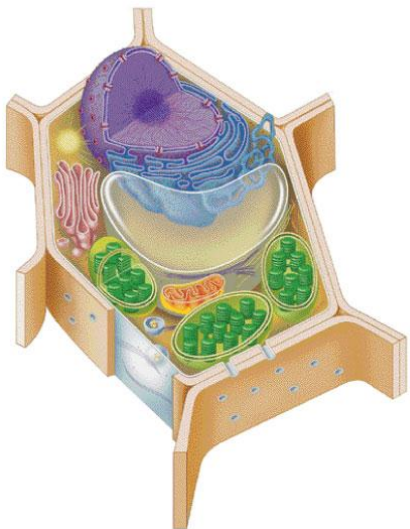
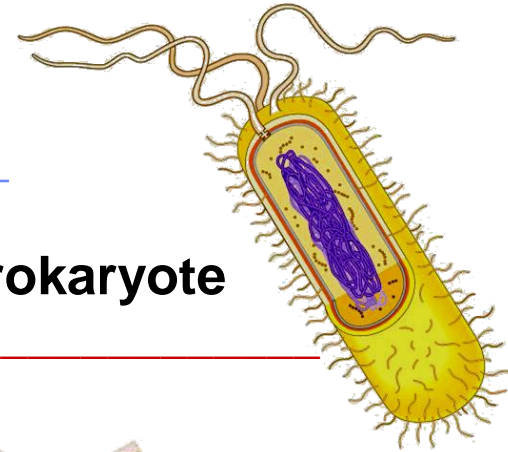


