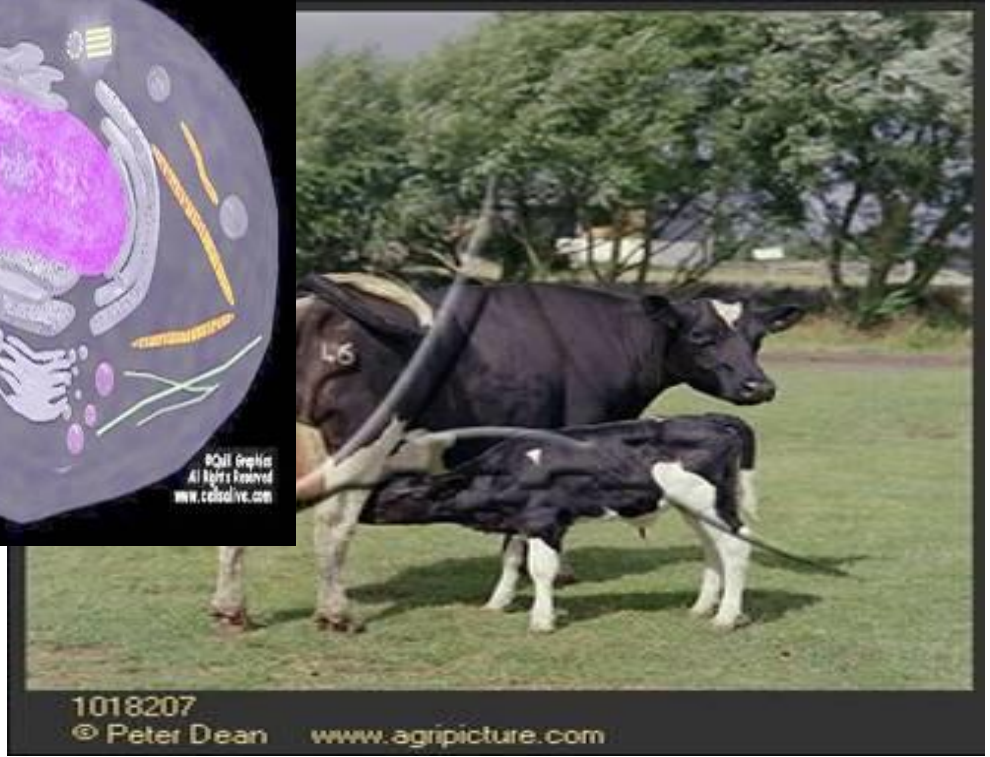


# Setting our Cytes Ahead!!

## Part 2



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Remember !! CELLS are the smallest unit of LIFE!

They control how organisms are made and function!

★ So far, we have covered..

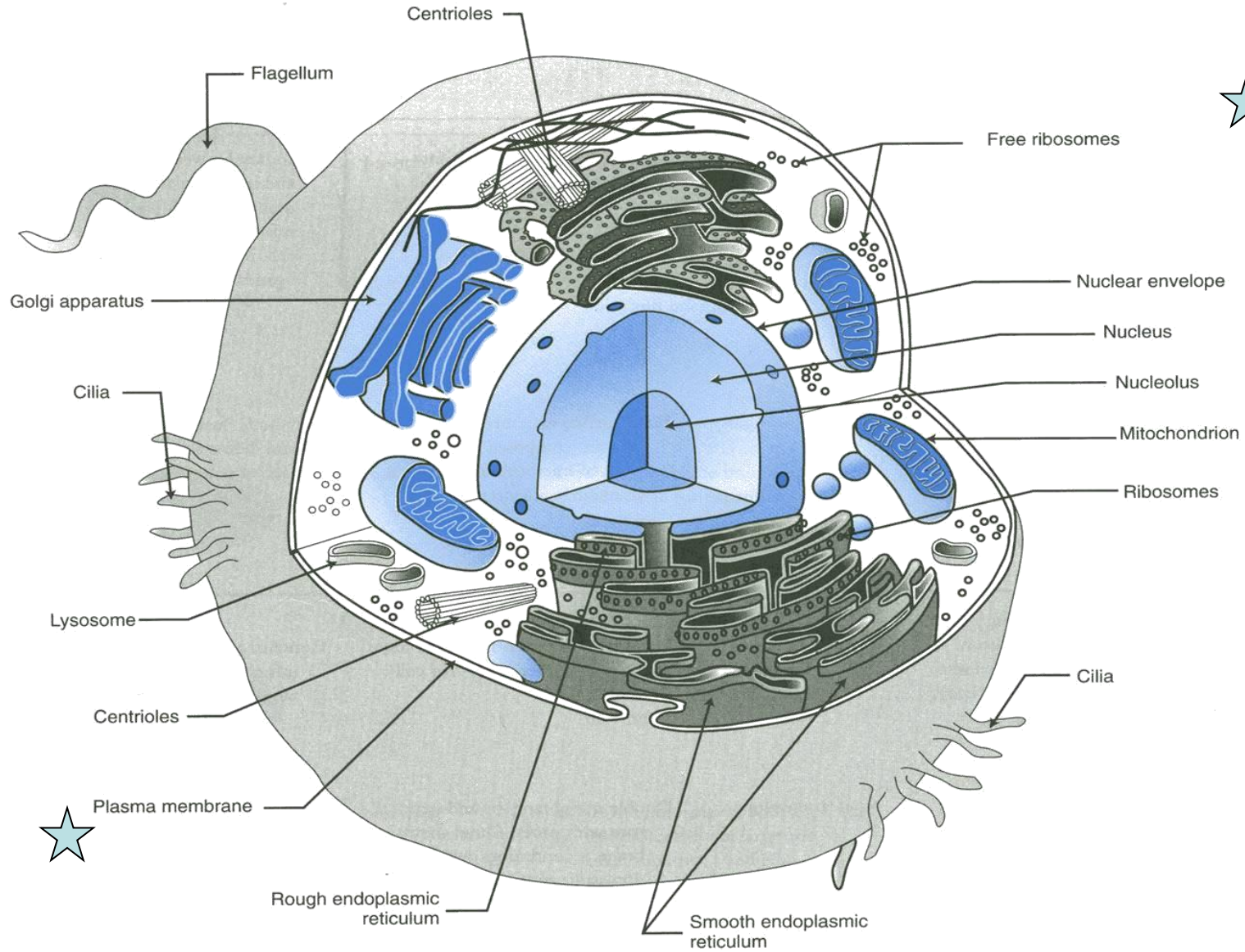
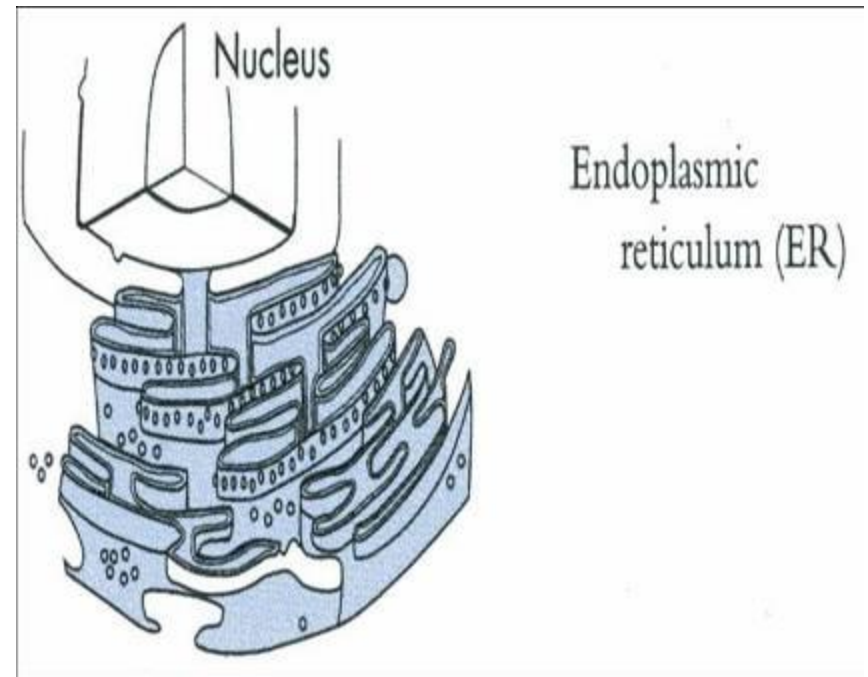


FIGURE 2-2 Example of a Mammalian Cell.

