

Organelles

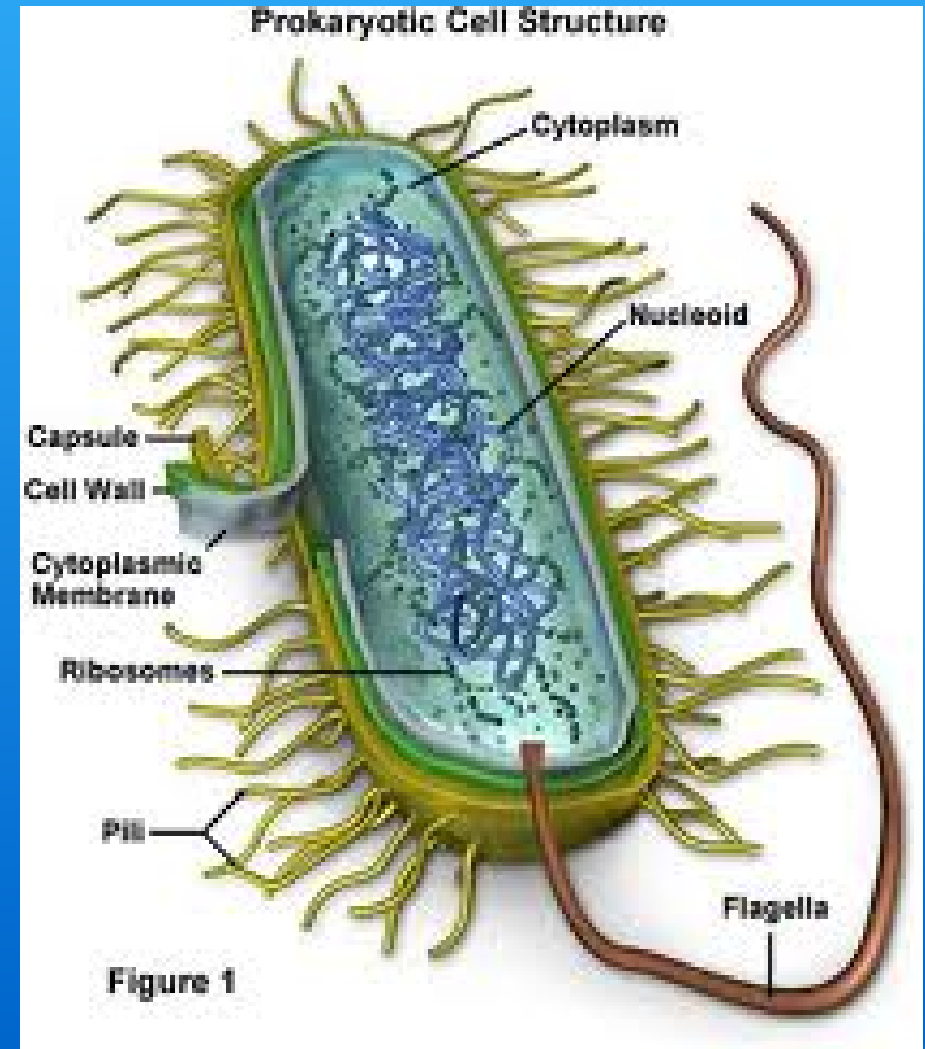
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Cells are like amusement parks...



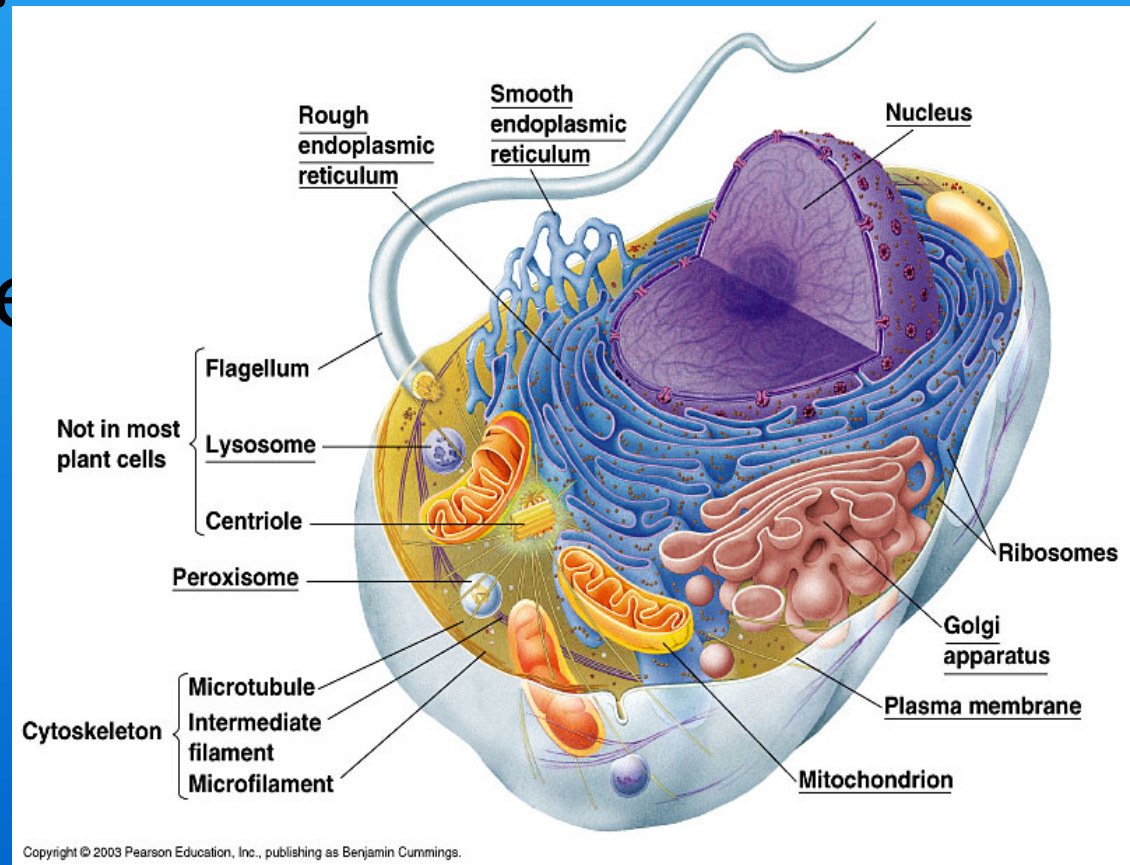
Prokaryotic Cells

- No nucleus is present.
- Cell usually divides by binary fission.
- Prokaryotic cells are haploid.
- Membrane is incapable of endocytosis and exocytosis.
- No chloroplasts.