Cells & Cell Organelles

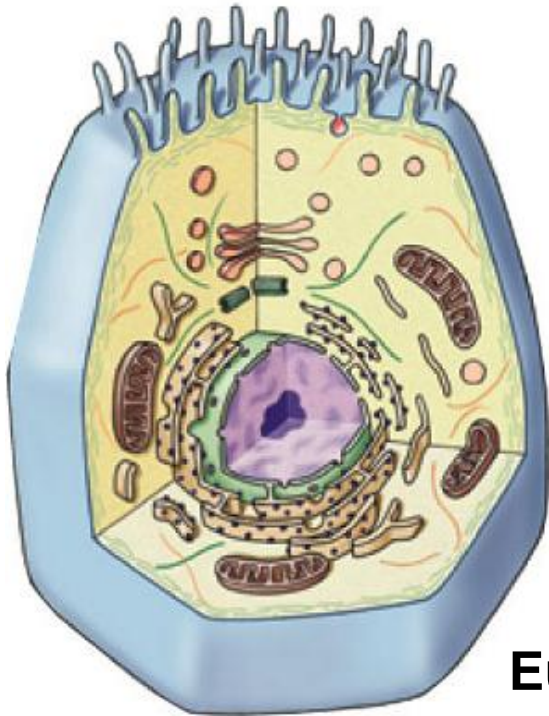
Doing Life's Work



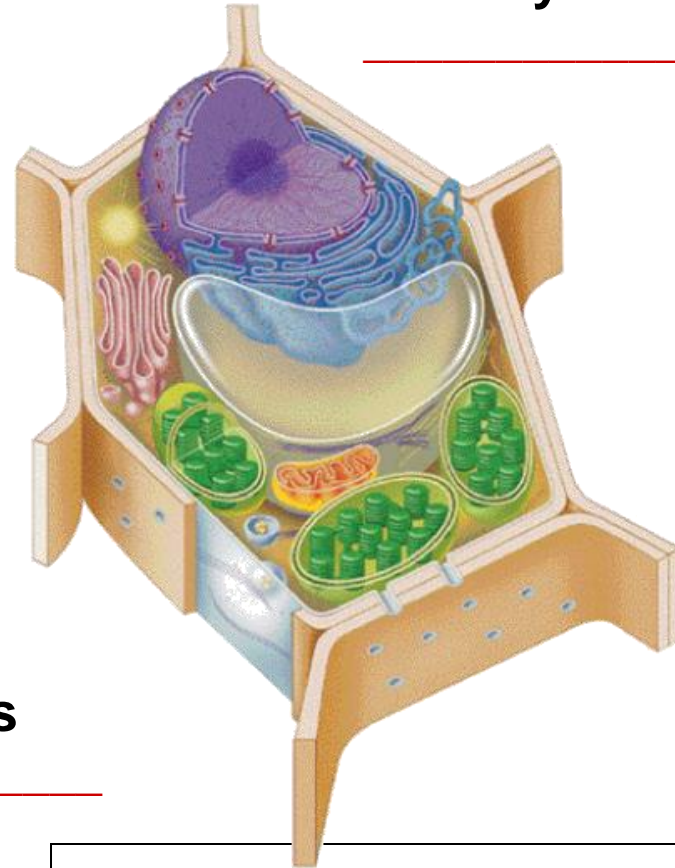
Types of cells



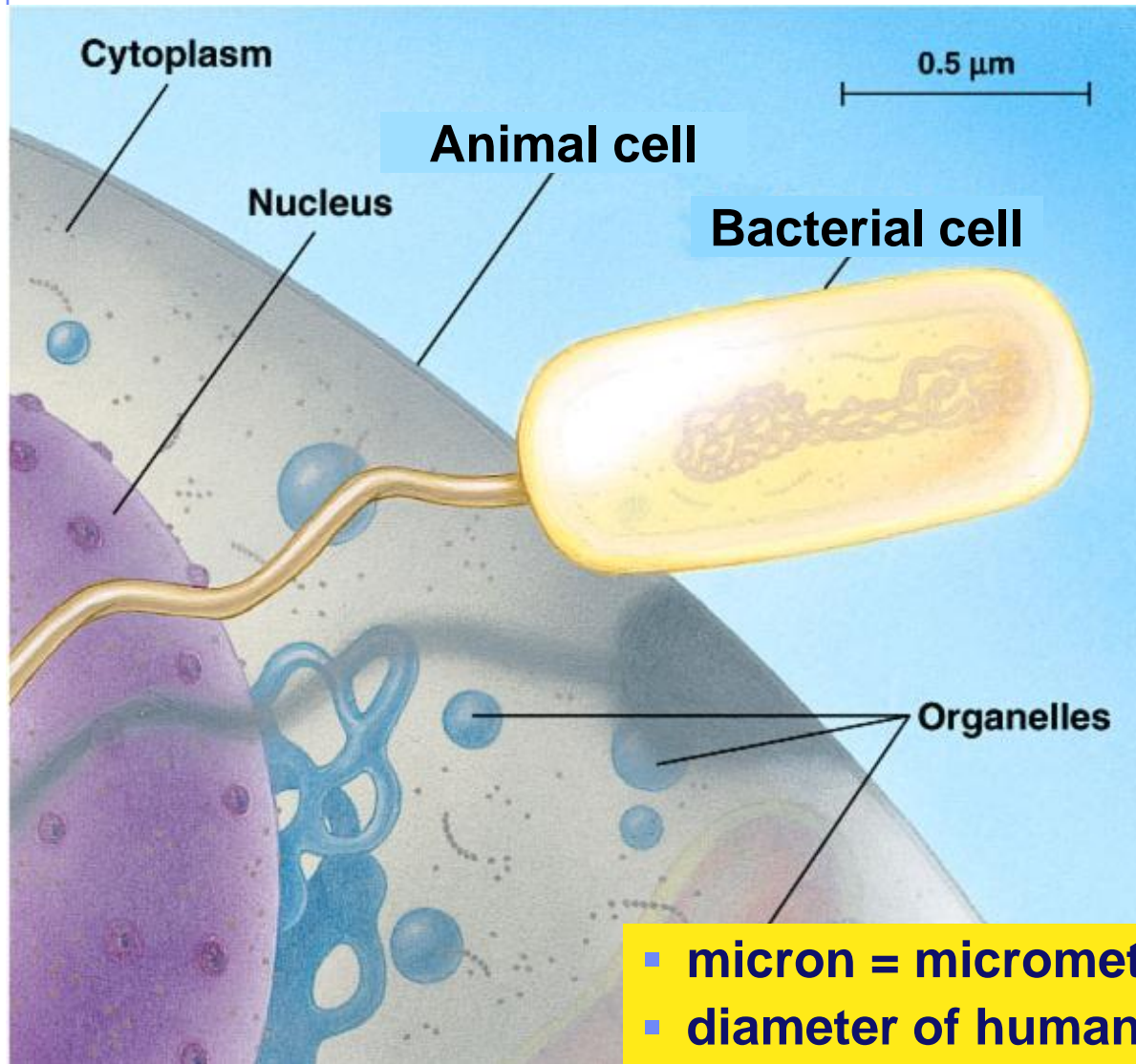
Prokaryote



Eukaryotes



Cell size comparison



most bacteria

- 1-10 microns

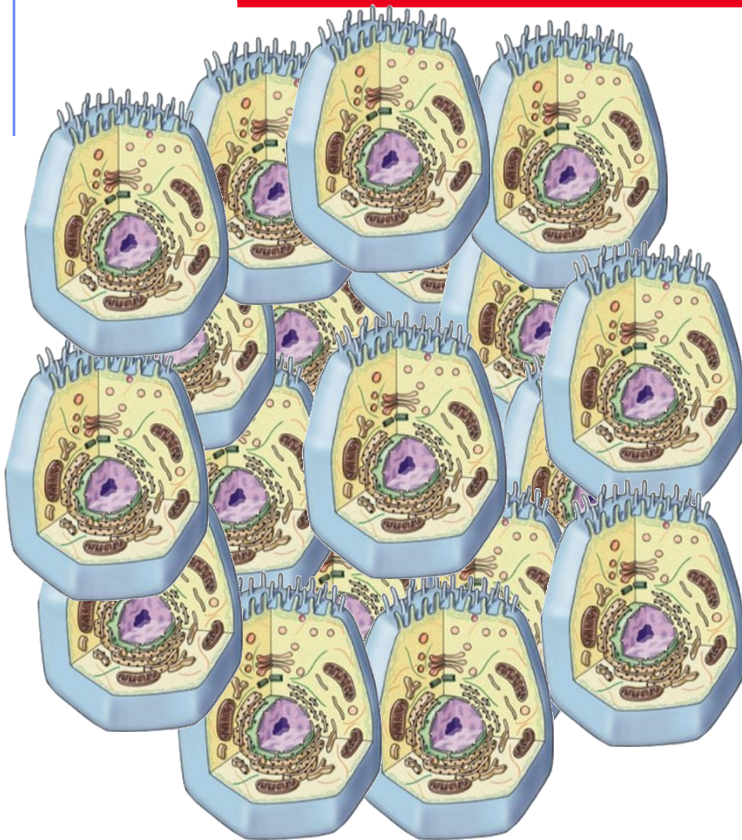
eukaryotic cells

- 10-100 microns

- micron = micrometer = 1/1,000,000 meter
- diameter of human hair = ~20 microns

Why study cells?

■ Cells → Tissues → Organs → Bodies



The Work of Life

- What jobs do cells have to do for an organism to live...
 - ◆ “breathe”
 - _____
 - ◆ _____
 - take in & digest food
 - ◆ _____
 - ATP
 - ◆ _____
 - proteins, carbohydrates, fats, nucleic acids
 - ◆ _____
 - ◆ _____
 - ◆ _____
 - _____
 - ◆ _____
 - ◆ _____
 - growth, repair, reproduction & development



The Jobs of Cells

- **Cells have 3 main jobs**



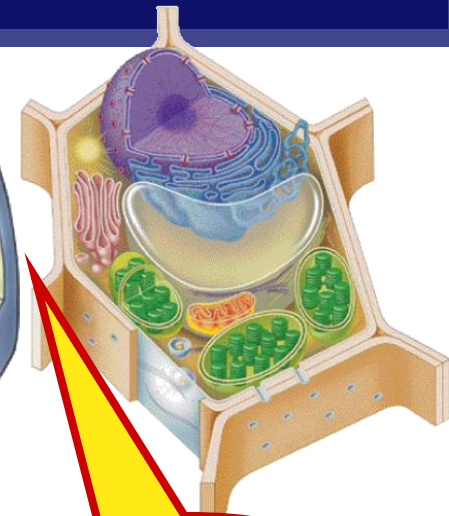
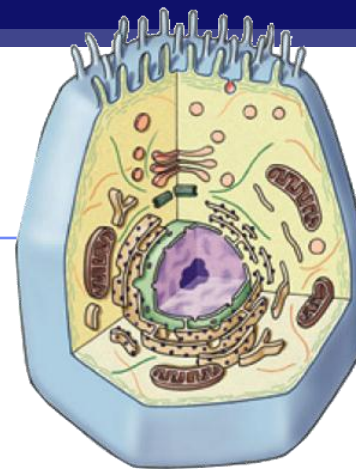
-
- need energy for all activities
 - need to clean up waste produced while making energy



-
- proteins do all the work in a cell, so we need lots of them



-
- for growth
 - to replace damaged or diseased cells

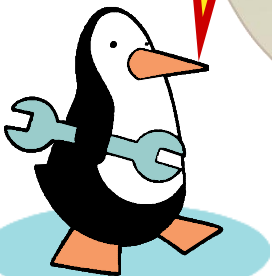


**Our organelles
do all these
jobs!**

Organelles

- Organelles do the work of cells
 - ◆ each structure has a job to do
 - keeps the cell alive; keeps you alive

They're like
mini-organs!



Model Animal Cell

1. Cells need power!

■ Making energy

◆ to fuel daily life & growth, the cell must...

- take in food & digest it
- take in oxygen (O_2)
- make ATP
- remove waste

◆ organelles that do this work...

- _____
- _____
- _____
- _____



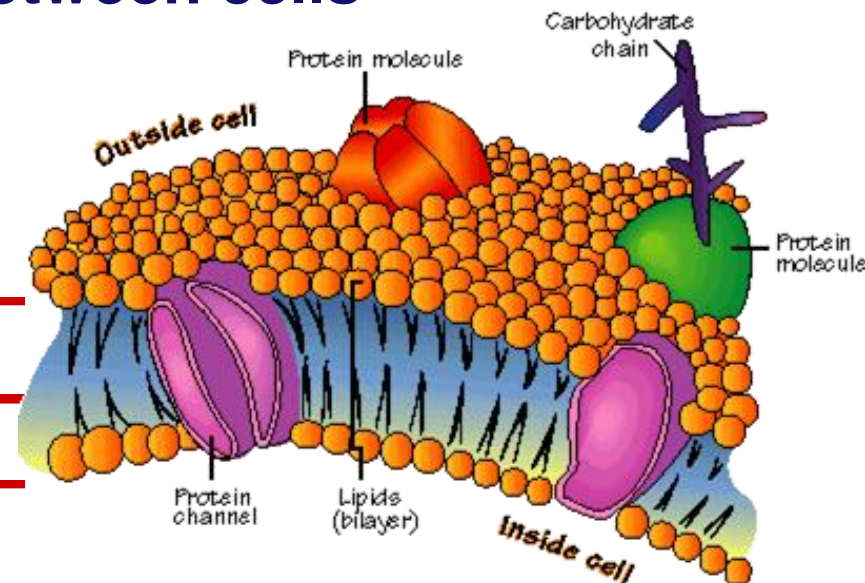
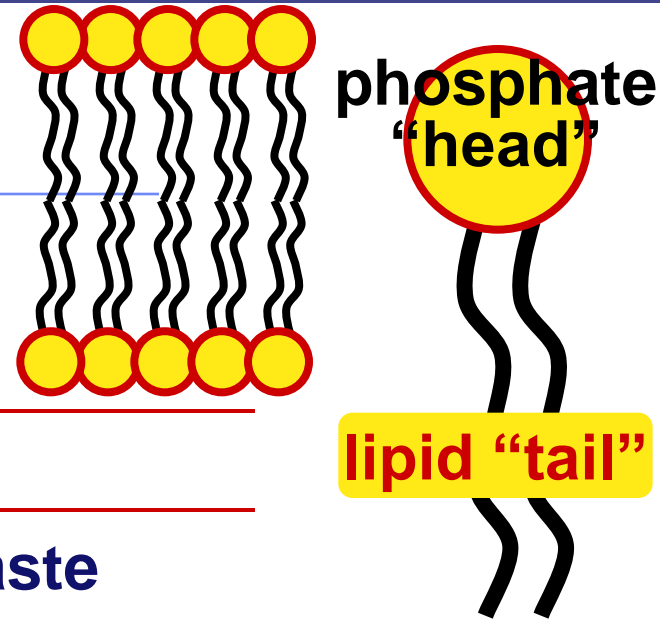
Cell membrane