# ***Structures for Assembly and Transport of Proteins***

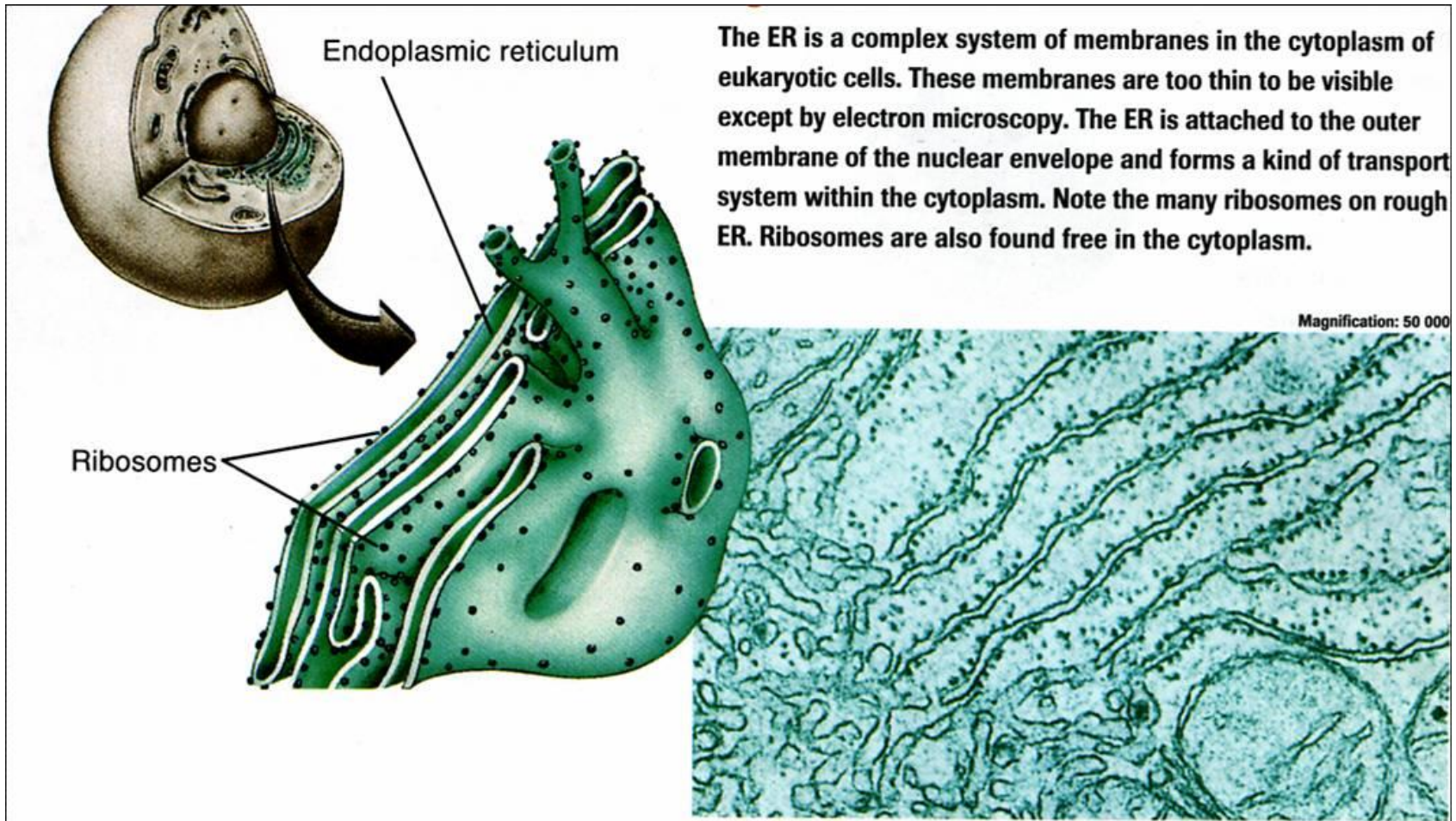
- We already mentioned the cytoplasm.
- Much of the cytoplasm is occupied by the ***endoplasmic reticulum***.



# Endoplasmic Reticulum

- The ER functions as the cell's delivery system, much like the trucks that deliver raw products such as beef, vegetables and beverages to the steak restaurant. To make dinners, these raw products must be assembled on the counter in the restaurant.

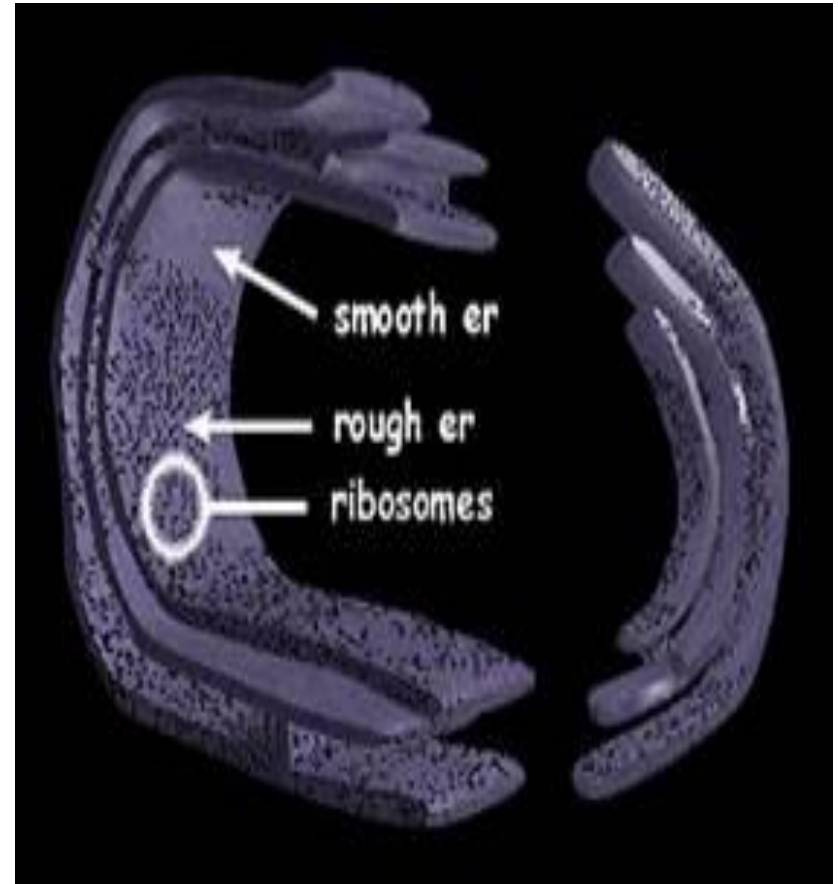
# Endoplasmic Reticulum



The ER is a complex system of membranes in the cytoplasm of eukaryotic cells. These membranes are too thin to be visible except by electron microscopy. The ER is attached to the outer membrane of the nuclear envelope and forms a kind of transport system within the cytoplasm. Note the many ribosomes on rough ER. Ribosomes are also found free in the cytoplasm.