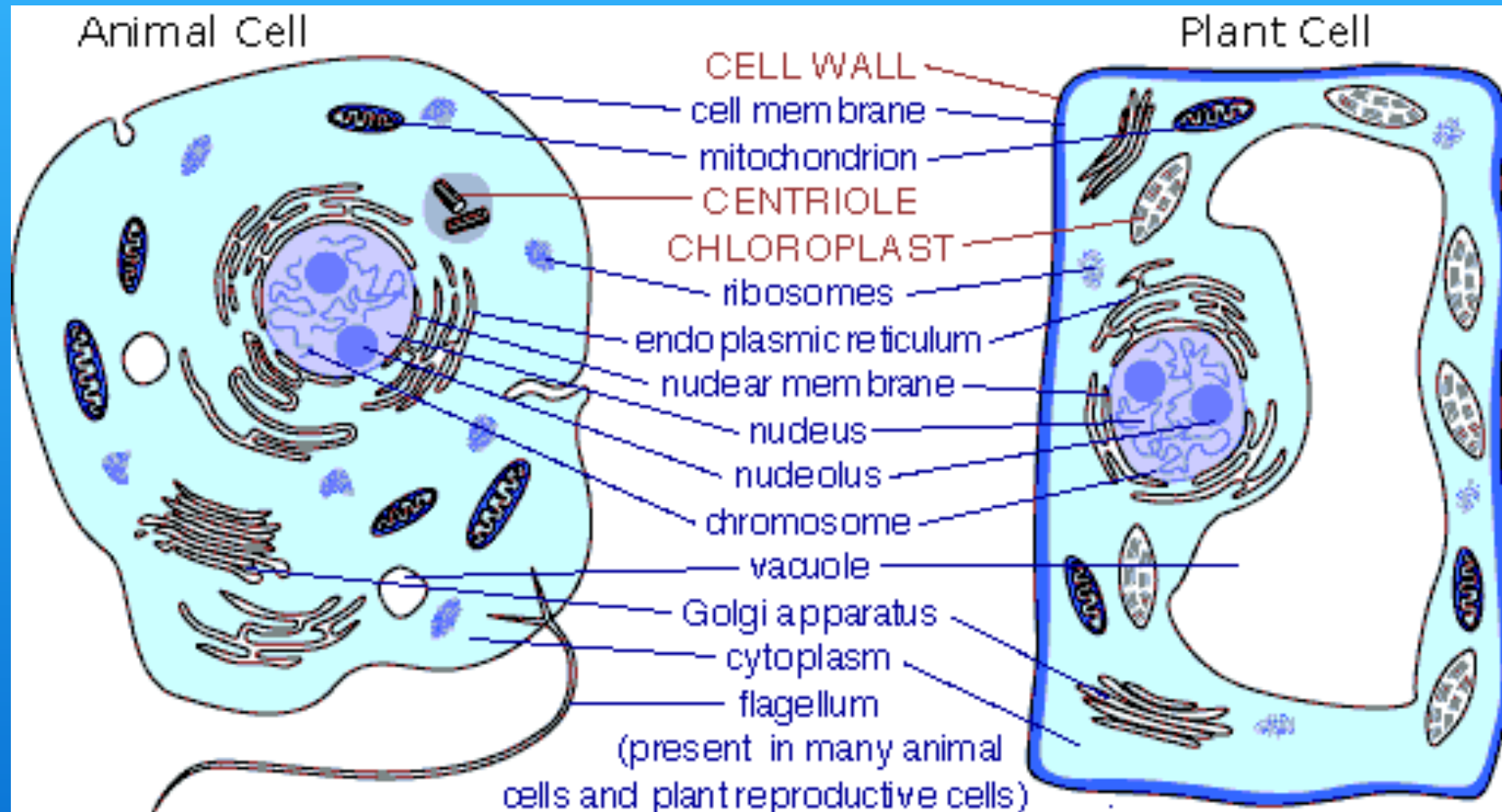


Eukaryotic Cells

- The nuclear body is called a nucleoid.
- Nucleus is present.
- Nucleus divides by mitosis.
- Eukaryotic cells are diploid.
- Membrane is capable of endocytosis and exocytosis.
- Chloroplasts



Every organelle has a different function.



There are also a couple differences between plant and animal cells. Plant cells have cell walls and chloroplasts, animal cells don't. On the other hand animal cells have centrioles and plant cells don't.

Communication in the Cell

When you are walking around the amusement park, do you sometimes notice guys with walkie talkies? Well, they are the people that keep the park in order. When a problem arises, they report it and make sure it is solved.

Different people must oversee different areas of the park.

Communication is very important in everyday life. You communicate with others all the time. Cells aren't different. The different organelles inside must "talk" to each other in order to keep the cell running properly. If one part of the cell doesn't do its job, then it affects the rest.

What would happen if cells were missing organelles?

- If the nucleus didn't exist, the cell wouldn't have direction and the nucleolus, which is inside the nucleus, wouldn't be able to produce ribosomes.
- If the ribosomes weren't present or weren't working correctly, proteins wouldn't be made.
- If proteins aren't produced then there is nothing that is helping repair the cell.
- If lysosomes weren't present the cell would be filled with waste.
- If the cell membrane were gone, the cell would be unprotected.

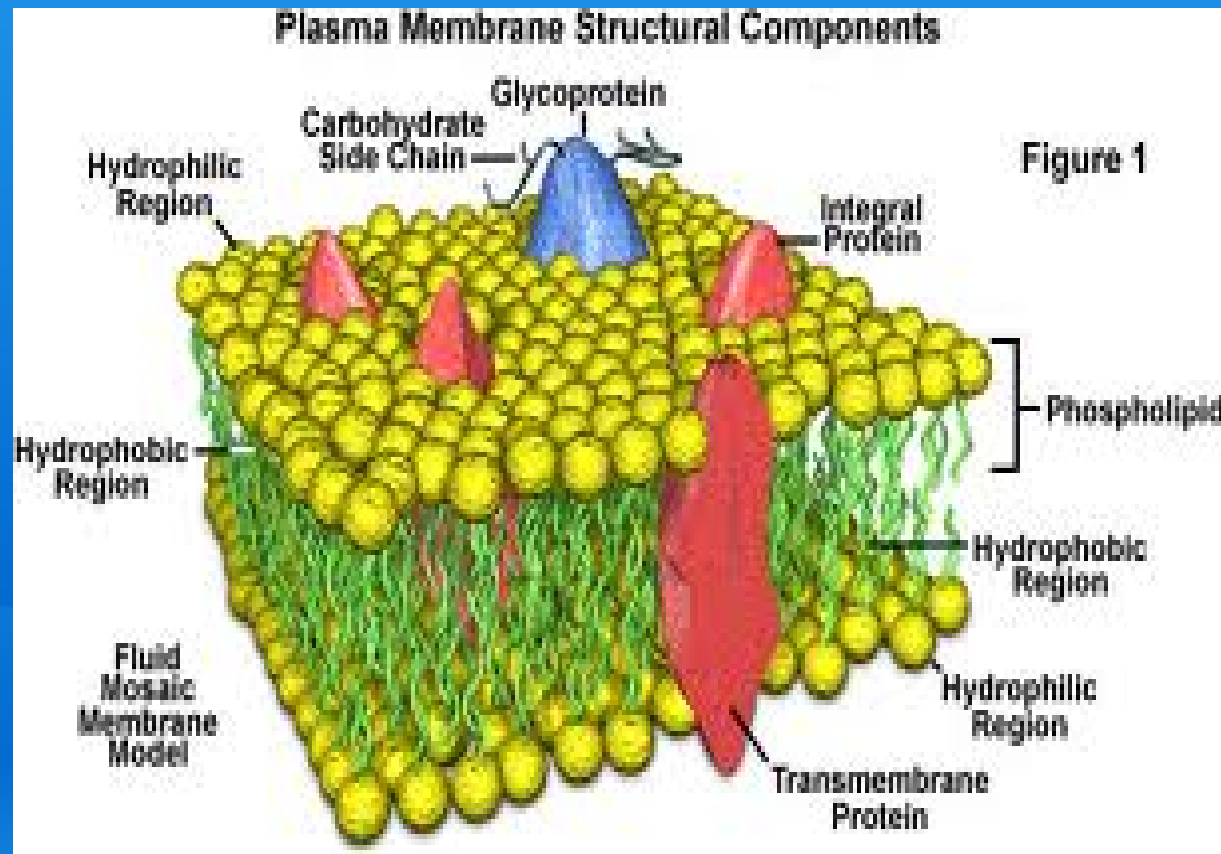
Everything would lead to the death of the cell.