Function

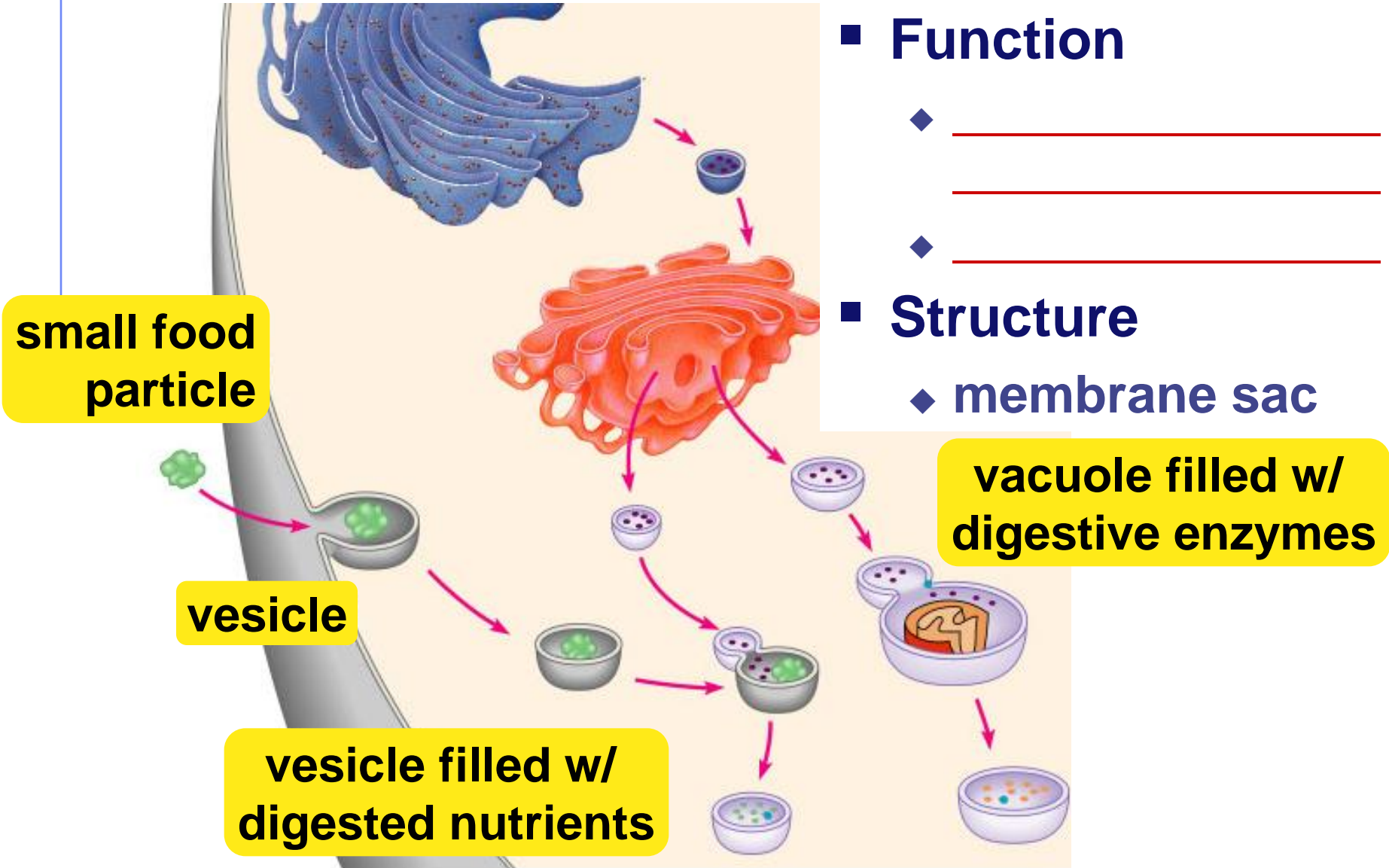
- ◆ _____
- ◆ _____
- O_2, CO_2 , food, H_2O , nutrients, waste
- ◆ _____
- allows communication between cells

Structure

- ◆ double layer of fat
- _____
- ◆ _____
- _____



Vacuoles & vesicles



Function

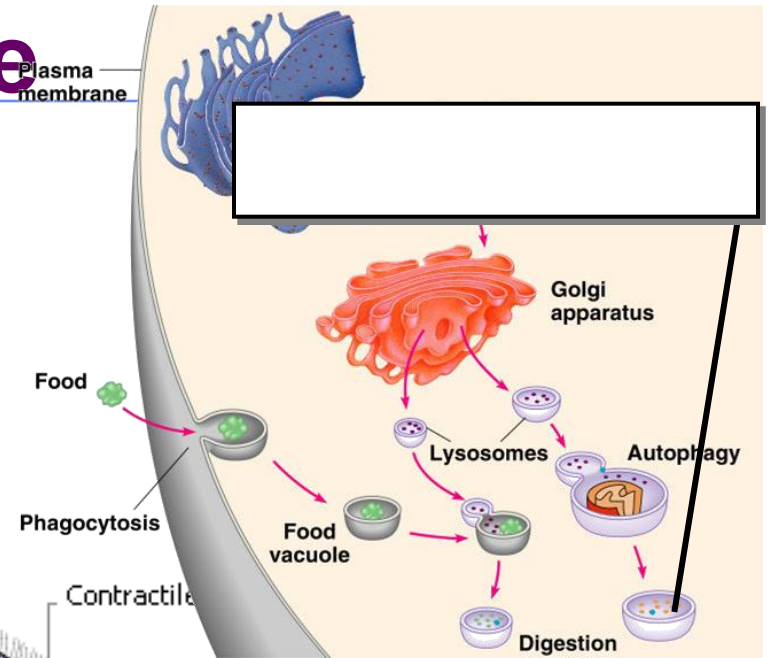
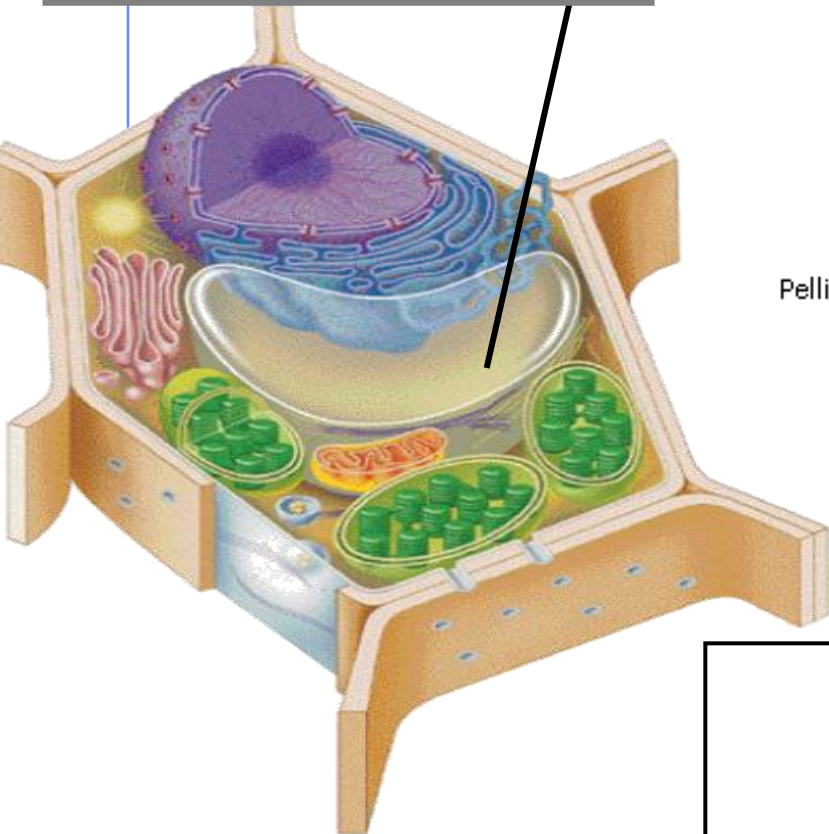
- ◆ _____
- ◆ _____