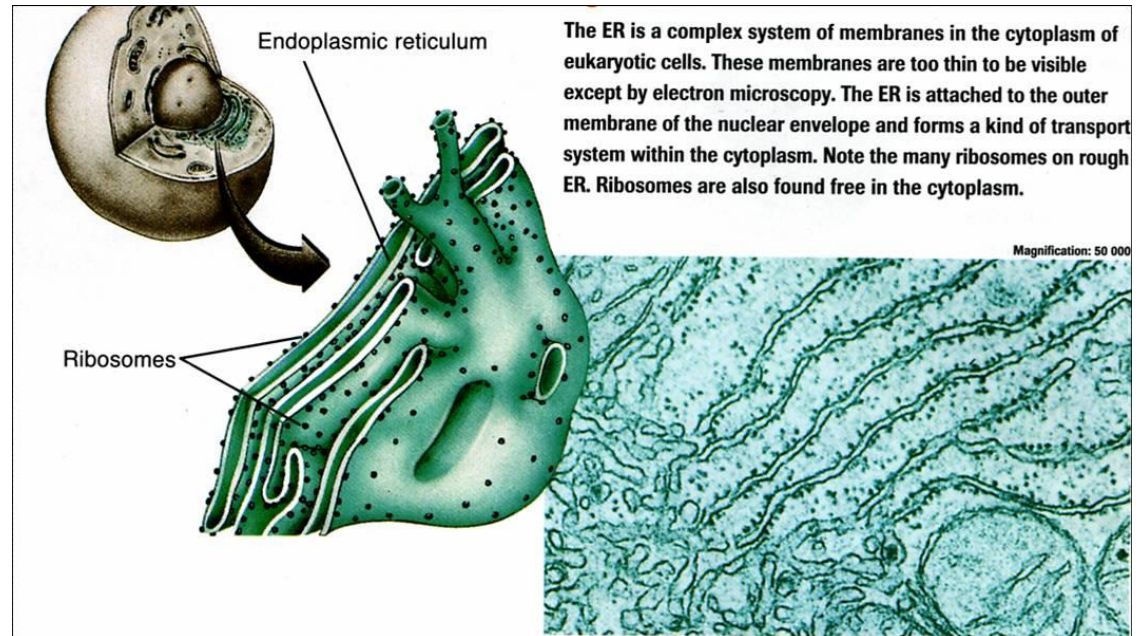
# ***Endoplasmic Reticulum***

- The endoplasmic reticulum is a system of folded sacs extending throughout the cytoplasm. Rough ER has ribosomes on the outer surface; smooth ER has no ribosomes.



# ***What is the function of the ER?***

- The endoplasmic reticulum is the site of protein synthesis, or where protein is made.



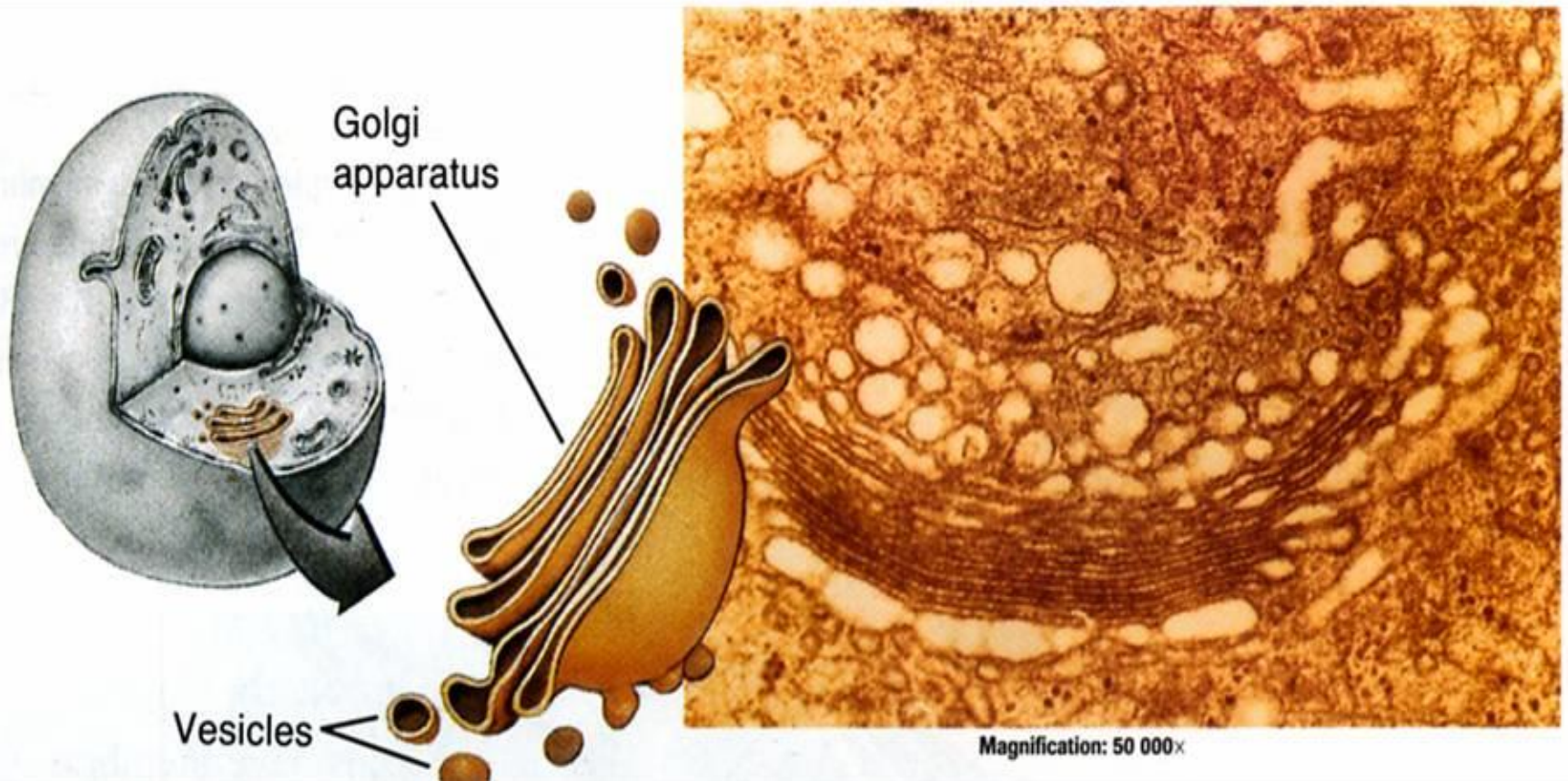


- **Color the ER on your cell now!**

# Structures for Protein Storage

- These structures are the storage rooms of the restaurant.
- They are the Golgi apparatus, vacuoles, and lysosomes.

