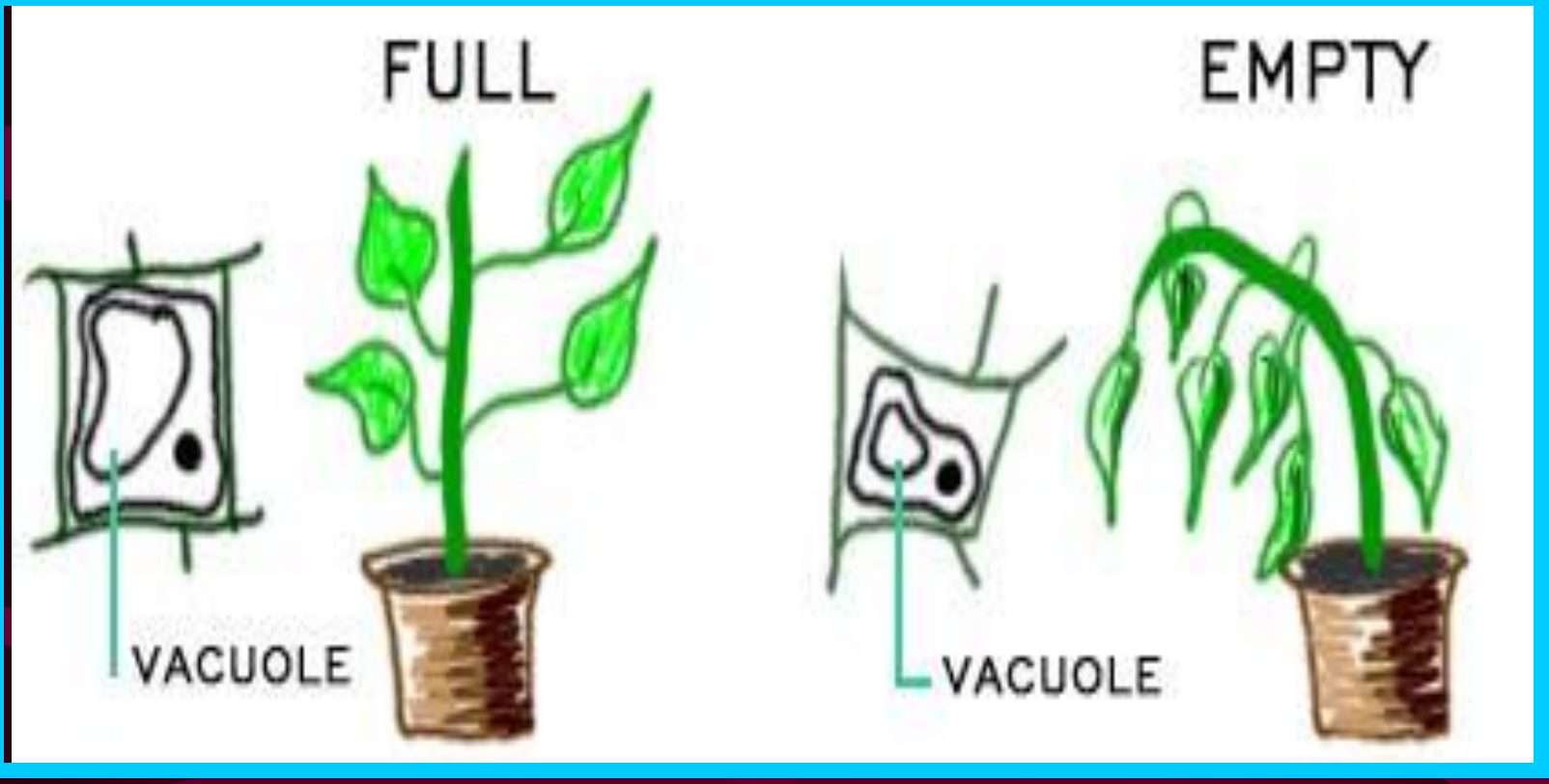
VACUOLE: STORAGE

- Vacuoles in plants support structure by storing water
- Stores things like water, fats, nutrients
- In animal cells, can store mainly fats

You will know that a plant's vacuoles are shrinking when you see the plant begin to droop over

HOLDING UP THE WALLS





Turgor Pressure- force exerted by the water entering (osmosis) the vacuole, which then swells exerting internal force on the cell wall

- Causes "rigidity" so the plant may increase pressure by stacking cells

Chloroplast

- the site of photosynthesis – the way a plant gets its energy

Exercise your brain w\

Homework Questions

Assignment Part A (slides 1-11)

Directions: Write the answers on a piece of paper to turn in by the due date listed on the website. You may copy and paste onto Word and answer there if you like.

1. Which organelle is known as the "Brain" of the cell?
2. If you look at a picture of a cell, how would you recognize the nucleolus?
3. List the 3 main jobs of the cell membrane
4. Explain why the cell membrane has tiny holes made of protein in it.
5. The term hydro means _____.

    A. If something is hydrophobic it is _____

    B. If something is hydrophilic it is _____

Assignment Part B (slides 11-20)

6. Which organelle is known as the Power House" of the cell?
7. Explain why it is beneficial for the mitochondria to have many "folds" of membrane.
8. Explain how you could distinguish the rough ER from the smooth ER.
9. What is the main job of the smooth ER?
10. What is a secretion vesicle and what does it do?
11. What is exocytosis?

Assignment Part C (slides 21-)

12. What is the main function of a lysosome? What cell in your body "eats" a lot of bacteria and might contain lots of lysosomes?
13. What happens to the cell if a lysosome breaks open?
14. Explain the difference between cytoplasm and protoplasm. (draw a diagram if it will help you)
15. Why are vacuoles important to PLANTS?
16. Which organelle is the site of photosynthesis?
17. What are the three main ingredients for photosynthesis?

Assignment Part D (slides 23-)

18. Centrioles are usually found in _____ cells.

19. What is the main function of a centriole?

20. List the two places you can find a ribosome in an animal cell.

21. What do ribosomes make?

22. What is Turgor pressure? Which organelle is responsible?