Structure

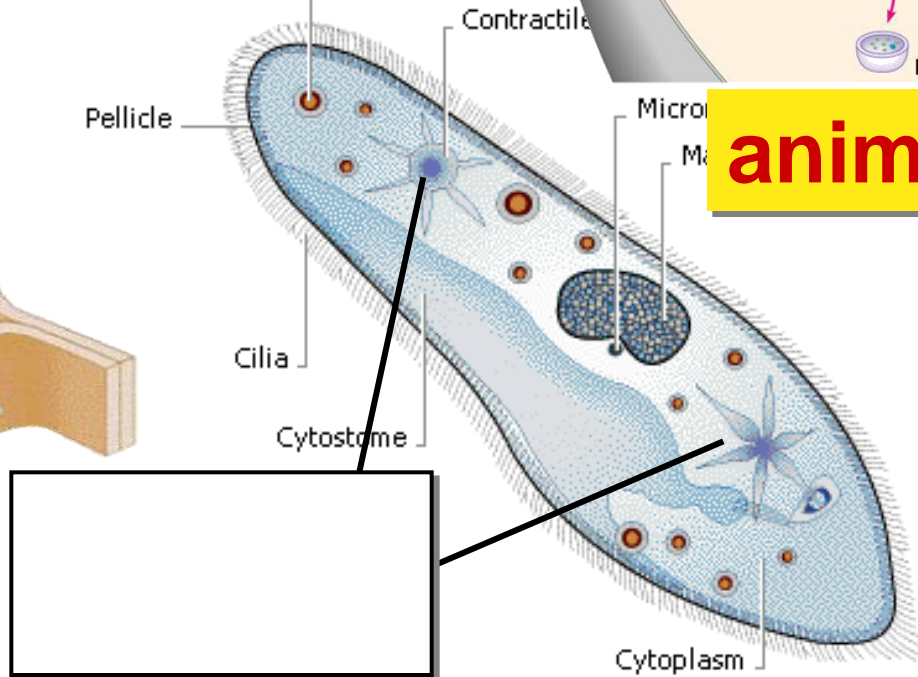
- ◆ membrane sac

Food & water storage

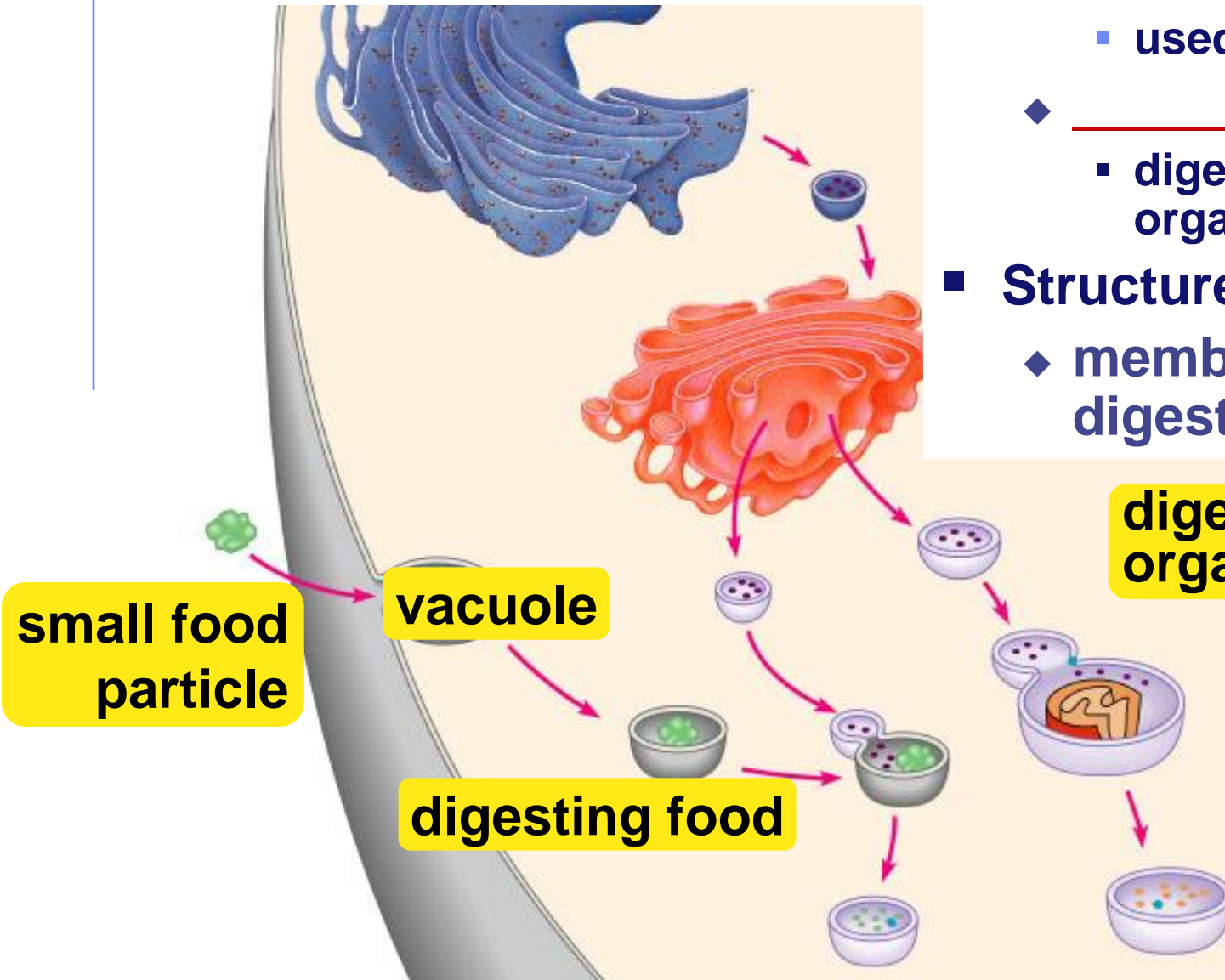
plant cells



animal cells



Lysosomes



Function

- ◆ _____
 - used to make energy
- ◆ _____
 - digest broken organelles

Structure

- ◆ membrane sac of digestive enzymes

digesting broken organelles

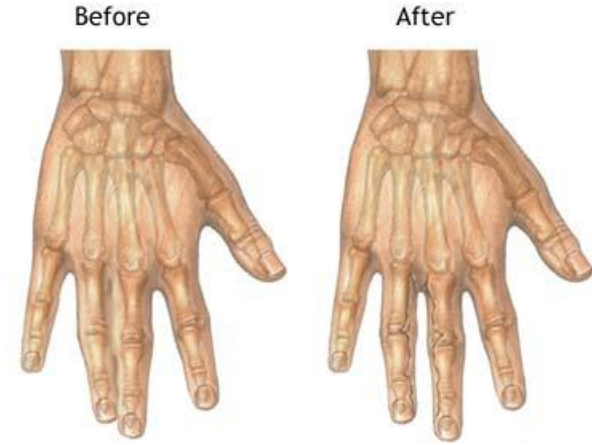
small food particle

vacuole

digesting food

A Job for Lysosomes

6 weeks



15 weeks



Mitochondria

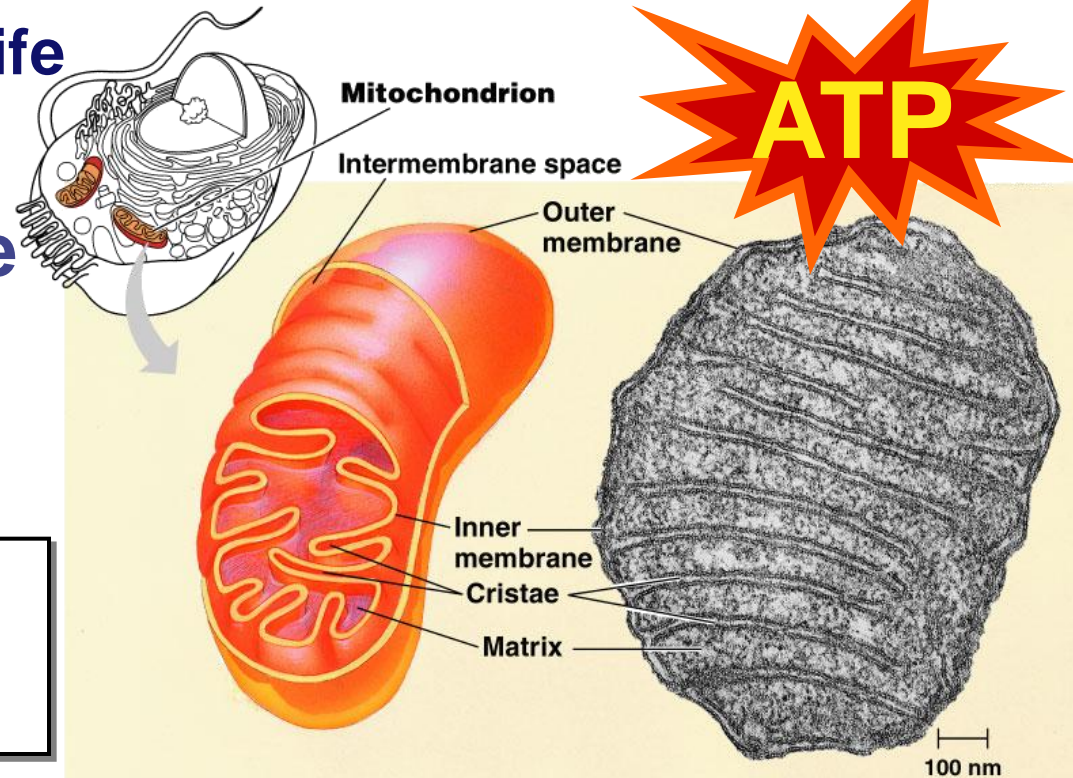
■ Function



- sugar + O₂ → ATP
- fuels the work of life

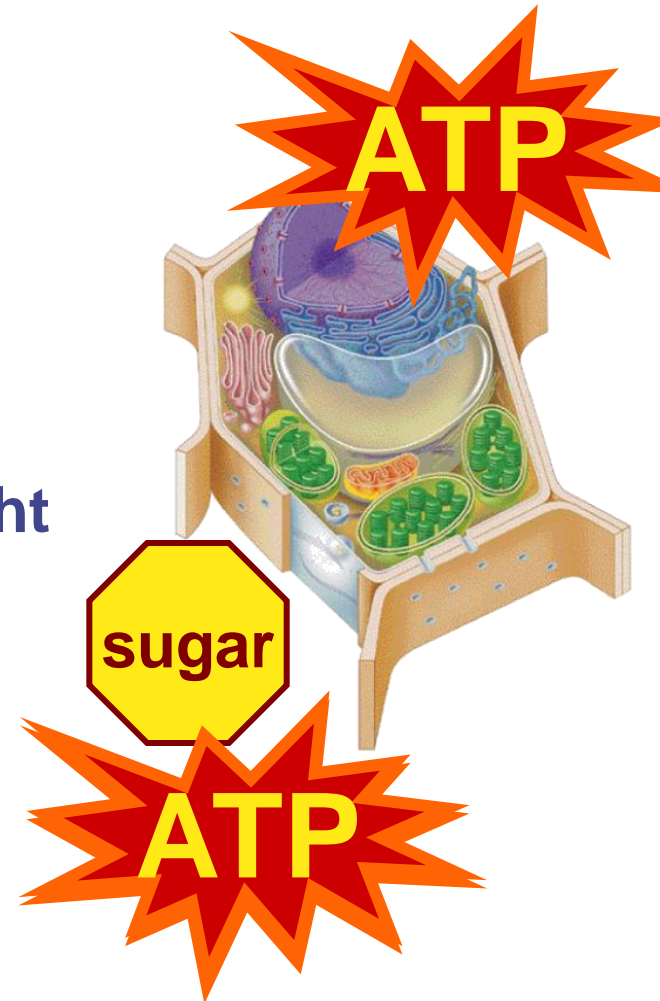
■ Structure

- ◆ double membrane



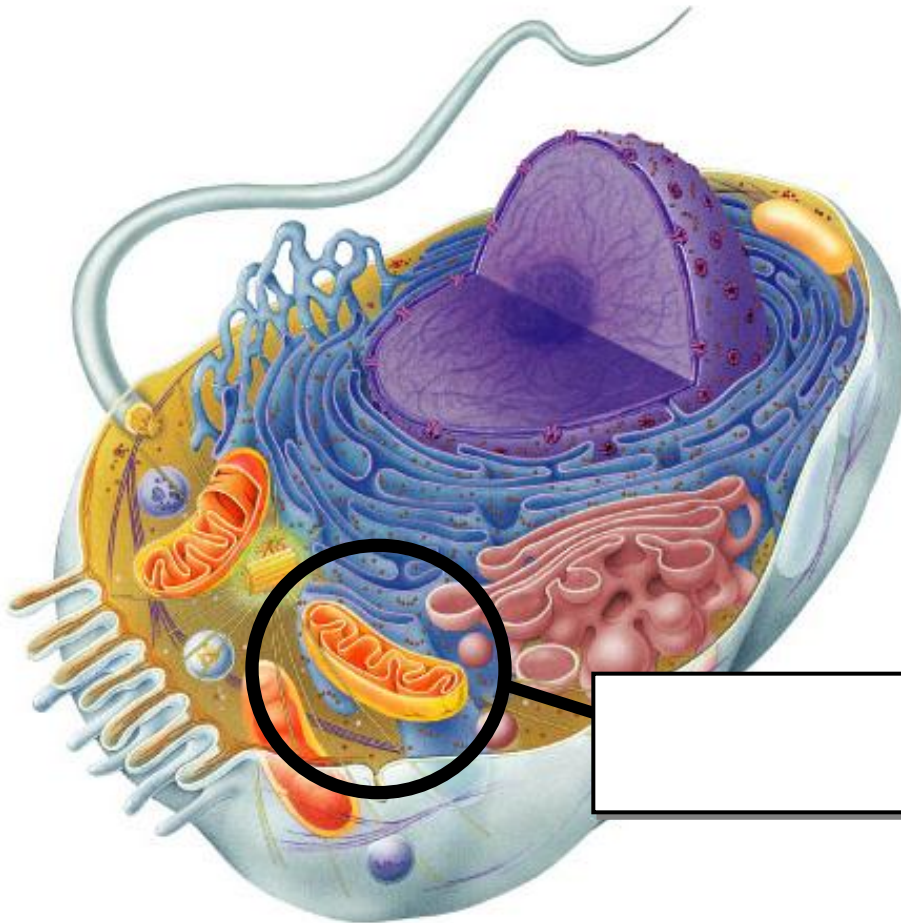