# ***Golgi Apparatus***



**The Golgi apparatus is a network of connected flattened tubes or sacs stacked on top of one another.**

# Function of the Golgi Apparatus

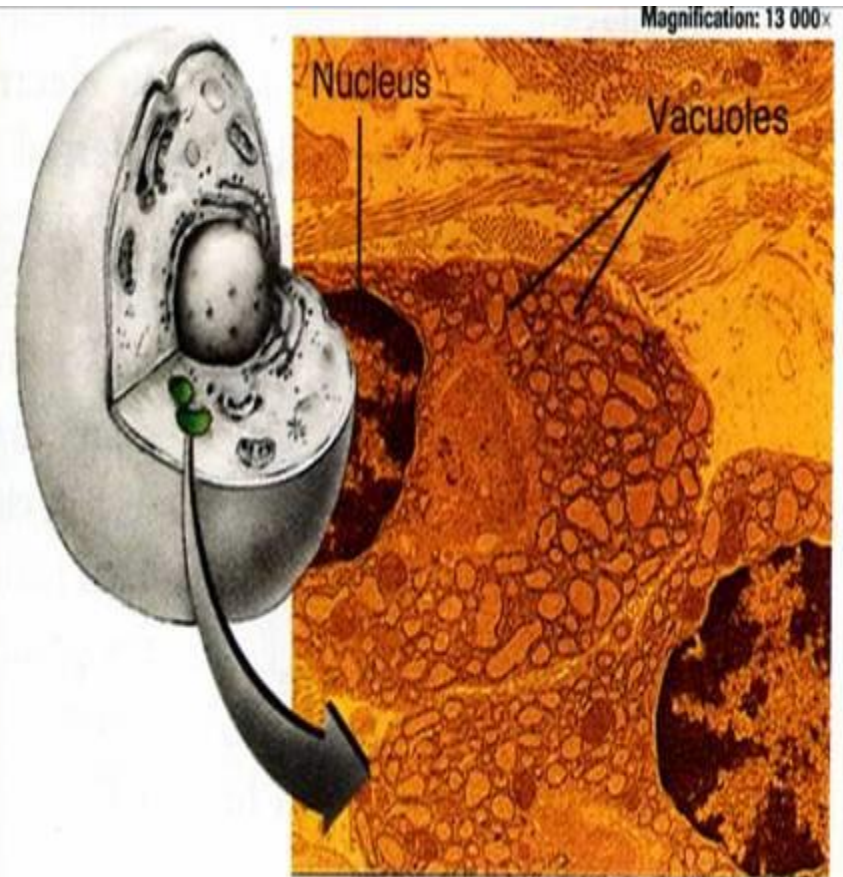
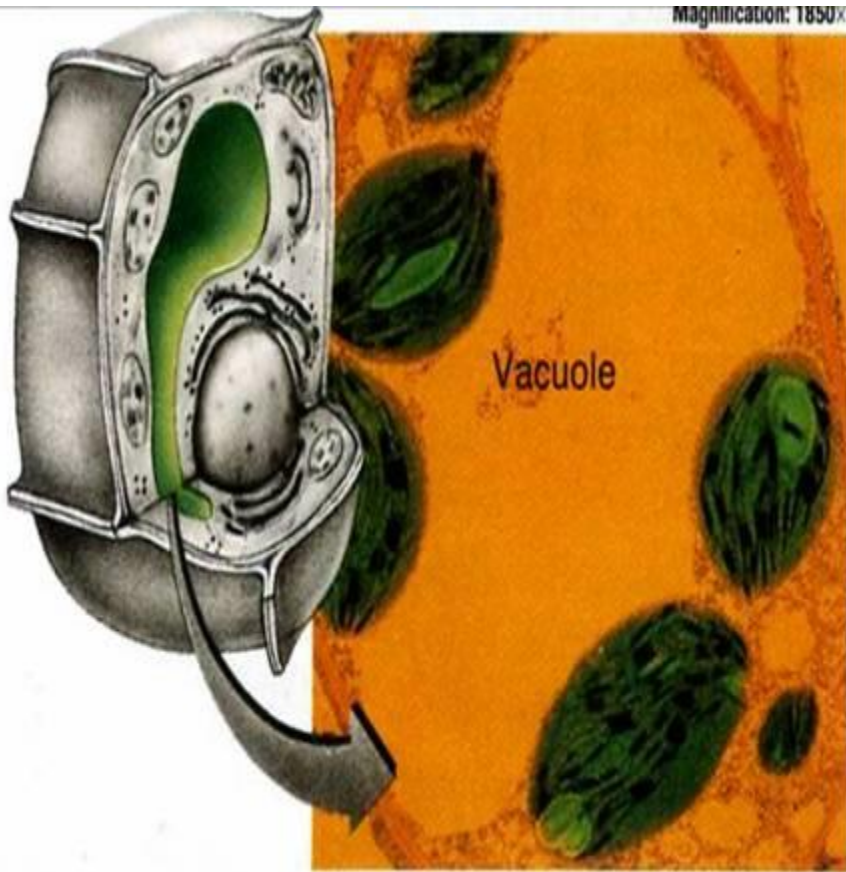
- To sort and package proteins from the ER.
- These protein vesicles are either secreted or used internally.

- Color the Golgi apparatus now!

# ***Function of Vacuoles***

- In the restaurant kitchen, the vegetables and meats are stored in bins and containers. Cells have spaces called vacuoles for temporary storage of materials. Vacuoles often store food, waste and enzymes needed by the cell.

# Vacuoles



- Color the vacuole now!



# ***Function of Lysosomes***

- Lysosomes are enzymes that digest excess or worn out cell parts. They can dispense their contents into vacuoles to digest whatever is being stored.

# Lysosomes



Lysosomes are vesicles filled with enzymes that have pinched off the Golgi apparatus.

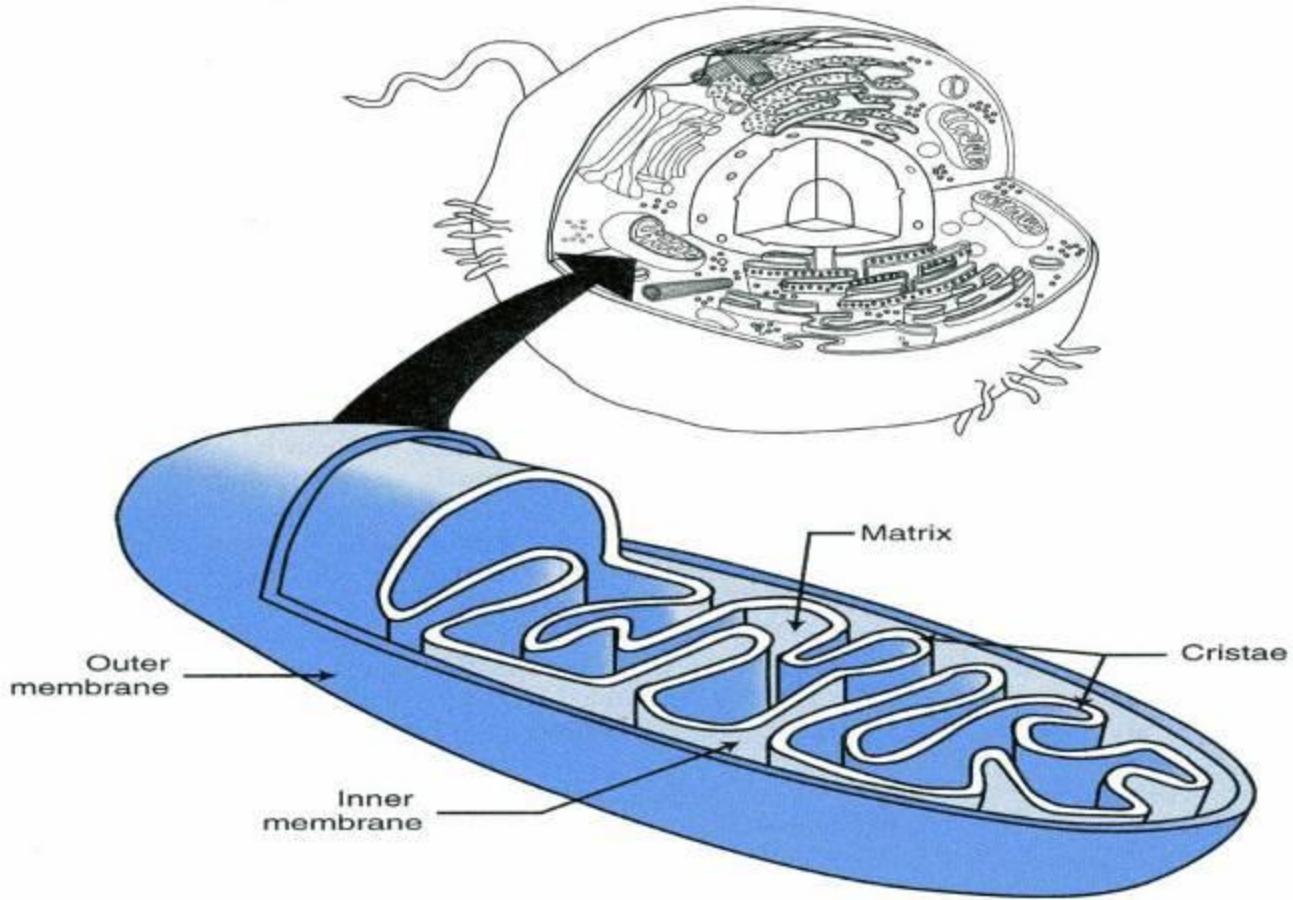
- Color the lysosomes now!

