



Inside the Cell

Cell Basics

- All of the activities of life itself take place first on the cell level
- Characteristics of Cells
 - Vary in size and Shape
- Unicellular organisms – organisms made up just one cell
 - Example: Amoeba, algae, yeasts

Multicellular organisms

- organisms made up of more than one cell
- Levels of Organizations
 - Cells work together to make tissues
 - Tissues work together to make organs
 - Organs work together to form organ systems
 - Systems together form organisms
 - Organisms form communities

Cell Structure

- Everything within the cell membrane is *protoplasm**
 - The material inside the nucleus is *nucleoplasm**
 - The material between the cell membrane and the nuclear membrane is cytoplasm*
 1. *Cytoplasm* is 70 % water
 2. Its consistency is like gelatin desert
 3. Most of the cells activities takes place in the cytoplasm
 - 100,000 proteins can be made each second

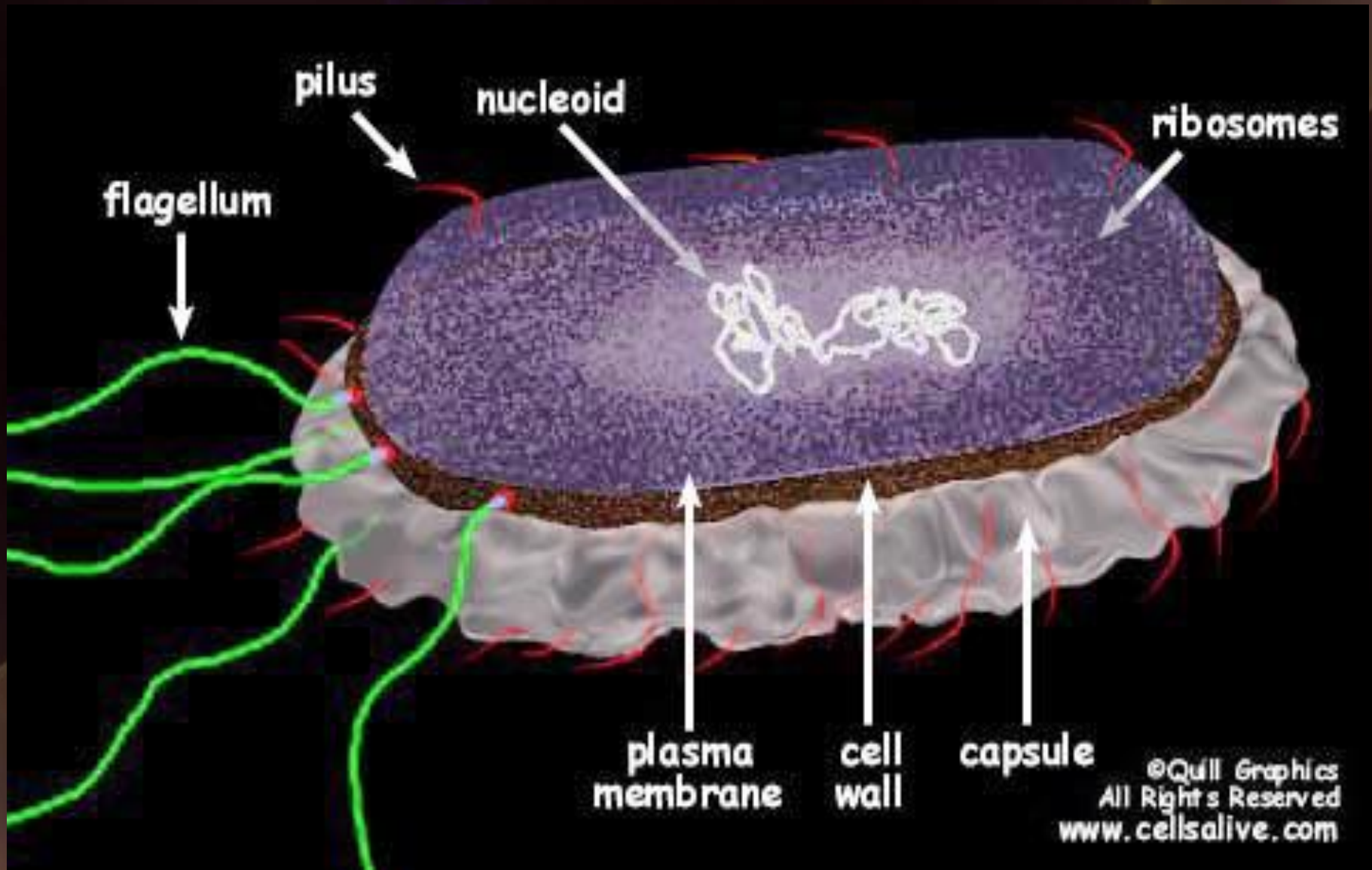
Metabolism*

- **is the sum of all chemical changes in the cell**
- **Cell organization – inside a cell different parts do different things (called division of labor)***