Plants make energy two ways!

- - ◆ make energy from sugar
 - _____
 - **sugar → ATP**
- - ◆ make energy + sugar from sunlight
 - _____
 - **sunlight → ATP & sugar**
 - ◆ ATP = active energy
 - ◆ sugar = stored energy
 - build leaves & roots & fruit out of sugars

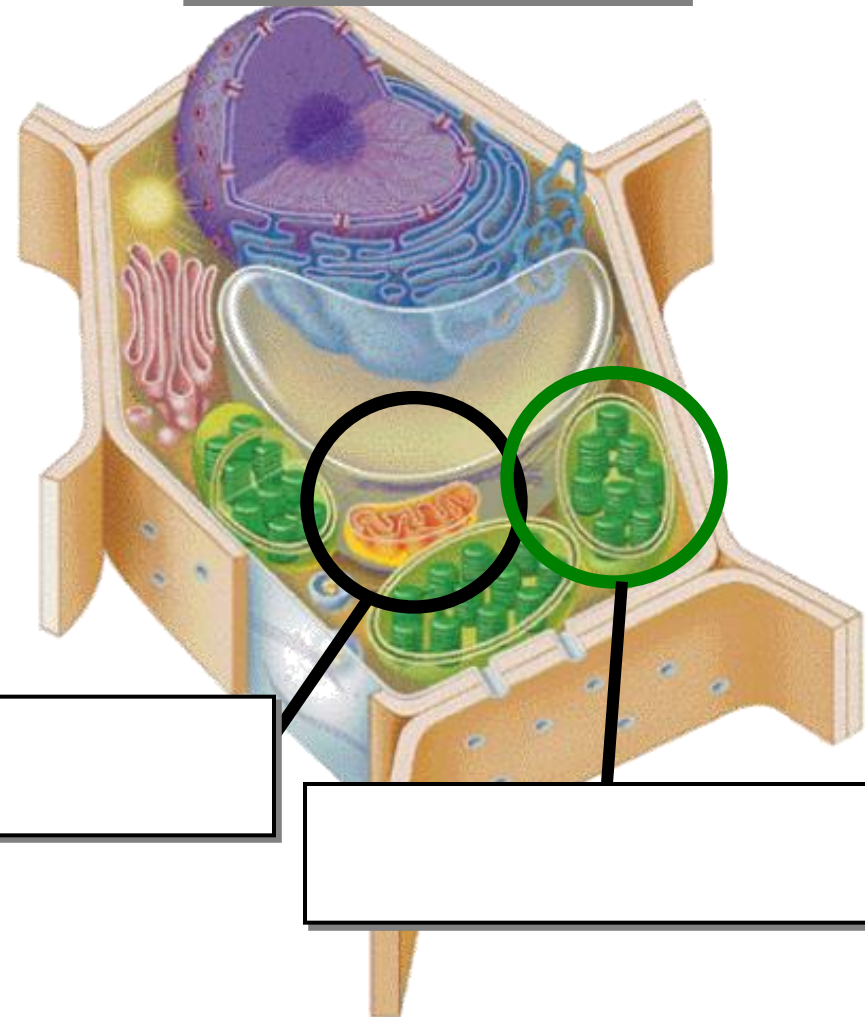


Mitochondria are in both cells!!

animal cells



plant cells



2. Cells need workers = proteins!

- **Making proteins**

- ◆ to run daily life & growth, the cell must...

- read genes (DNA)

- build proteins

- ◆ structural proteins (muscle fibers)

- ◆ enzymes (speed up chemical reactions)

- ◆ signals (hormones) & receptors

- ◆ organelles that do this work...