# ***“THE POWER HOUSE”***

The mitochondria is similar to the restaurant's electricity source. All functions—the stove, lights, music, refrigerator—depend on energy from the electrical outlets located in the restaurant. The mitochondria provides the same source for the cell.

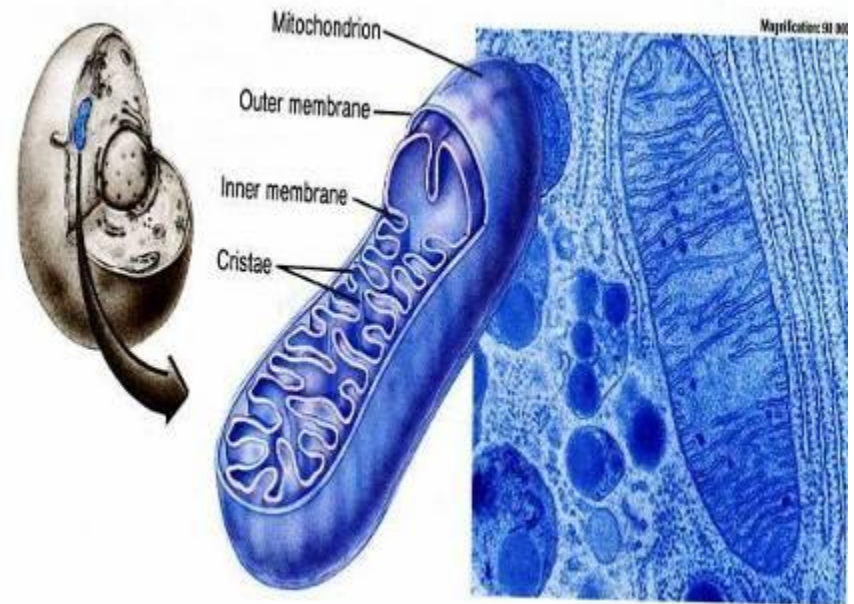


# ENERGY TRANSFORMERS!!



# Functions of the Mitochondria

- Site of ATP (Adenosine Tri Phosphate) production from respiration.
- This is where food molecules are broken down to release energy!



- Color the mitochondria now!

# Structures for Support and Locomotion!!

- Years ago, scientists thought cell organelles just floated around within the cytoplasm. Recently, scientists have discovered that there are **tiny rods and filaments** that can move and change to form a framework for supporting organelles.



- These tiny filaments and rods are composed of ***microtubules*** and ***microfilaments***.
- Microtubules are thin and **hollow**.
- Microfilaments are thin and **solid**.



# Cytoskeleton

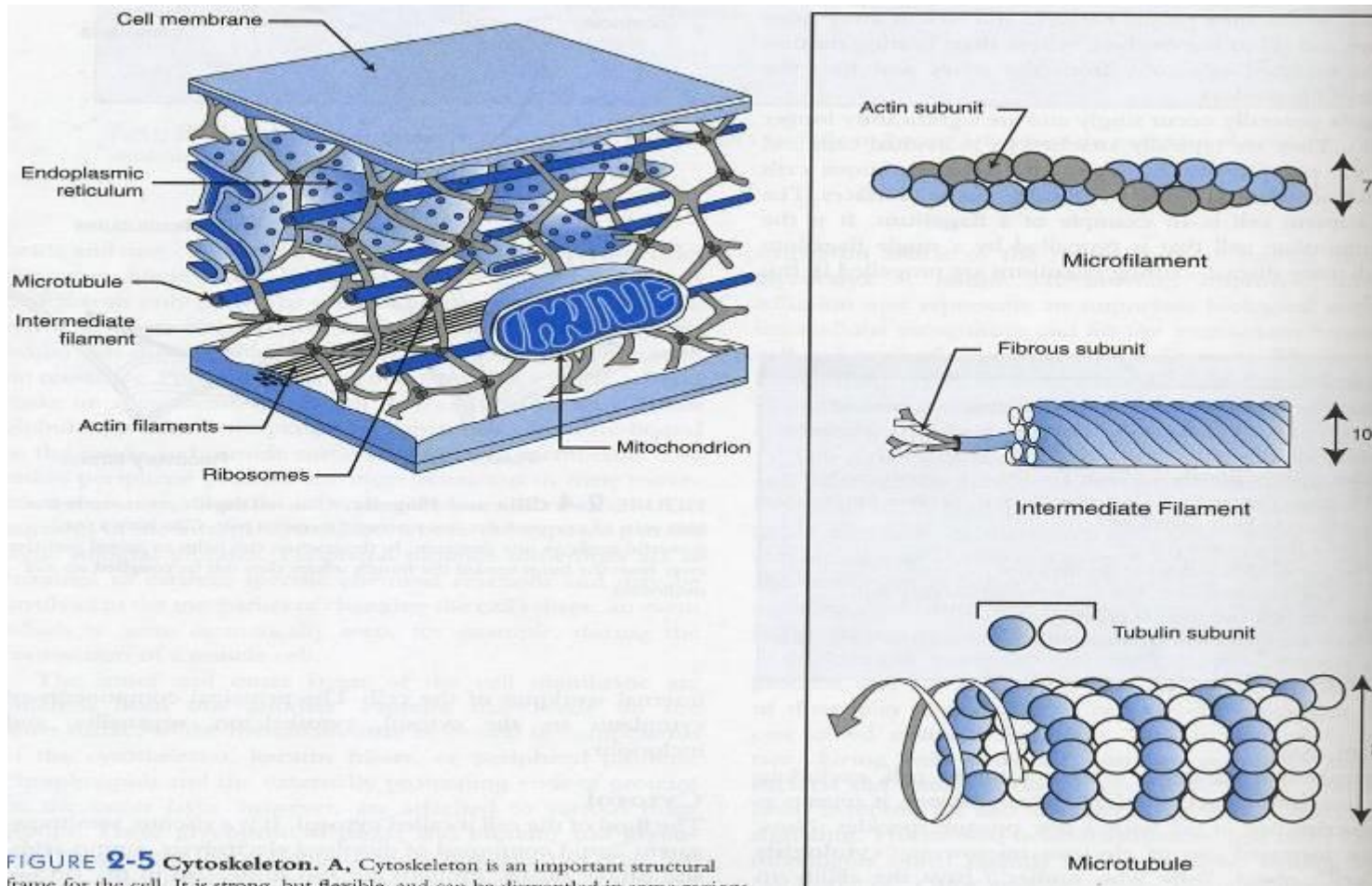


FIGURE 2-5 Cytoskeleton. A, Cytoskeleton is an important structural frame for the cell. It is strong, but flexible, and can be dismantled in some regions.

# Function of the Cytoskeleton

- The cytoskeleton provides strength, structure and support; it also maintains cell shape, and aids movement of organelles and intracellular materials.

- Color the cytoskeleton now!

# ***How do cells move?***

- Cells move in two ways!!
- By the use of **cilia** or **flagella**.