Plasma Membrane

Security guards walk around the outside gates (cell wall) and make sure the people inside are safe and not being threatened by any outside forces. This is just like the plasma membrane.



The plasma membrane acts as an outer boundary, preventing the cell from the invasion of external germs. It consists of various biological molecules, lipids and proteins, that help in the regulation of body functions.



Plasma Membrane Structures

- Phospholipids have two opposite functioning parts. One end attracts water and the other repels it. This helps the cell function when it is being mixed with a water molecule.
- Glycoproteins have carbohydrates attached to them. Their most important function seems to be the involvement in directing proper folding in the ER.
- Transmembrane proteins play many roles when it comes to the functioning of a cell, but the most important is communication. These proteins are useful in signaling to the cell what the outside environment contains.

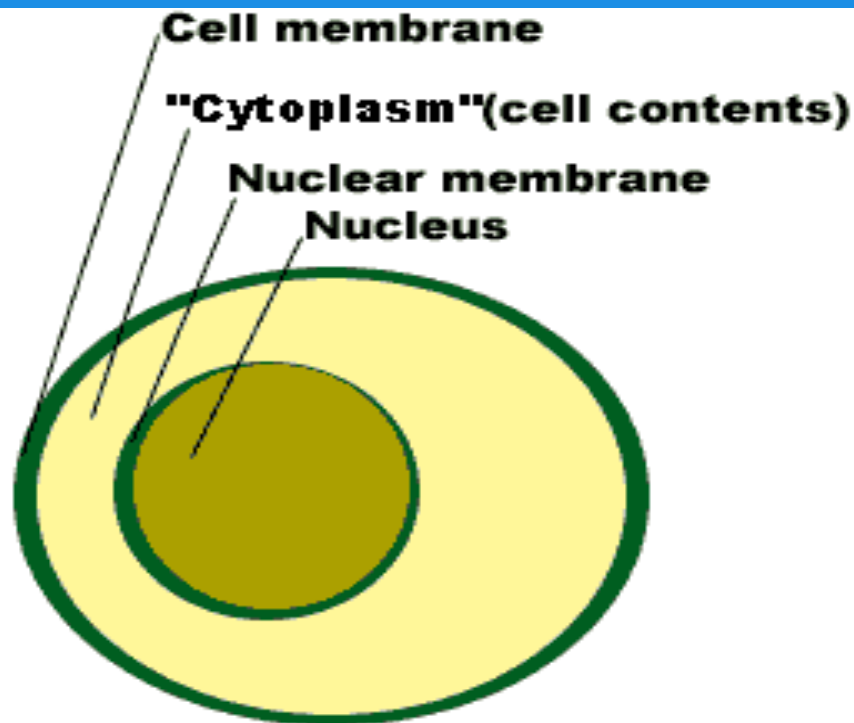
Nuclear Membrane

There are many rides that people are afraid to go on, but no matter what you will be safe. Do you know what keeps those rides together? Bolts. Without these parts the ride would collapse, it wouldn't be safe. The nuclear membrane is exactly like this.



The major functions of the nuclear membrane are:

- Regulate the movement of specific substances in and out of the cell.
- Nuclear membranes in animal and plant cells help prevent the cell from collapsing.
- It also helps the nucleus stay together.



A eukaryotic cell

Membrane Impact

There are three types of membranes:

- Nuclear
- Plasma
- Cell

If one of these membranes didn't exist the cell would be vulnerable. It would be susceptible to germs and disease. Without the nuclear membrane the cell would collapse and die. Without the cell membrane, any chemical would be allowed to enter. Membranes are very important because they help protect the cell.

Movement across the Membrane

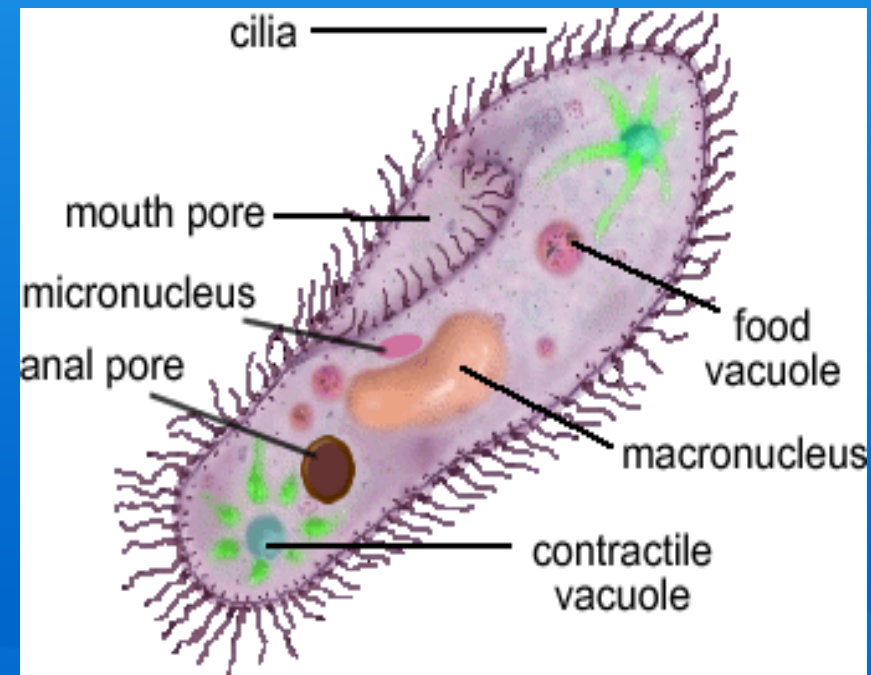
Materials move across the membrane by diffusion.

Diffusion is the movement of oxygen, nutrients, and other molecules.

Cilia and Flagella

Have you ever tried climbing up the rope ladder to win a prize? Well, the cilia and/or flagella are much like this. The rope acts as the tail, it allows movement, and the person is the body of the cilia and/or flagella.

- Cilia are whip-like tails that extend from most eukaryotic cells.
- Cilia and flagella move liquid past the surface of the cell.
- For single cells, these structures allow them to "swim" through the cell.
- The difference between cilia and flagella is that cilia is more than five tail-like structures and flagella is only less than five.