-

-

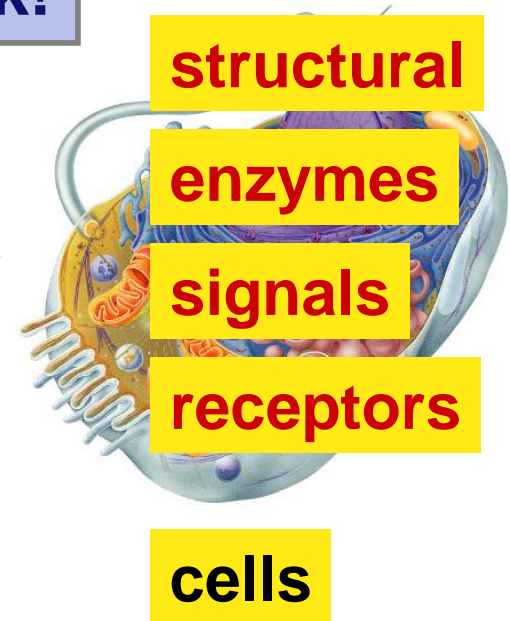
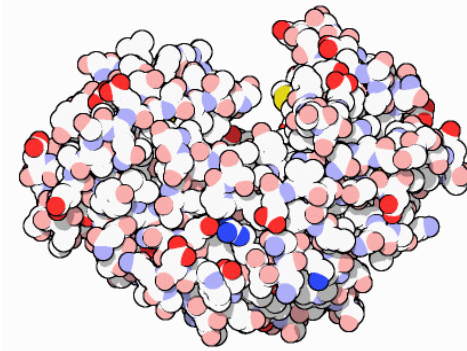
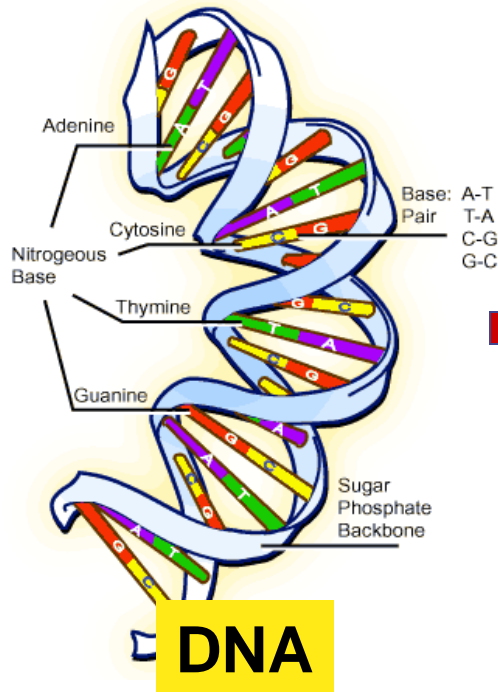
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-

Proteins do all the work!

one of the major job of cells is to make proteins, because...

proteins do all the work!



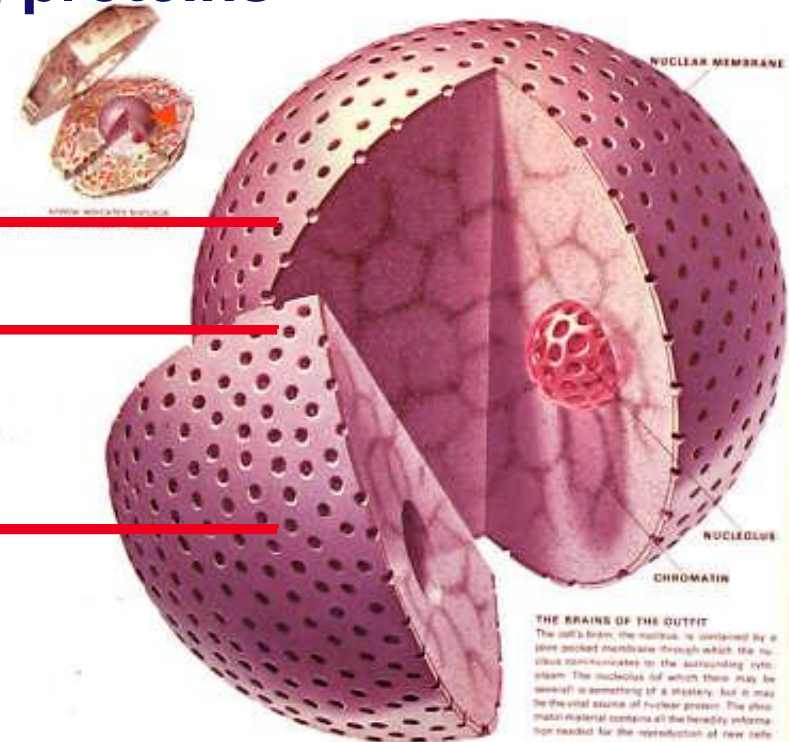
Nucleus

■ Function

- ◆ control center of cell
- ◆ protects DNA
 - instructions for building proteins