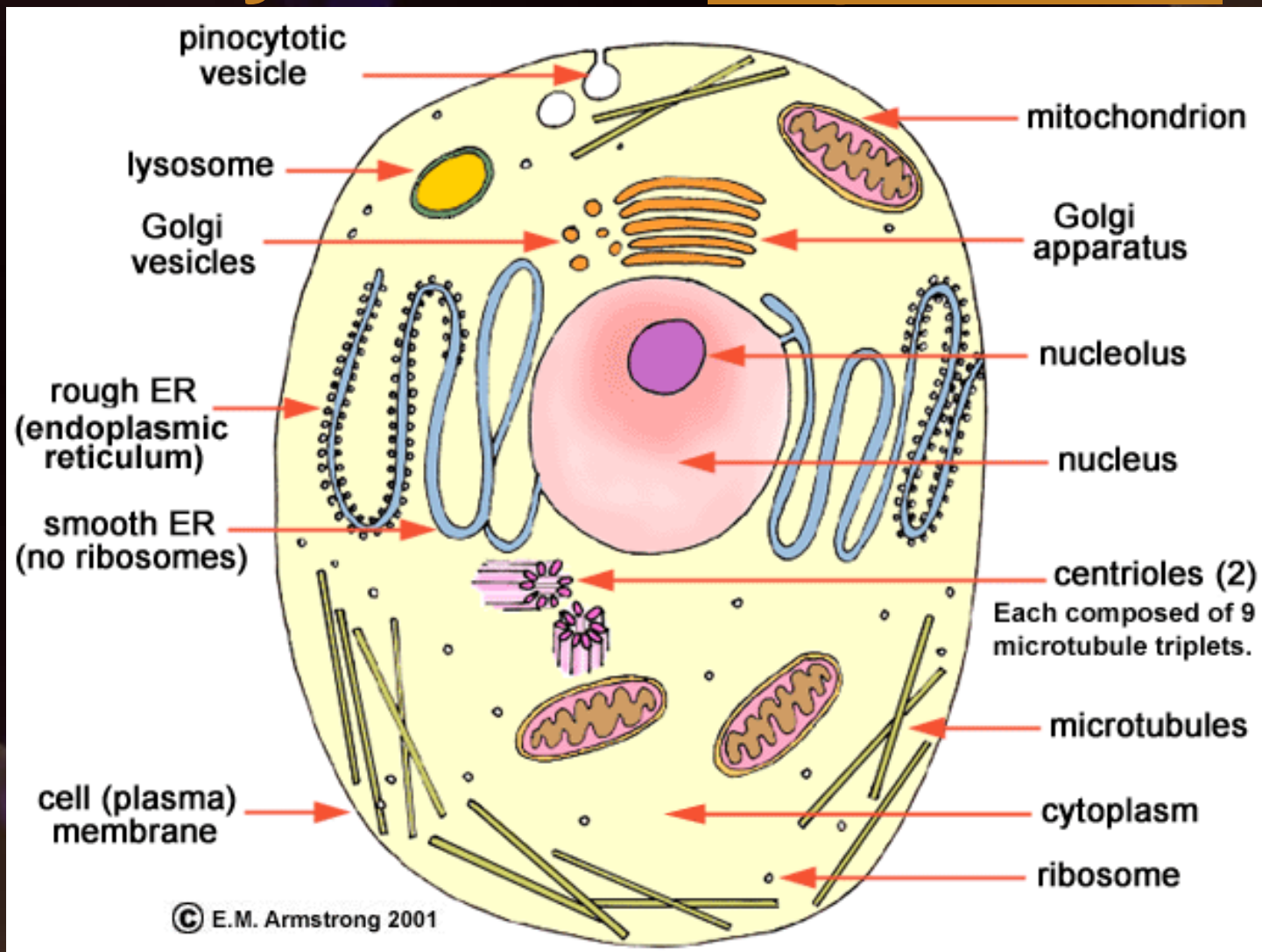
Cell Types

- ***Eukaryotes* are cells with nuclei***
 - Example: Plants, animals, fungi, protists,
- ***Prokaryote* are cells without nuclei***
 - Example: Monerans (Bacteria & Blue Green algae)