# Cilia

- Cilia are short, numerous, hair-like projections from the plasma membrane. They move in a “wave” motion.
- The cilia ***move the cell*** by beating rhythmically.

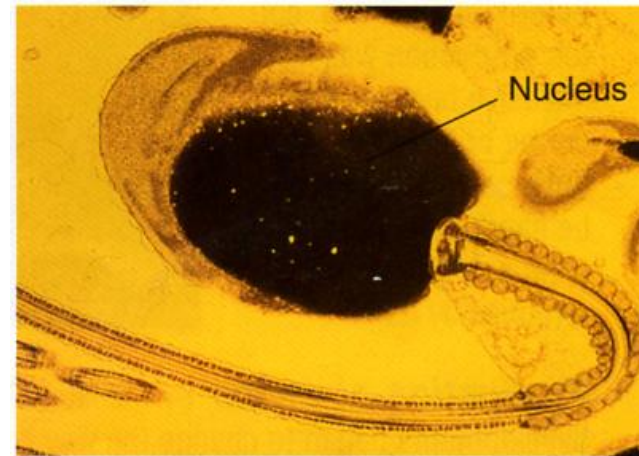


# Flagella

- Flagella function to move the cell by one long projection that moves in a whip-like motion. Cells that have flagella will only have one or two projections.



Sperm cells



# Can you guess how each of these cells move?

Cell A

Cell B



Cilia

Flagella



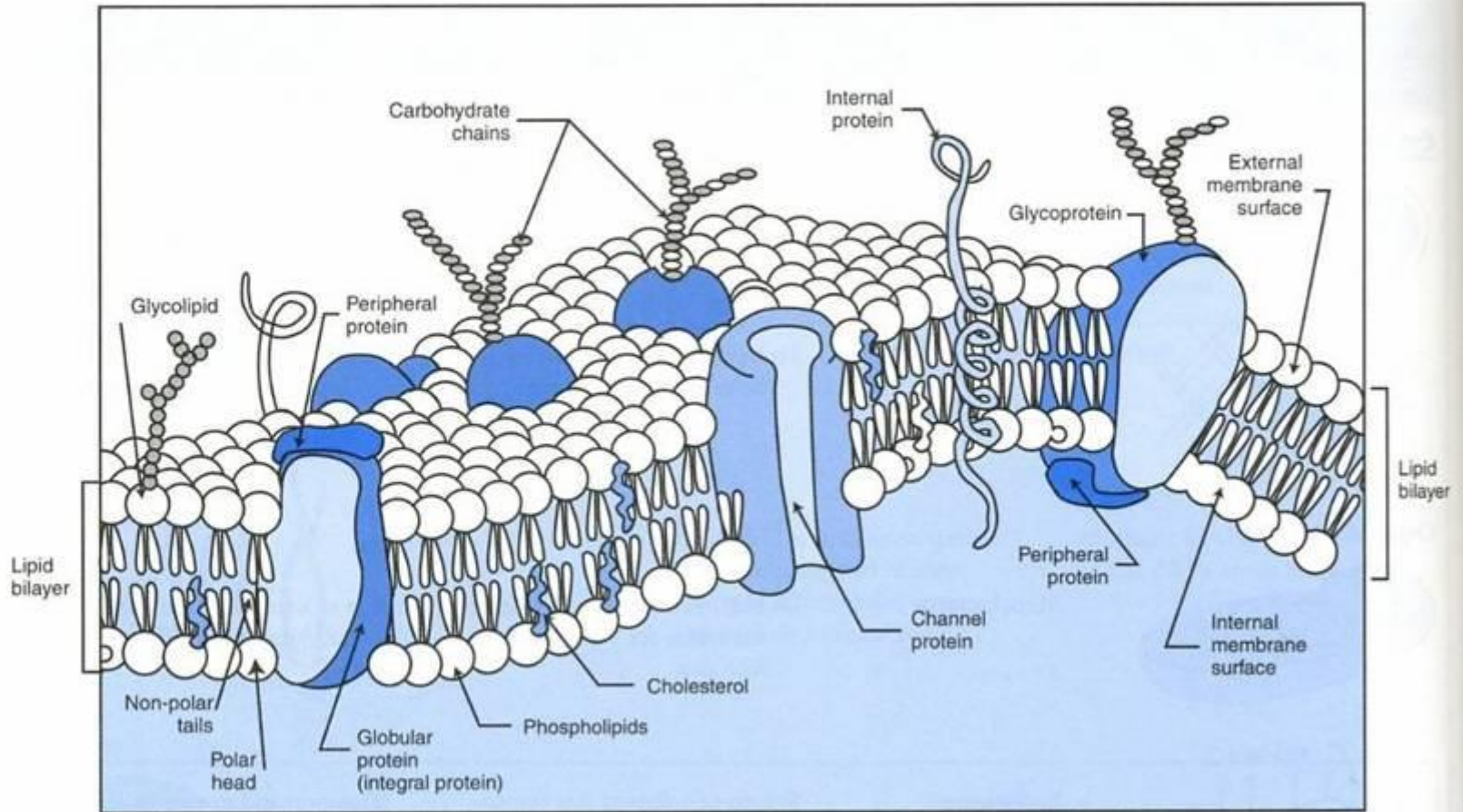
- Color the cilia or flagella now!
- (If they are not present, draw them onto your cell coloring)

It's time to play...

***THE  
ORGANELLE  
IS RIGHT?***

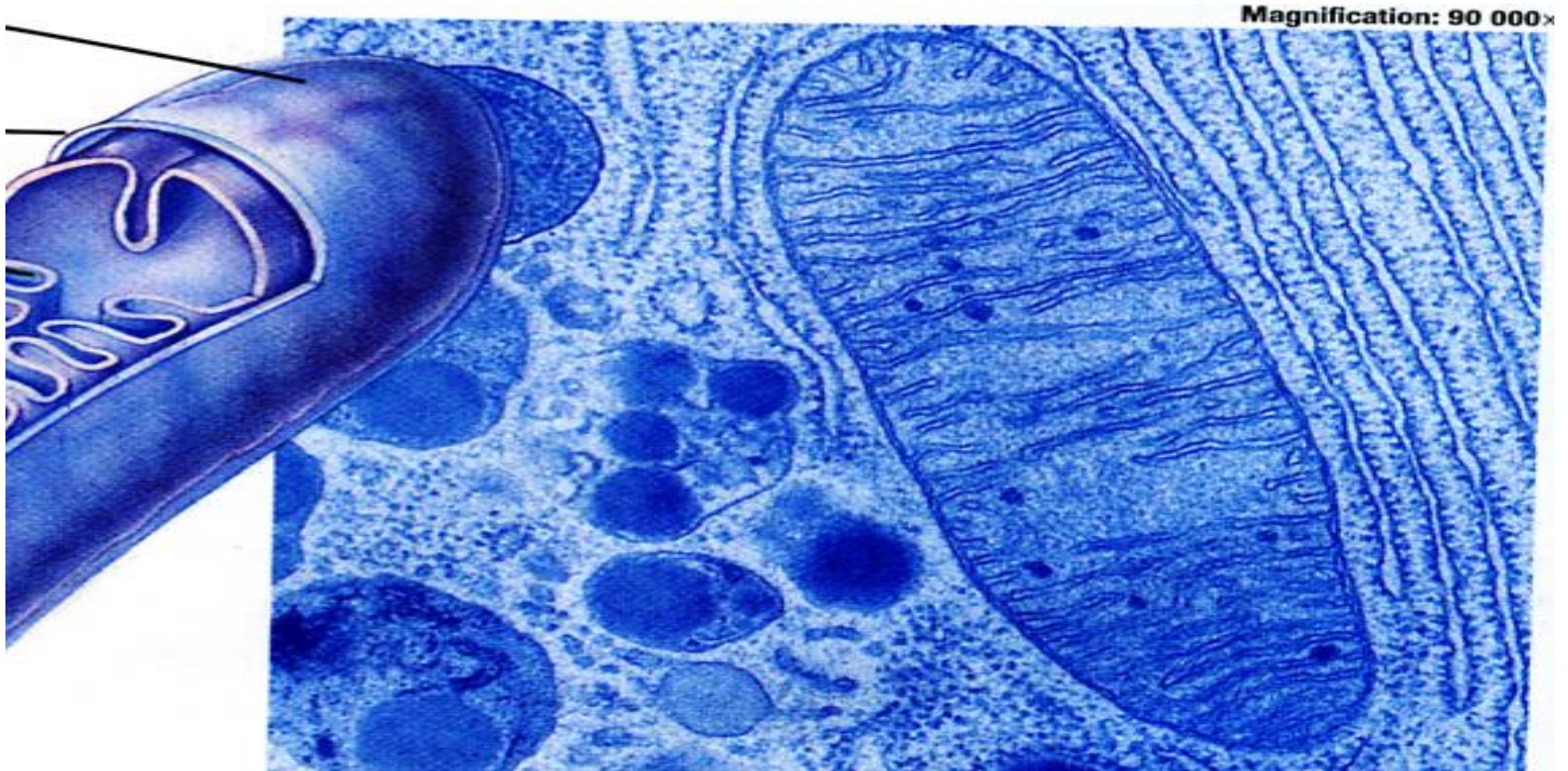
- At this time, get out your organelle quiz sheet that reads “THE ORGANELLE IS RIGHT.”
- All students will take the quiz!!
- Points for all correct answers!!
- ARE YOU READY?