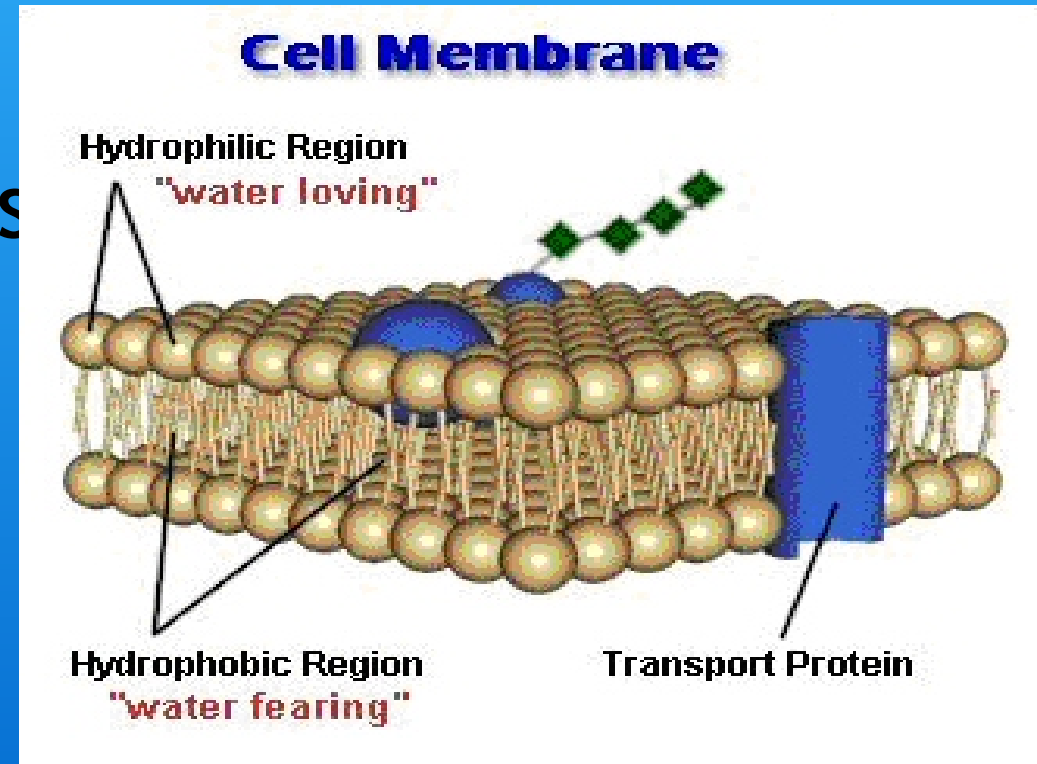
Cell Membrane

When you first visit an amusement park, you notice the front gate where people stand in line and wait to enter. The front gates of all amusement parks allow people to enter and exit the cell. This is like a cell membrane.



The major functions of the cell membrane are:

- Acts as a barrier to keep the temperatures different from inside and outside the cell.
- Allow chemicals to enter and leave the cell.



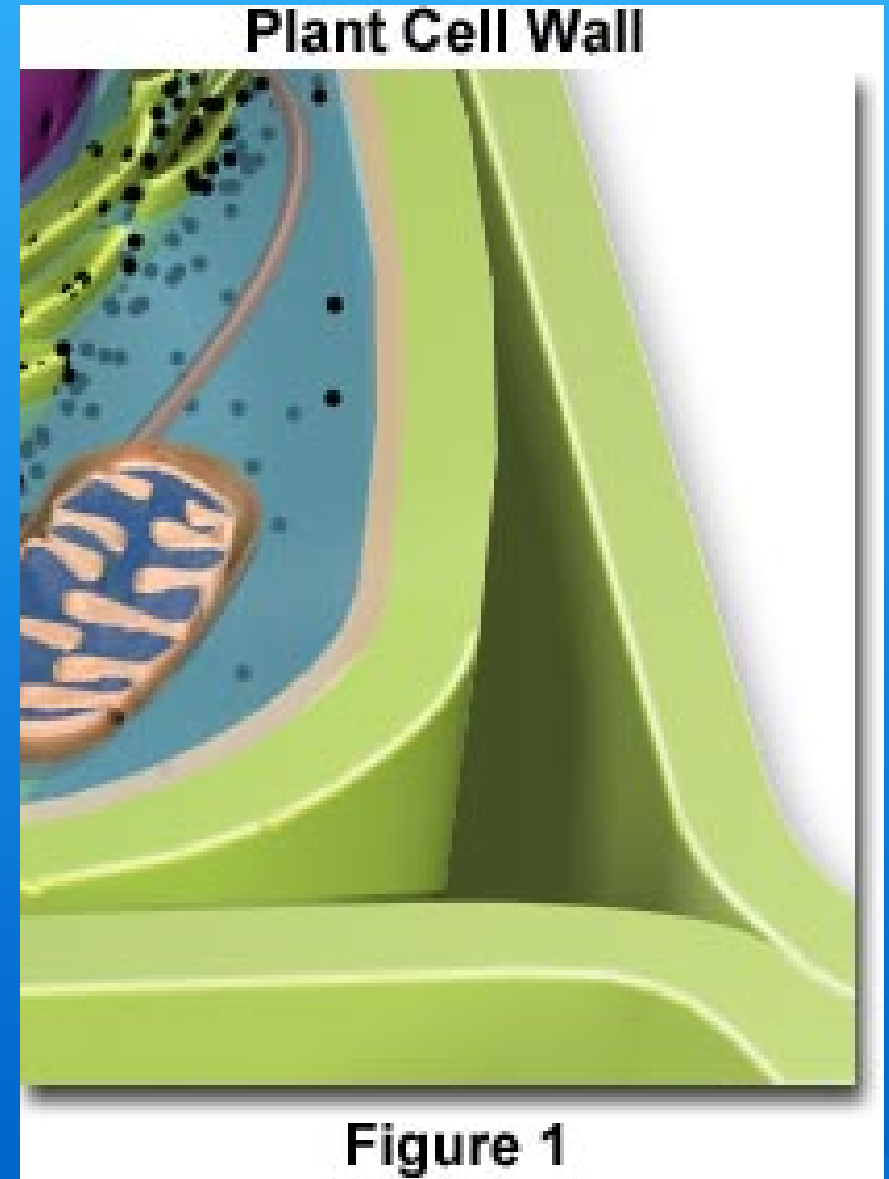
Cell Wall

The wall of a plant cell is much like the fence around an amusement park. Fences keep people who didn't pay out of the park and they allow safety to the people inside.



The cell wall major functions are:

- Provides protection from physical injury.
- Provides skeletal support for the plant cell.