Prokaryotic Cell

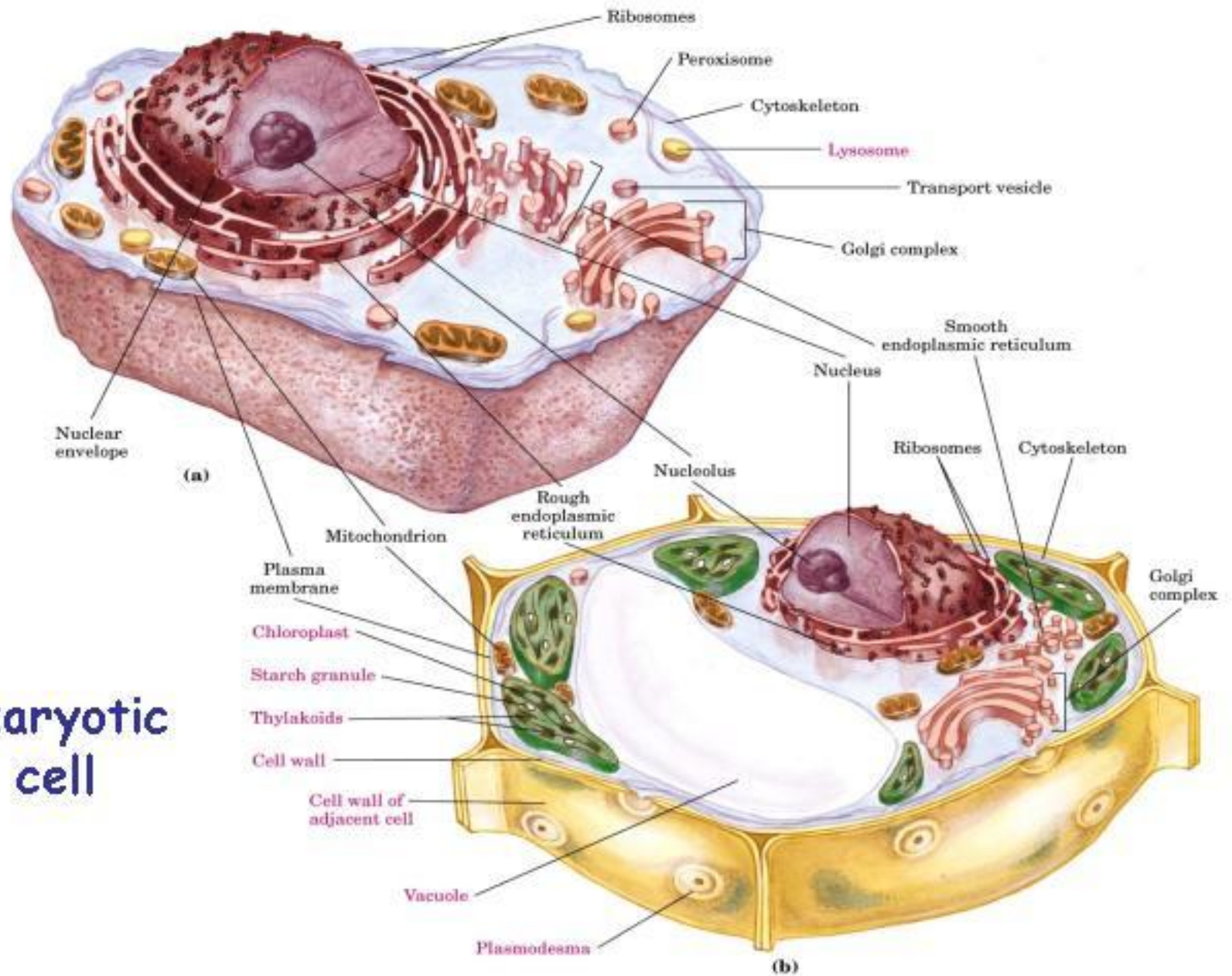


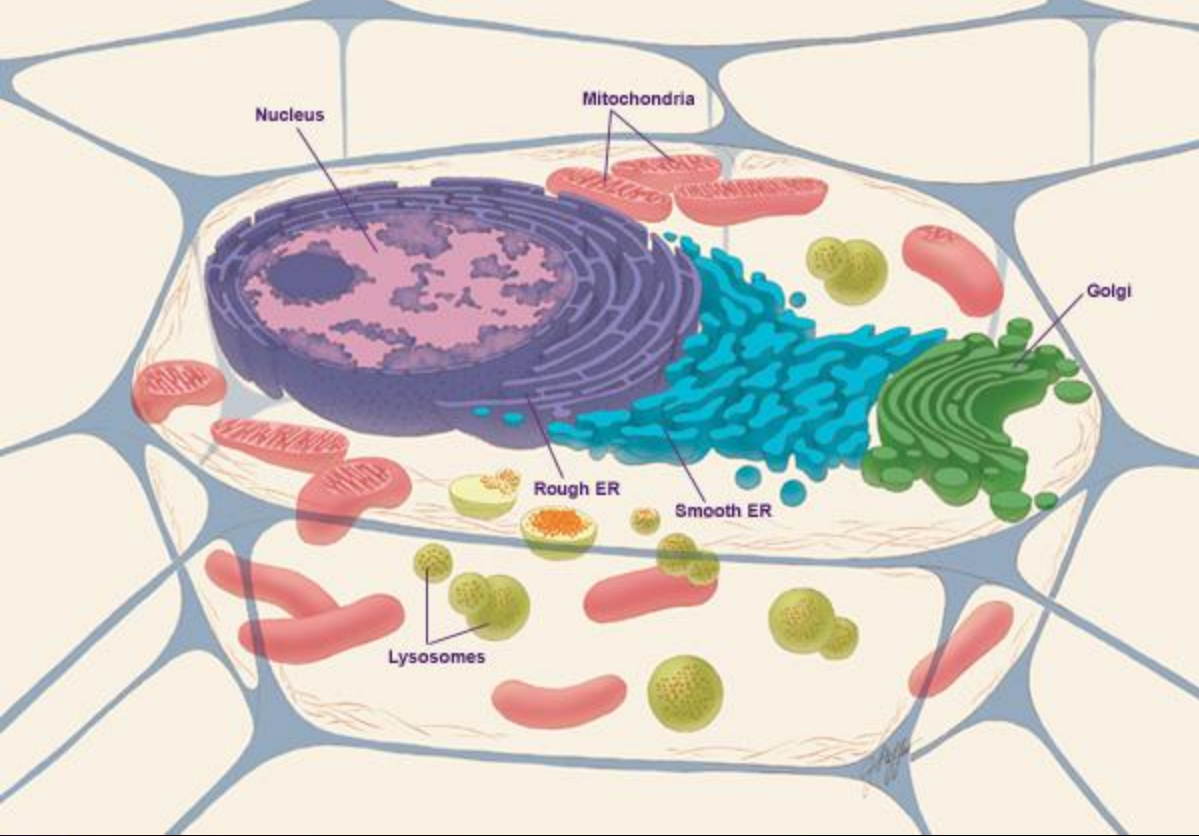
Eukaryotic cell organelles *



Be able to draw label and give functions of cell parts.