■ Structure

- ◆ _____
- ◆ _____
- ribosome factory
- ◆ _____
- DNA



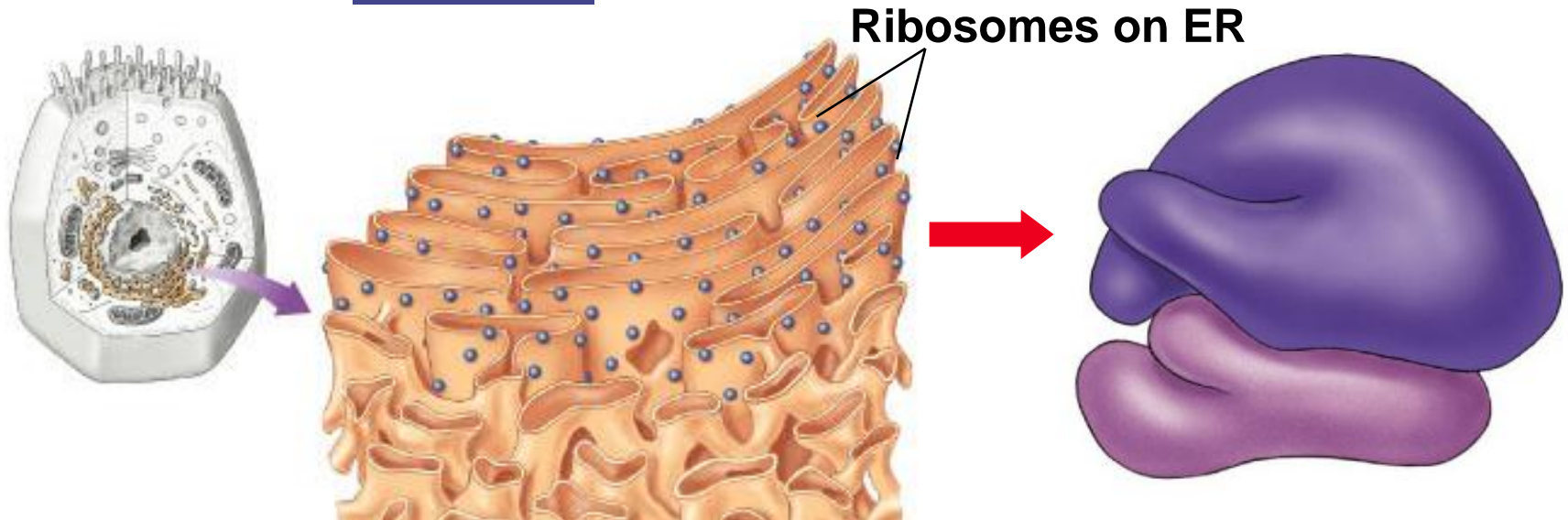
Ribosomes

- Function

- ◆ _____
- ◆ read instructions to build proteins from DNA

- Structure

- ◆ some free in cytoplasm
- ◆ some attached to ER



Endoplasmic Reticulum

■ Function

- ◆

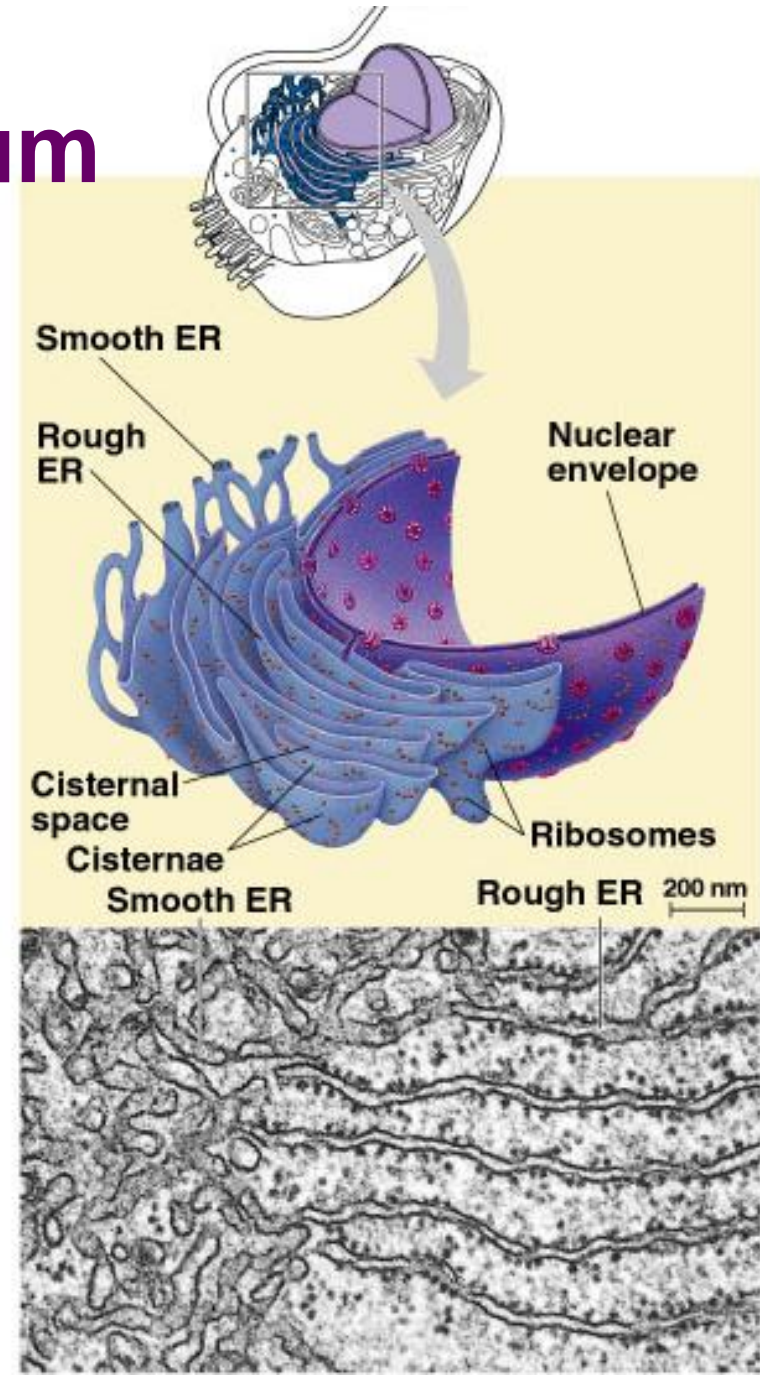
 - helps complete the proteins after ribosome builds them

■ Structure

- ◆

 - ribosomes attached
 - works on proteins
- ◆

 - makes membranes



Golgi Apparatus

■ Function



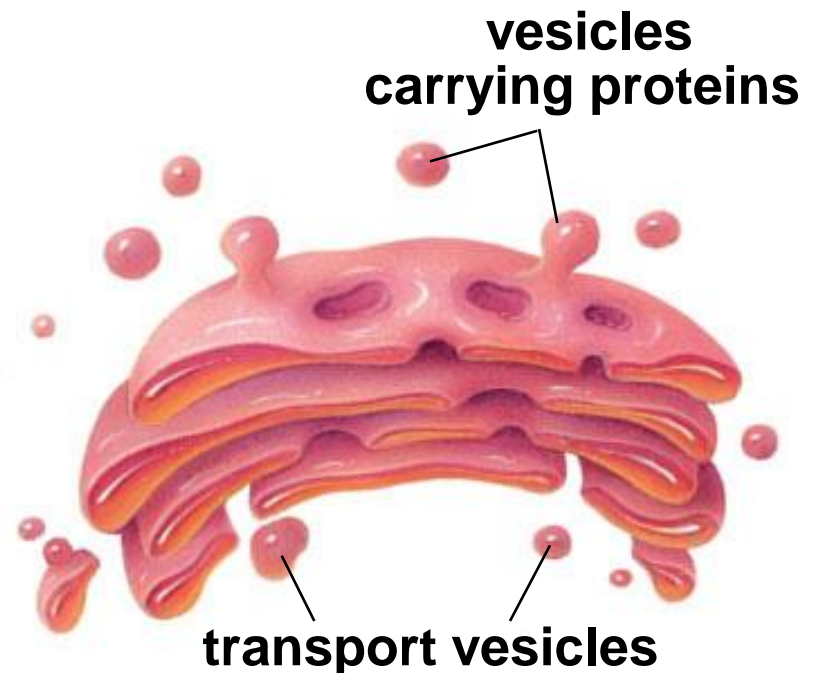
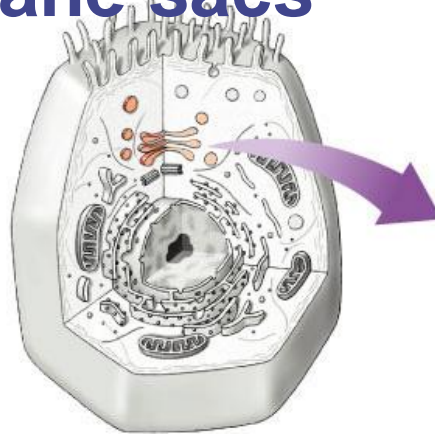
- like UPS headquarters
- shipping & receiving department

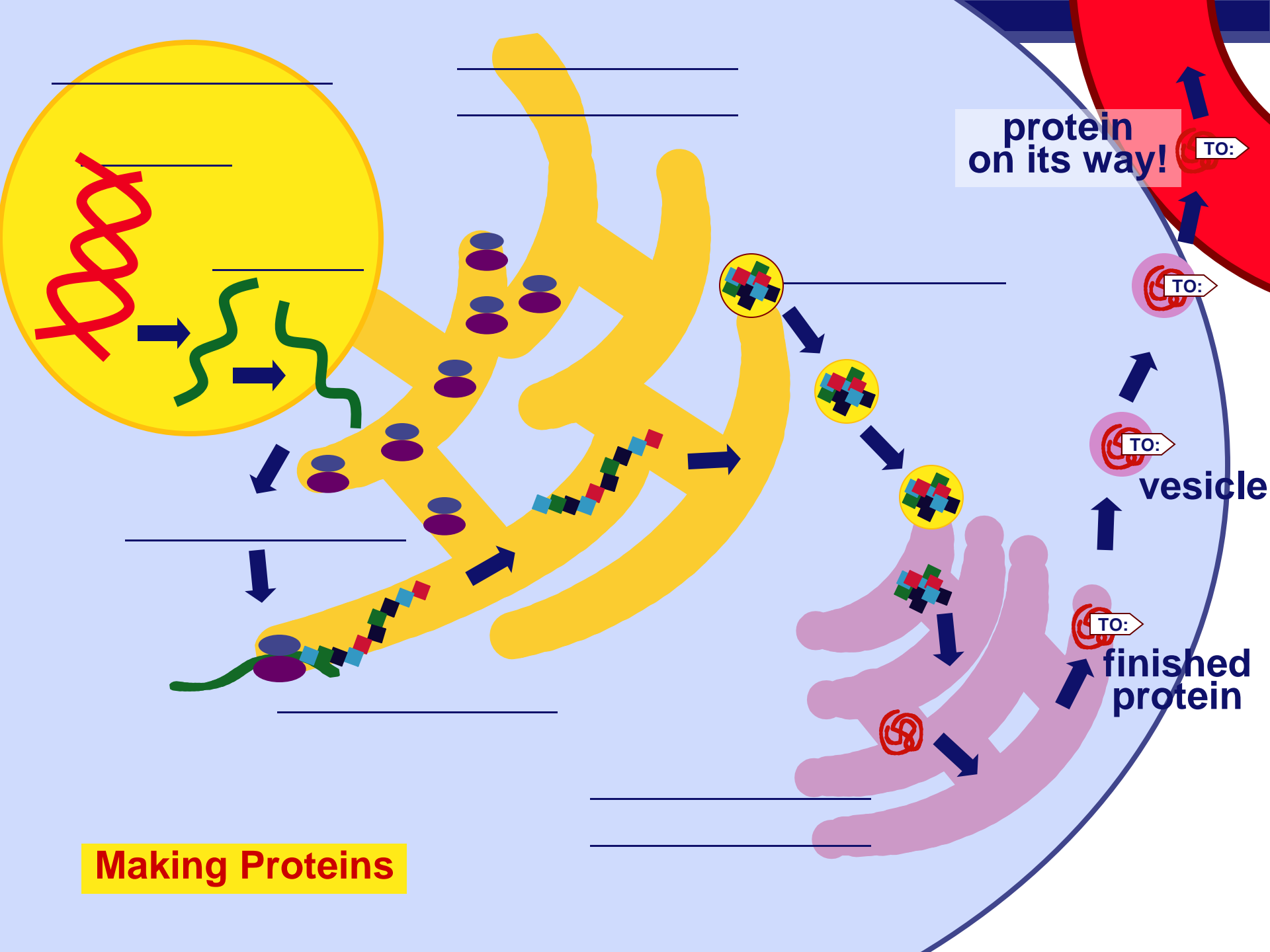


- “UPS trucks”

■ Structure

- ◆ membrane sacs





protein on its way!