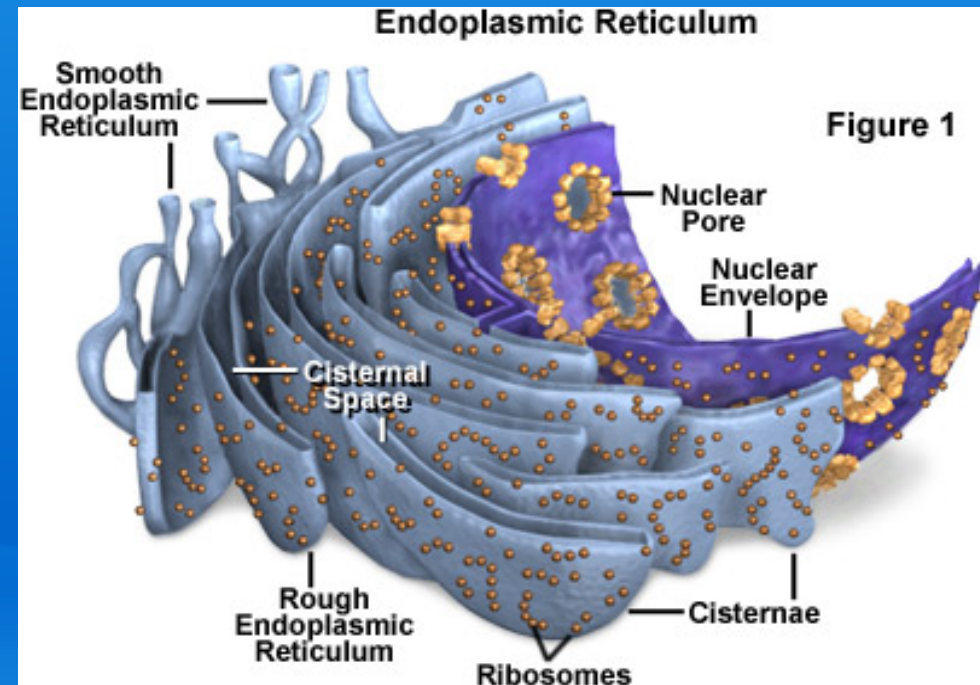
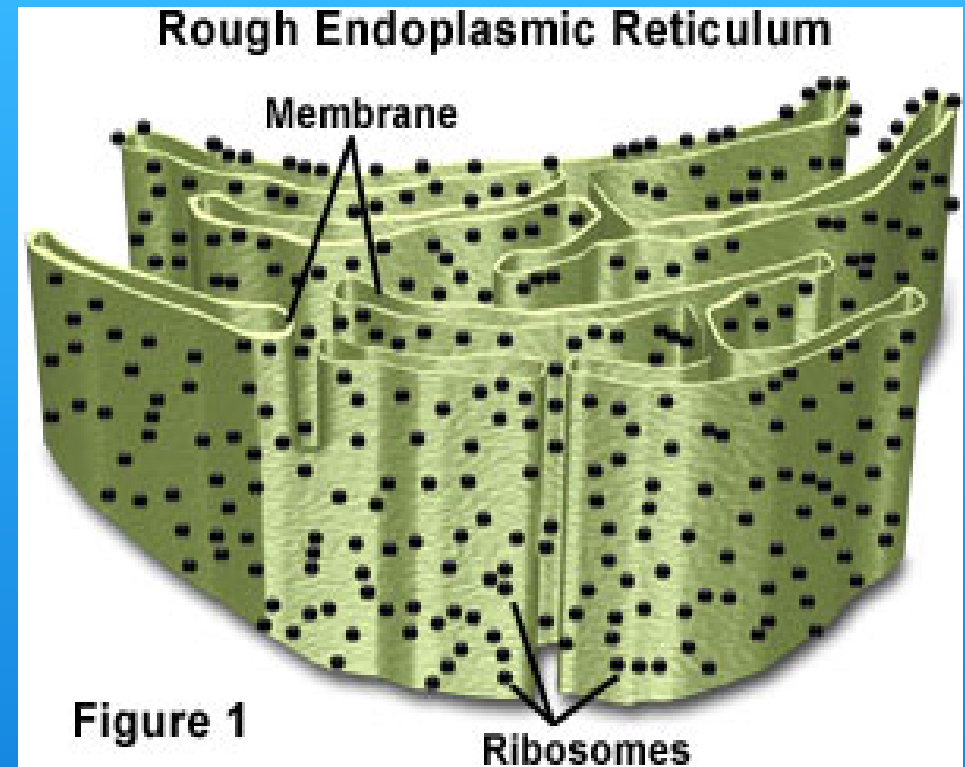
Rough Endoplasmic Reticulum

When you visit an amusement park, you walk on the pathways that lead to different rides and concession stands. The pathways transport people to different areas of the park.



Well the rough endoplasmic reticulum also acts as a pathway within the cell. Its major function is to:

- Allow different materials and ribosomes to move from one part of the cell to another.



Ribosomes

Concession stands in amusement parks make money by selling their food. In return, the money they make is then used to help keep the park running. It repairs damages. Without concession stands, amusement parks would go out of business.

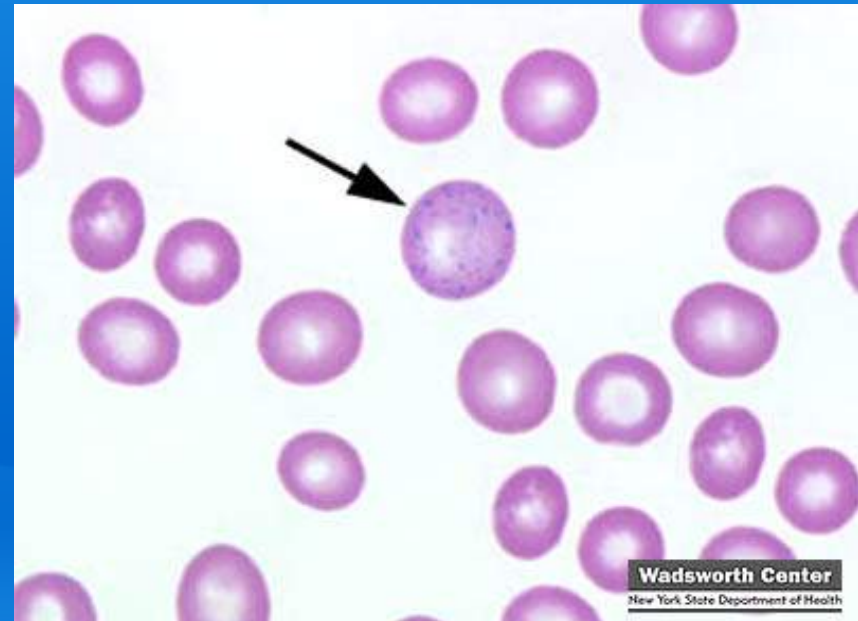


Ribosomes help keep the cell running.

Major function:

- Production of proteins

Without ribosomes, the cell would die.