Eukaryotic cell





Organelles

- ***Mitochondria*** *- most of the cellular respiration occurs here
 - Called the power house of the cell
 - Takes chemical energy and breaks it down into usable cell energy
 - The more energy a cell needs the more mitochondria it will have



Mitochondria Structural Features

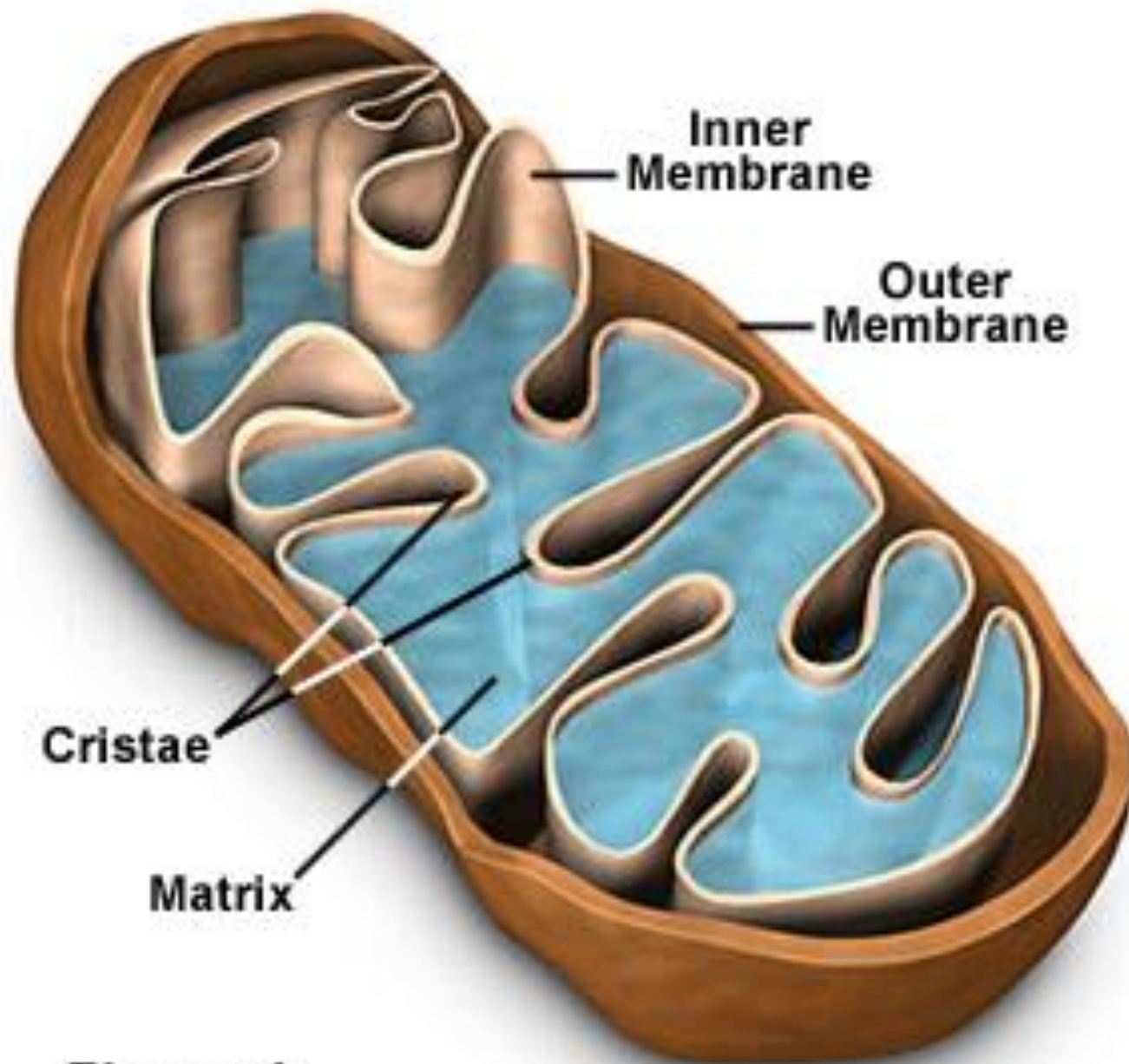
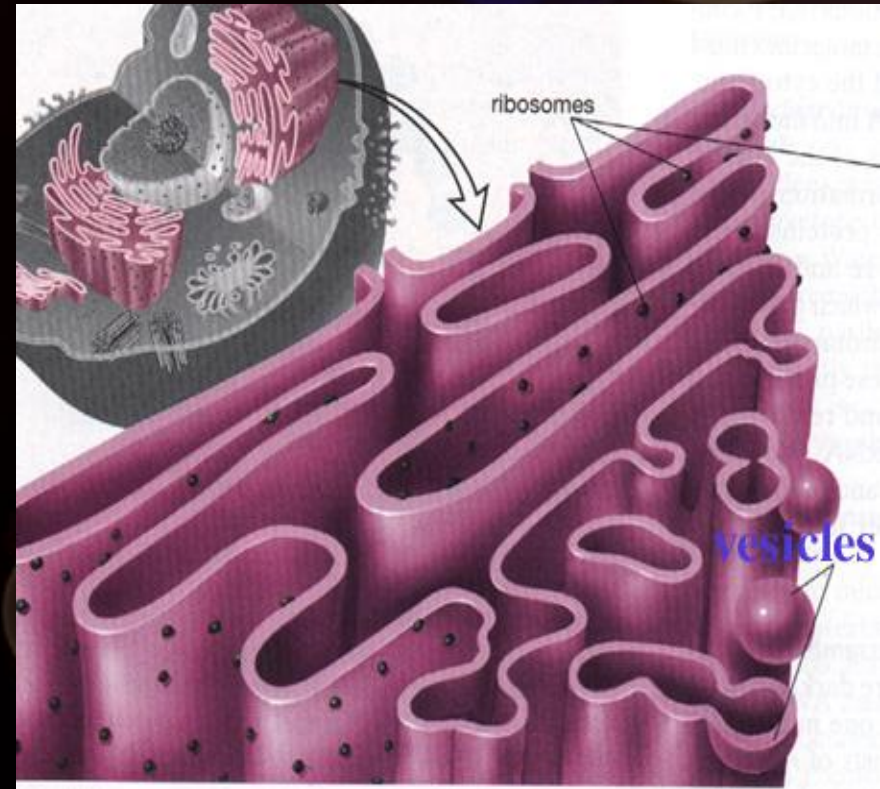
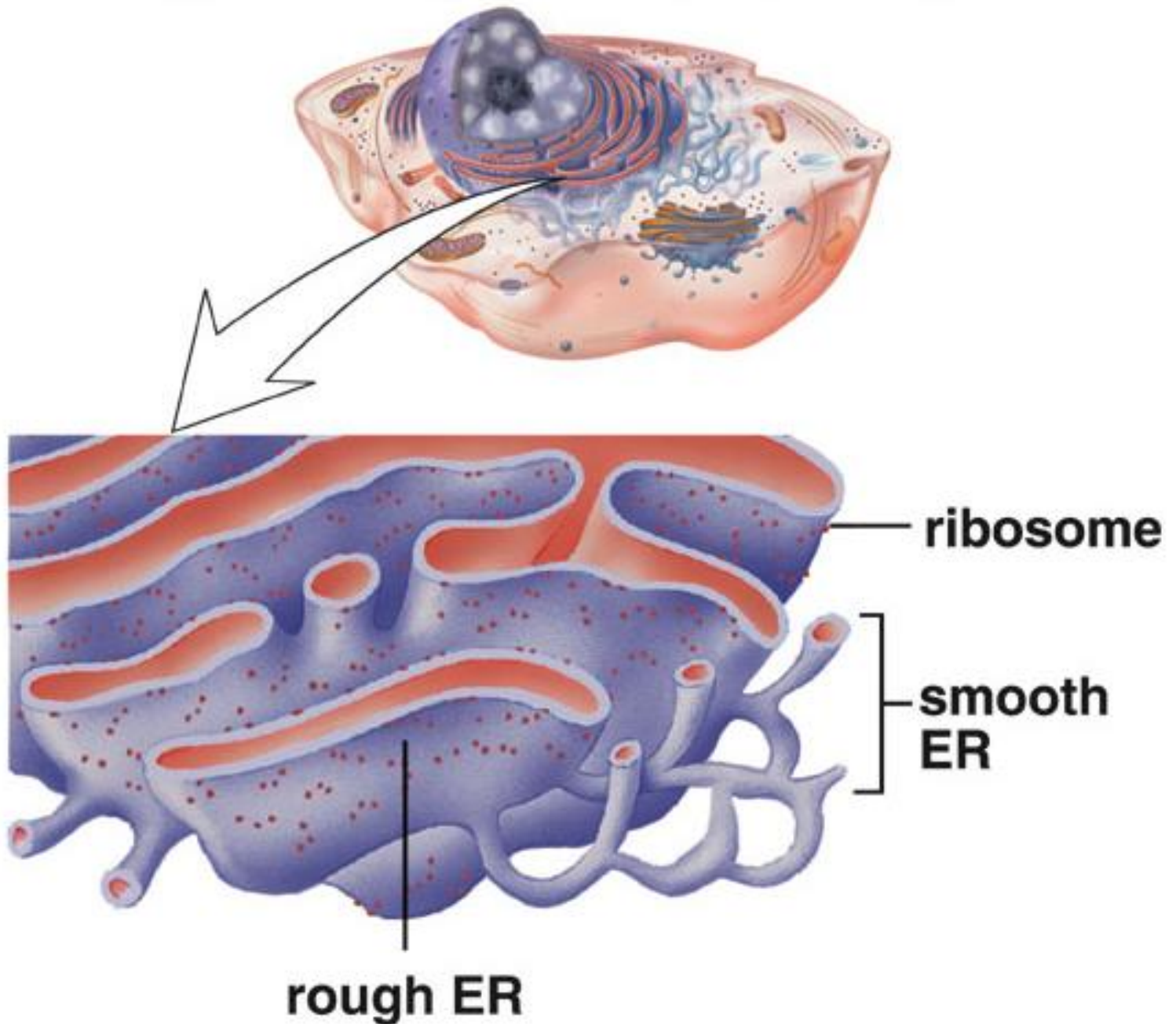