TO:

TO:

vesicle

TO:

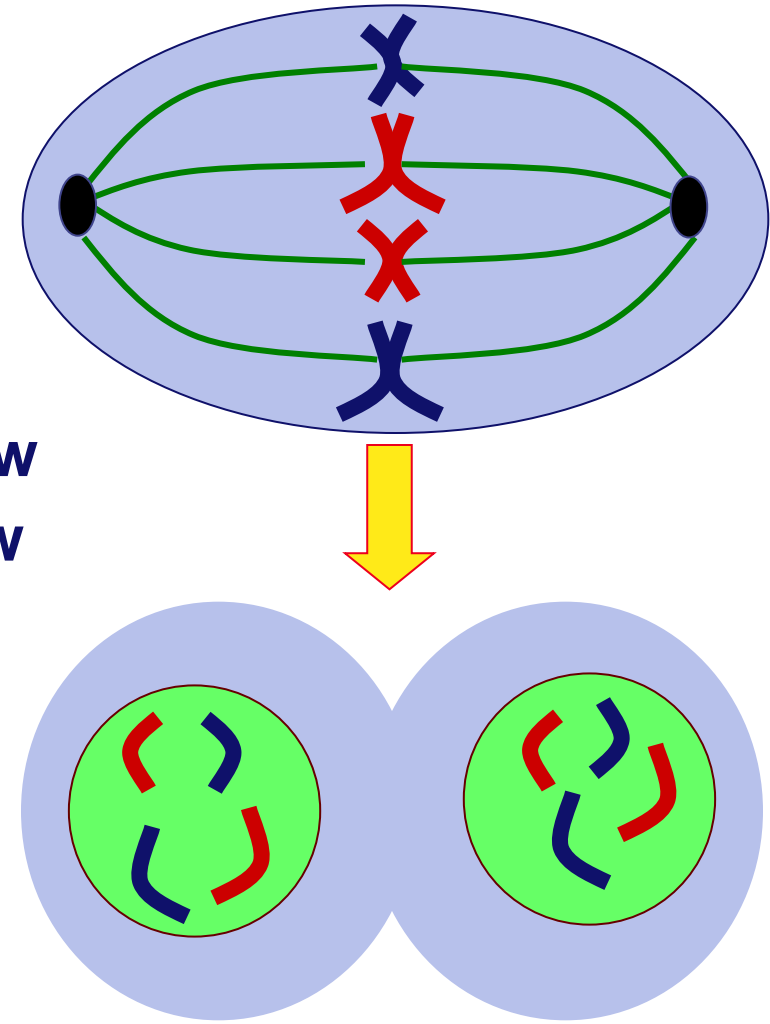
finished protein

Making Proteins

Cells need to make more cells!

■ Making more cells

- ◆ to repair & reproduce, the cell must...
 - copy their DNA
 - make extra organelles
 - divide the new DNA & new organelles between 2 new “daughter” cells
- ◆ organelles that do this work...
 - _____
 - _____



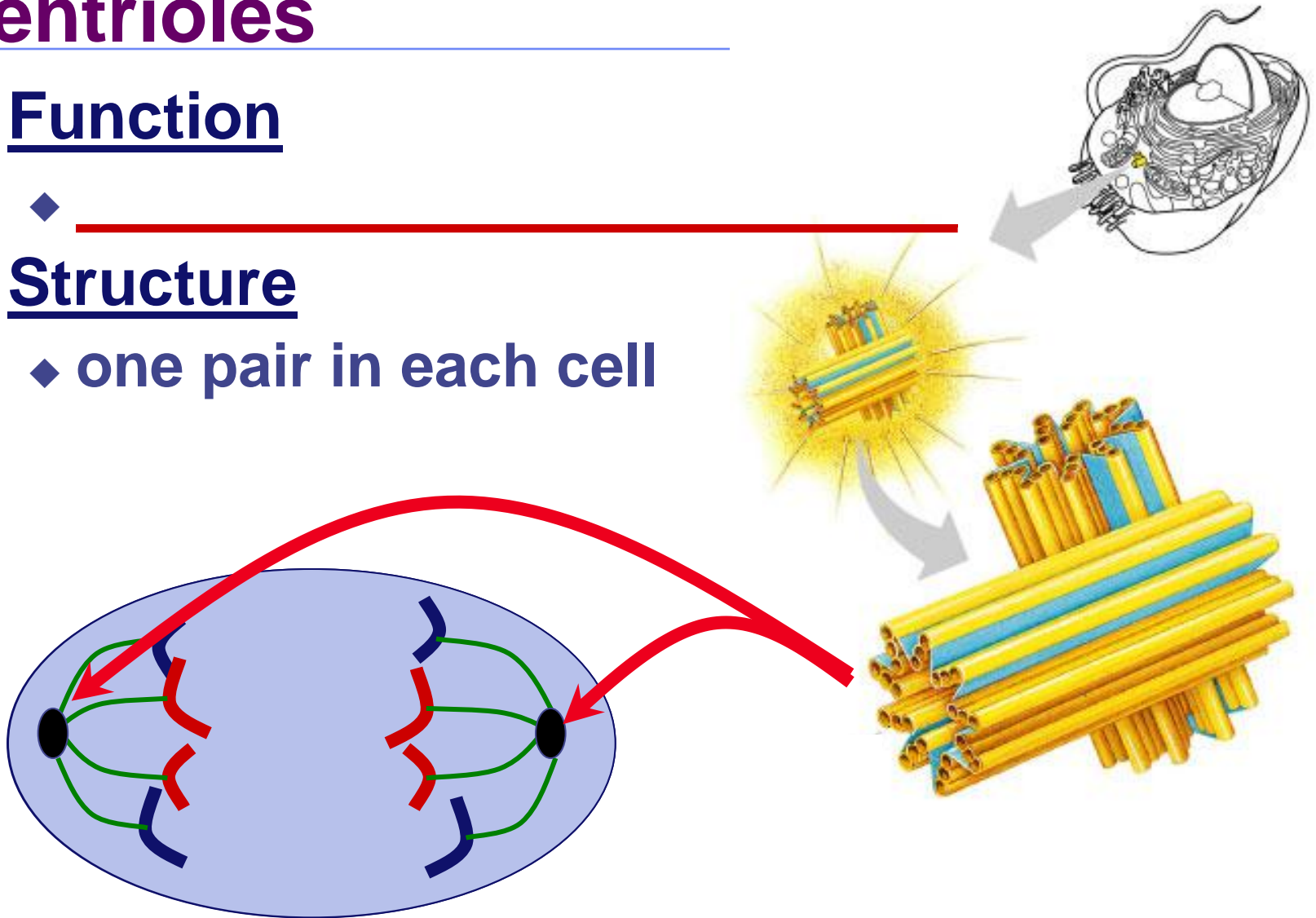
Centrioles

- Function



- Structure

 - ◆ one pair in each cell



Cell Summary

■ Cells have 3 main jobs



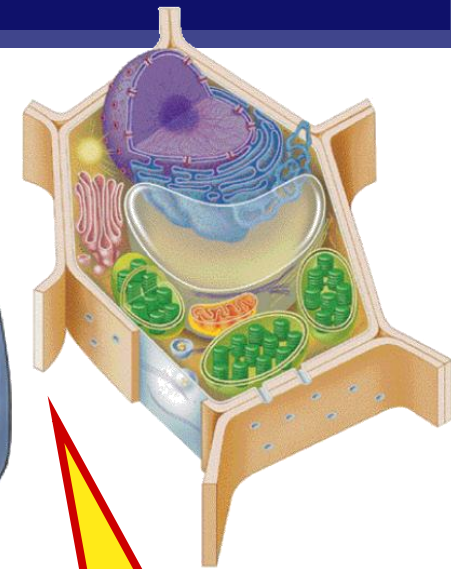
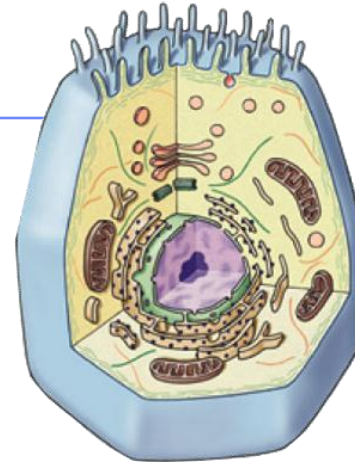
- need food + O₂
- cellular respiration & photosynthesis
- need to remove wastes



- need instructions from DNA
- need to chain together amino acids & “finish” & “ship” the protein



- need to copy DNA & divide it up to daughter cells



Our organelles
do all those
jobs!