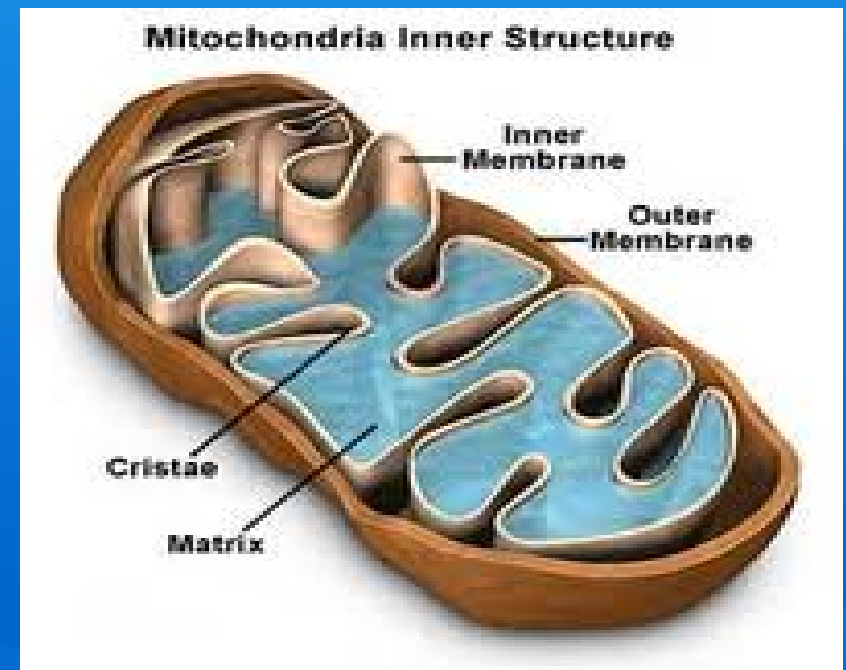


Mitochondria

Everything is powered by some source of energy. Amusement parks are powered by local power plants. They provide the electricity needed to run the rides and power concession stands. Have you seen an amusement park at night? It takes a lot of energy to run that kind of power.



- *The major function of the mitochondria is to power the cell.*
- The enzyme mitochondria produce is adenosine triphosphate.
- In return the cell uses ATP to perform the specific tasks necessary for survival and function.

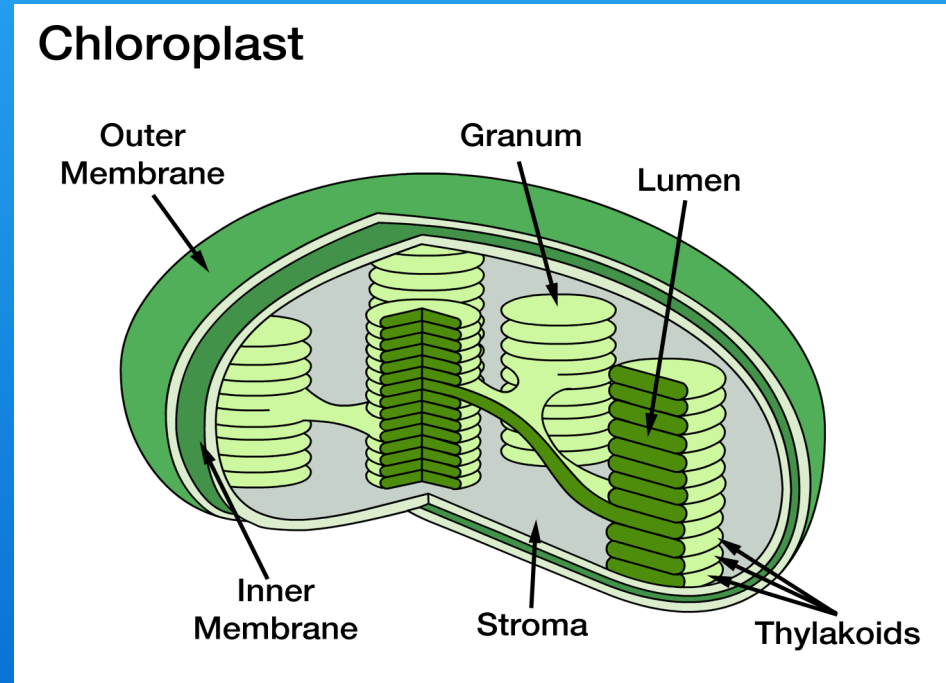


Chloroplasts

Chloroplasts are like solar pannels. Solar pannels take light from the sun and convert it to electricity.



- The chloroplast is the site of photosynthesis.
 - It has a double membrane.
 - The stacks of disk like structures are called grana and the connecting structures are called thylakoid membranes.
- Their major function is :
- The ability to use light and convert it into sugar.



Mitochondria and Chloroplasts

(Compare and Contrast)

Similarities:

- Both organelles have a double membrane.
- Both have the ability to generate metabolic energy.
- Outer membranes contain porins.
- Both contain their own genetic system.

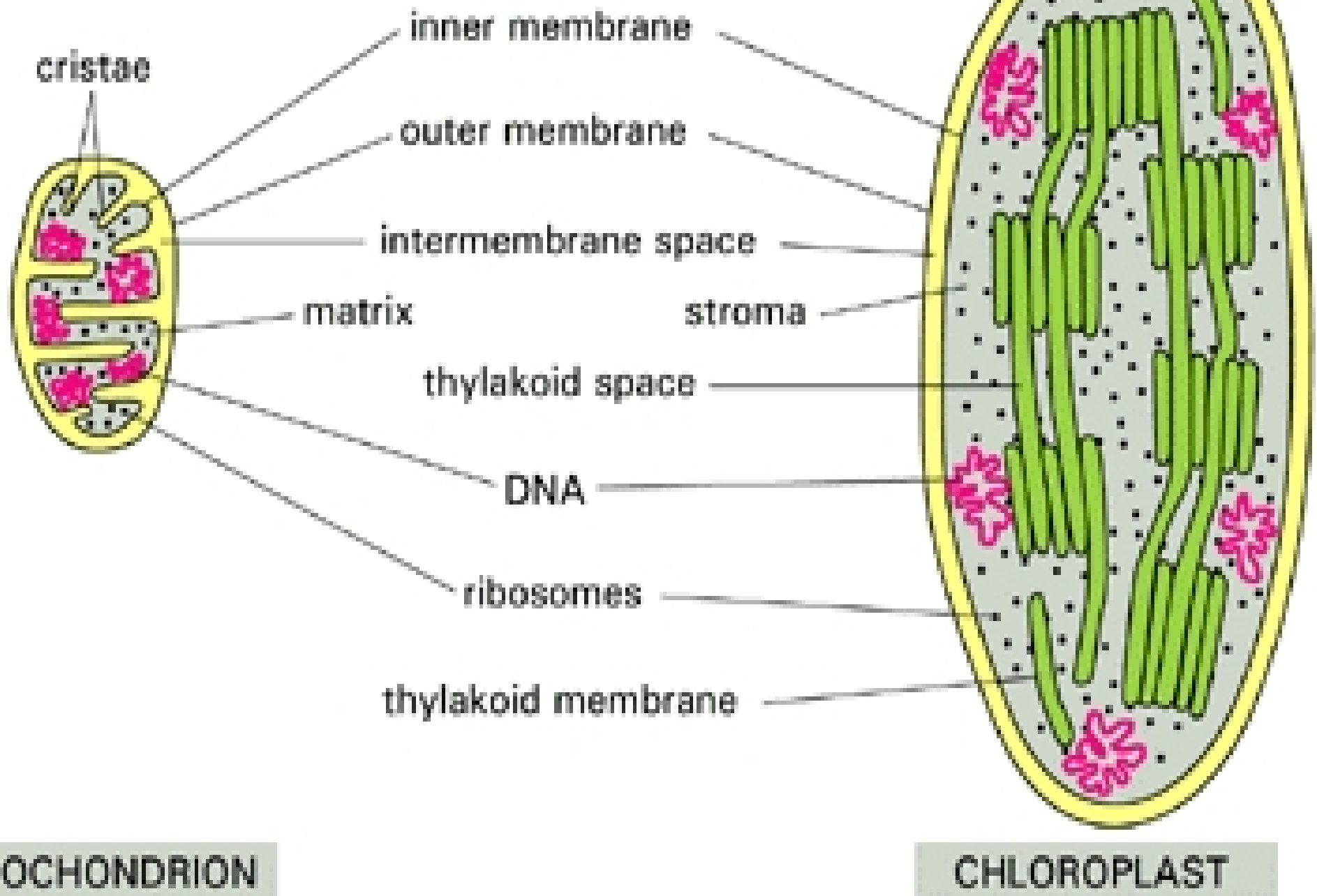
Mitochondria and Chloroplasts

(Compare and Contrast)

Differences:

- Chloroplasts are larger and more complex.
- Mitochondria do not have thylakoid membranes, instead it has respiratory enzymes.
- Chloroplasts have the ability to use light to convert carbon into sugar.
- Mitochondria break down simple sugars into carbon dioxide and release energy.
- Chloroplasts exist only in plant cells, they help give its green color.