# For 1 point, name this organelle!



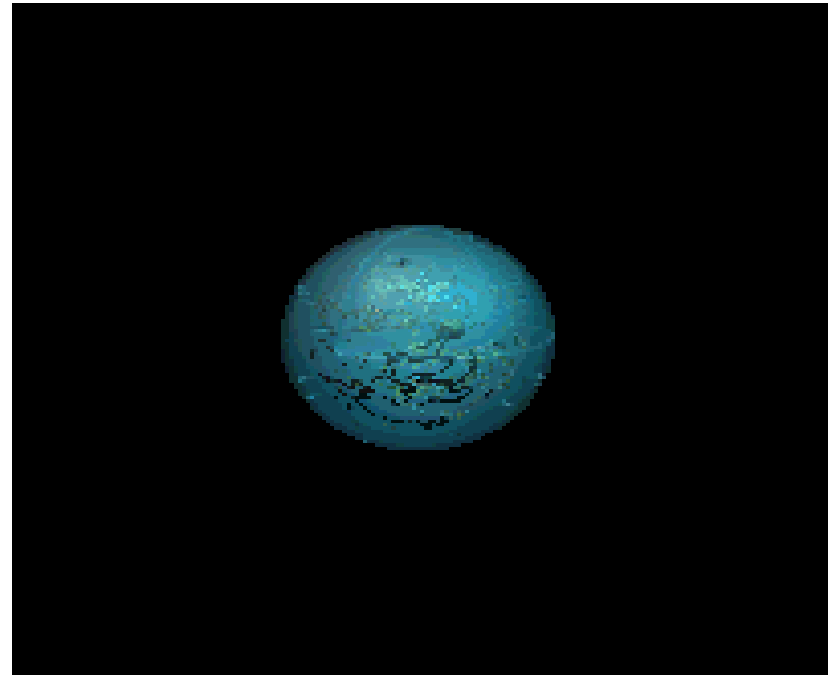
Hint: This entire picture is the organelle.

**For 1 point, name this organelle!**



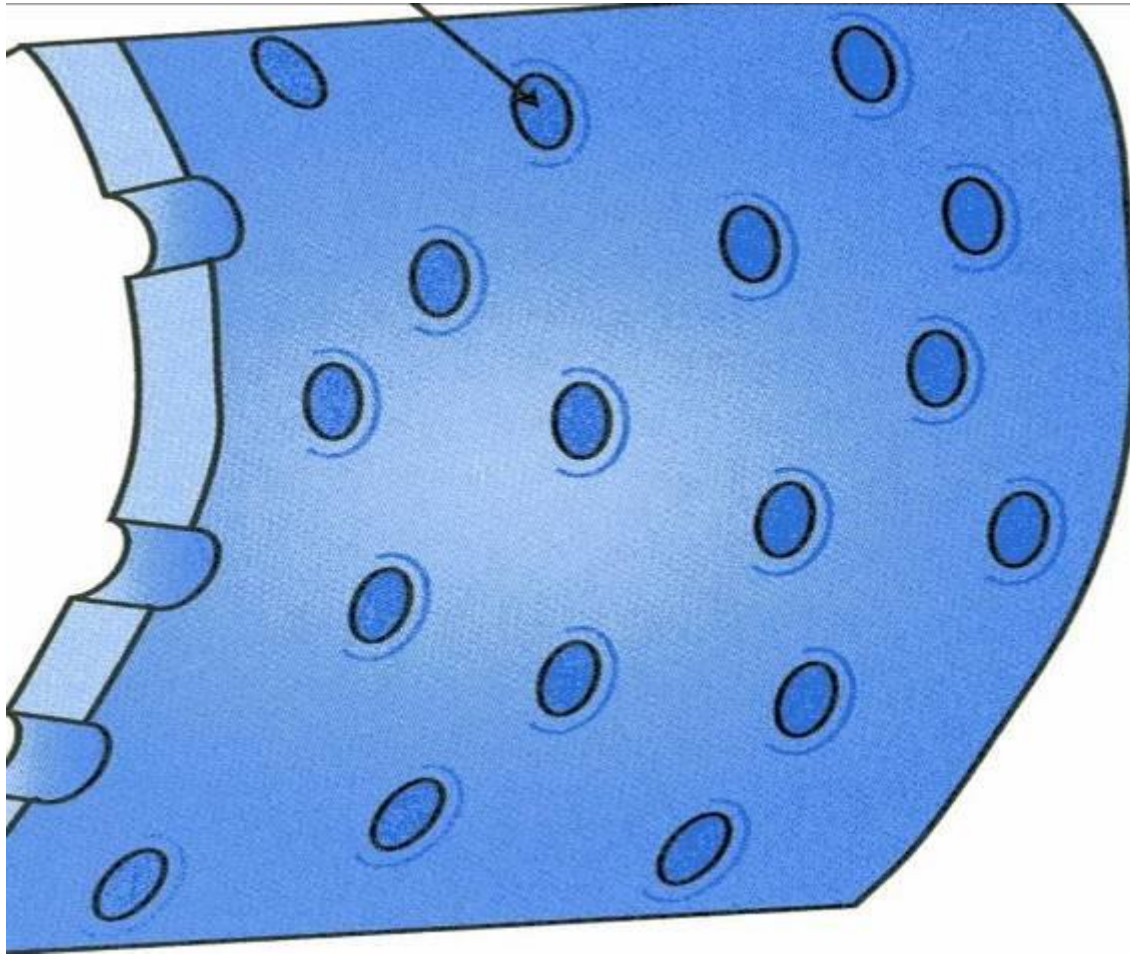
Hint: Powerhouse baby!!

**For 2 points, name this organelle!**



Hint: All personal report to the OFFICE!!

**For 3 points, name this organelle.**



Hint: Round and full of protein pass through.