Figure 1

Organelles

- **Endoplasmic reticulum *** – is a network of fluid filled, tube like structures
 - Sometimes called the subway system in the cell
 - Mainly the transport of proteins
 - There is rough ER and smooth ER
 - Rough ER has ribosomes on it
- **Ribosomes *** – RNA proteins that are involved in the making of proteins (protein synthesis)





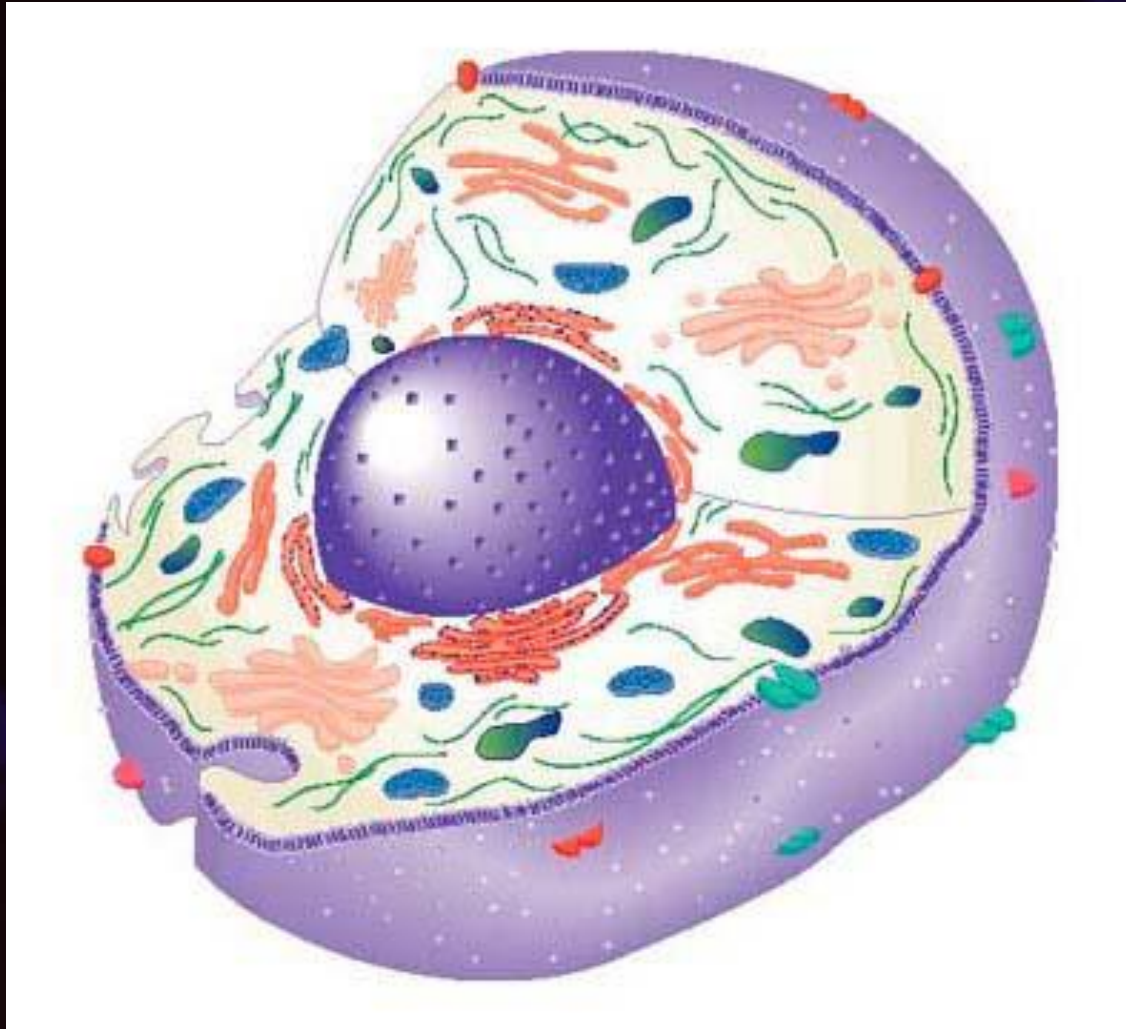
a.