2 μm



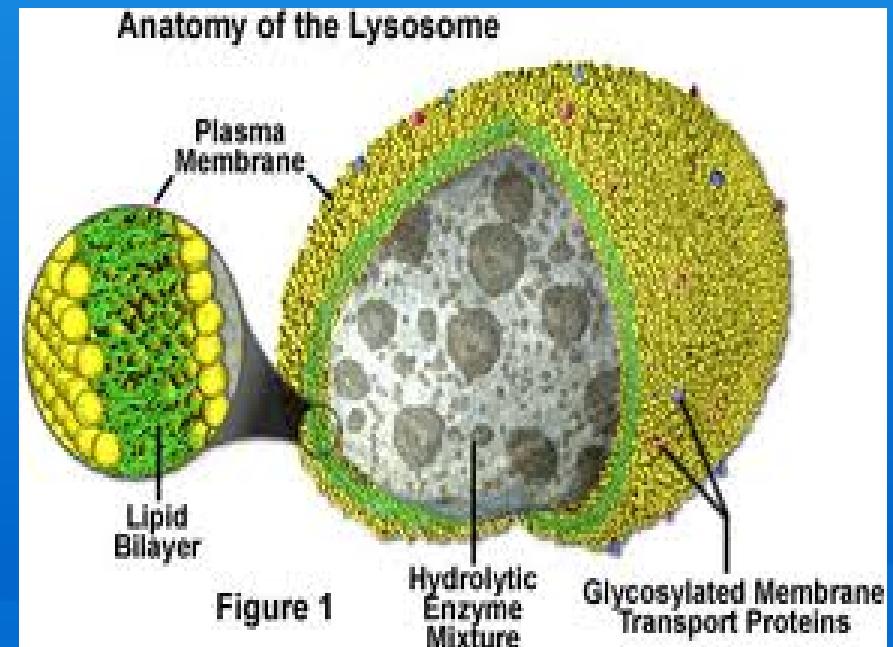
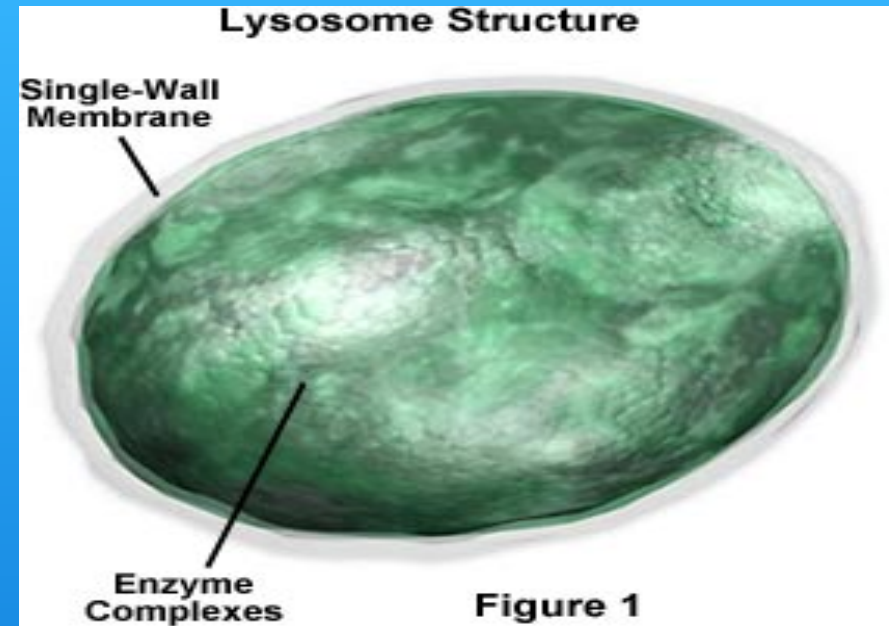
Lysosomes

When you are at an amusement park and you have the urge to use the bathroom, where do you go? The 'porta-potty' of course! The restroom in amusement parks help rid it of waste. They make sure the park stays clean.



Lysosomes rid the cell of all unwanted waste. The major functions of lysosomes are:

- Help keep the cell clean
- Rid the cell of all unwanted materials and chemicals.



Cytoskeletons

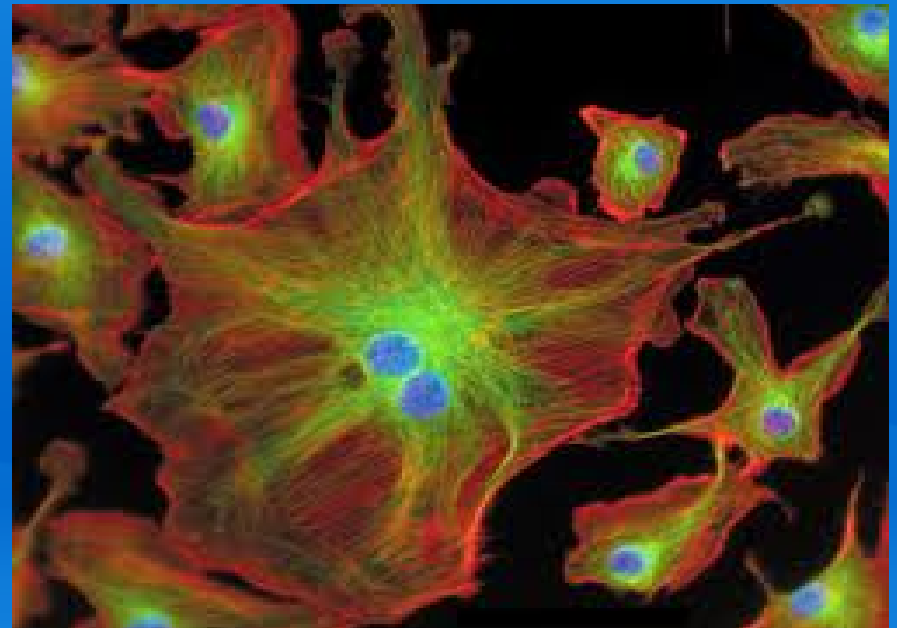
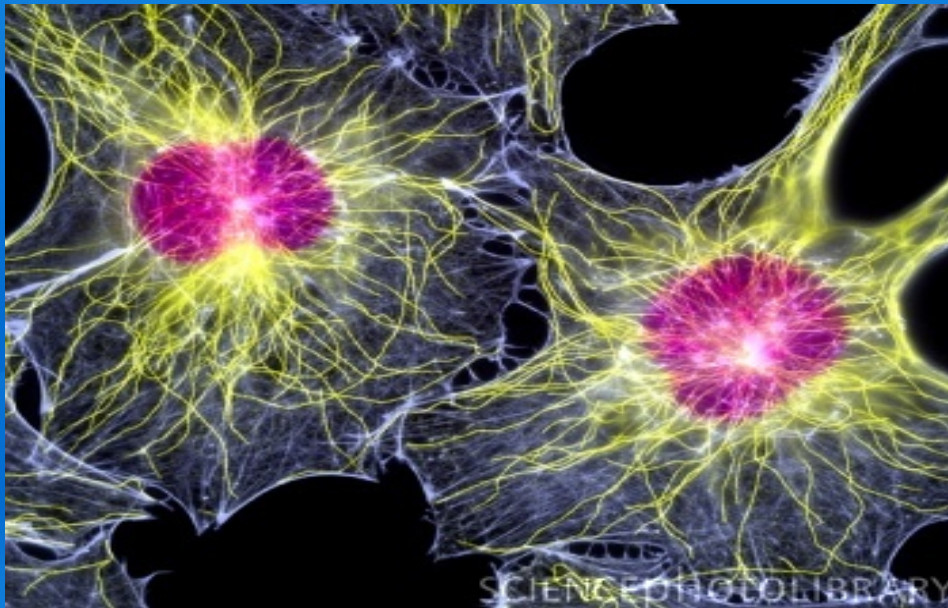
Everyone loves to ride on the bumper cars. Cytoskeletons are much like them. When you are bumping into other cars the rubber around it protects the car itself. It makes sure the car is in good condition.