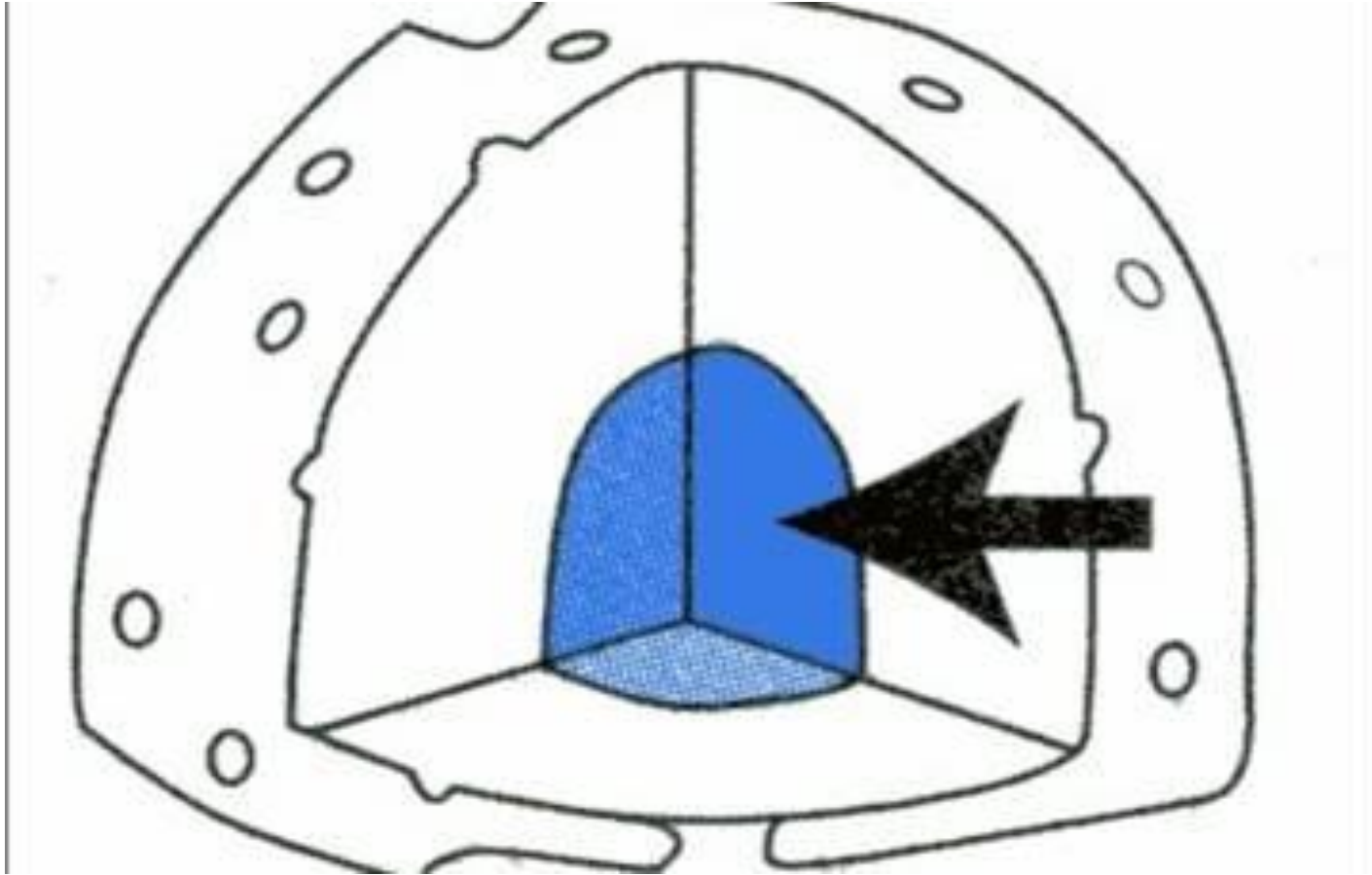
**For 5 points, name this organelle.**



Hint: Causes the cell to dance!

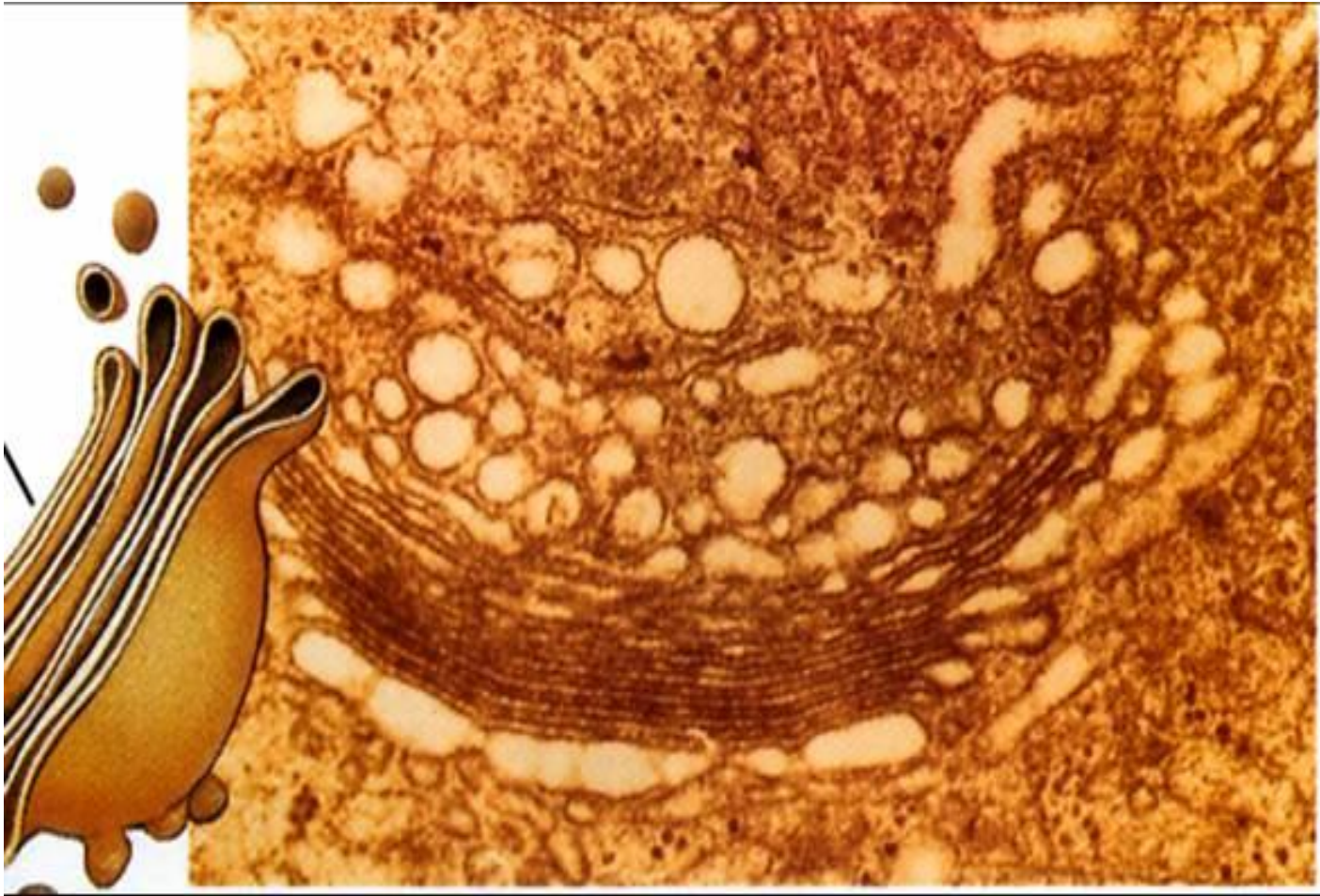


**For 5 points, name this organelle.**



Hint: Ribosomes are made here.

# Final question worth 5 points!



Hint: Packages and sends.

# **EXCELLENT JOB!**

There were 22 possible extra-credit points. Please pass in your quizzes and colorings for credit. Great work!