Cytoskeletons help prevent the cell from damage. Their major functions are to:

- maintain cell shape
- protect the cell
- enable cellular motion

Cytoskeletons play an important role in intracellular transport and are very important in cell division



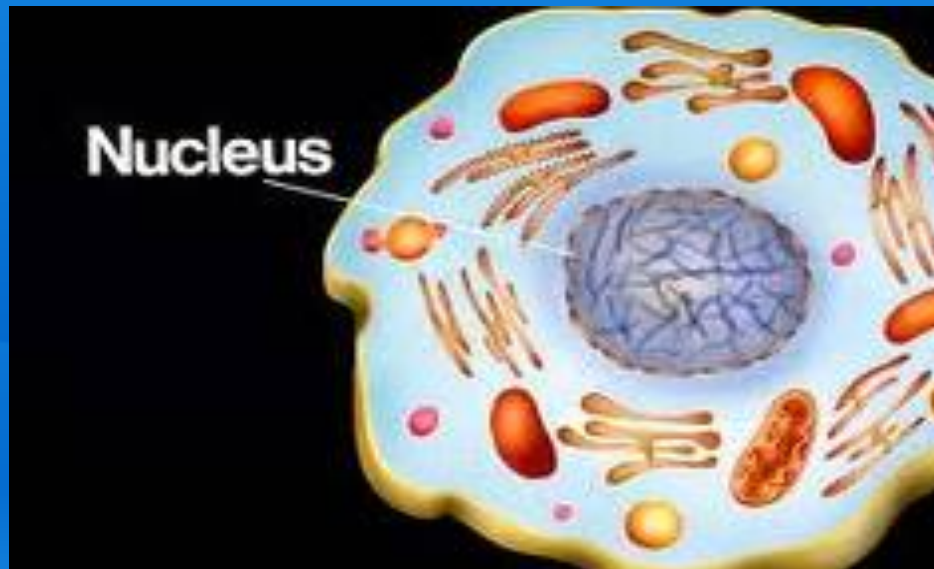
Nucleus

When you visit an amusement park and you're lost or don't know where to go, what is the first thing you do? You look at a map. The map directs you where to go and where the rides are located.



The nucleus is known as the headquarters of the cell, it controls all cell activity. The nucleus and the map are alike because the nucleus tells the cell what to do. Some functions of the nucleus are:

- Stores heredity material
- Controls all functions of the cell

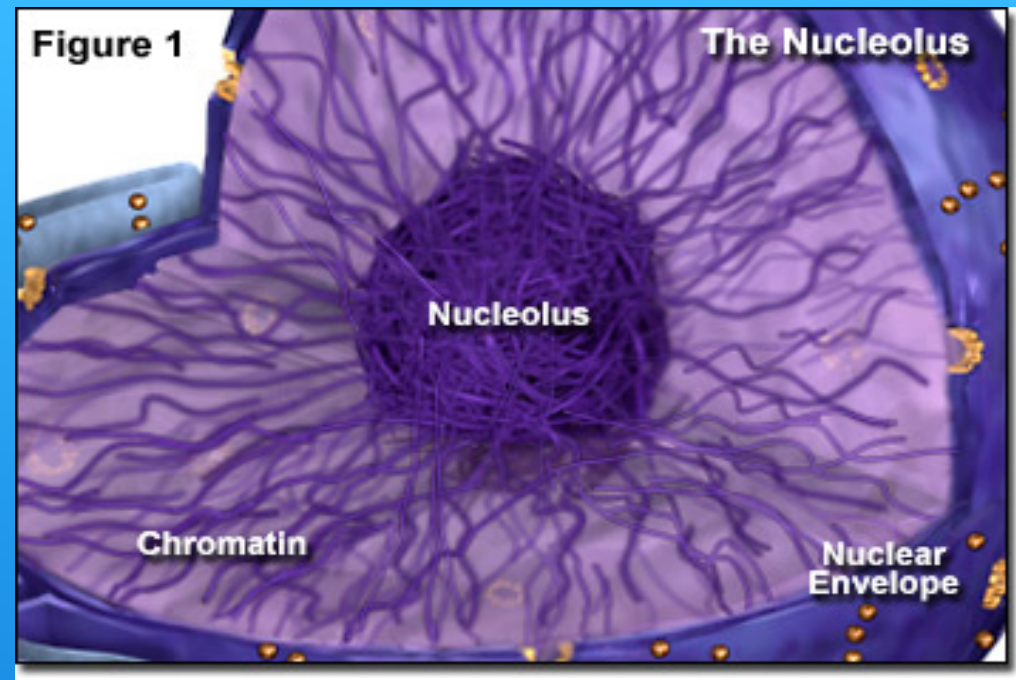


Nucleolus

A directory person is like the nucleolus. When you don't understand the map, you ask this person where to go. In return, he or she will give you directions.



Nucleolus



- The nucleolus is located in the center of the nucleus.
- It's a big ball of coiled chromatin. (Chromatin is DNA in its active form. It's a combination of histone proteins and DNA.)
- It plays a big part in cellular respiration.

Major function:

- produces ribosomes

Golgi Apparatus

When a fair ends people come and pack up the rides, then they move somewhere else. The Golgi apparatus is like this.



Golgi Apparatus

- The packaging of proteins.
- Once the proteins are produced they pass into the cisternae. After that, they are then squeezed into the little blebs which transfer into cytoplasm.