rough ER

ribosome

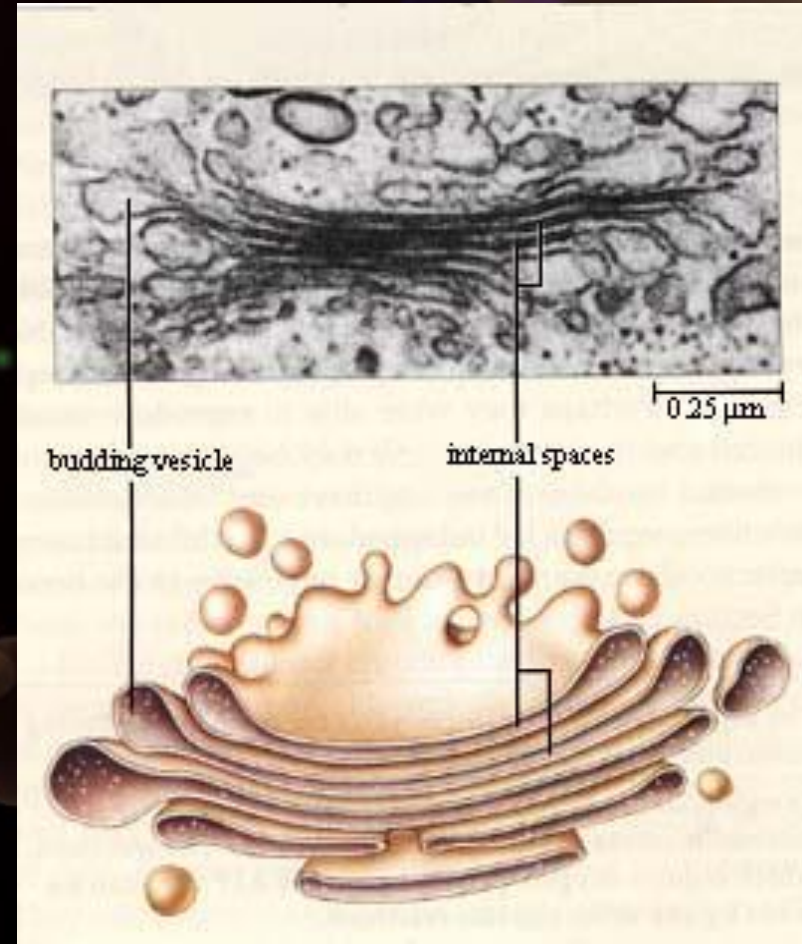
smooth ER

Three dimensional cell

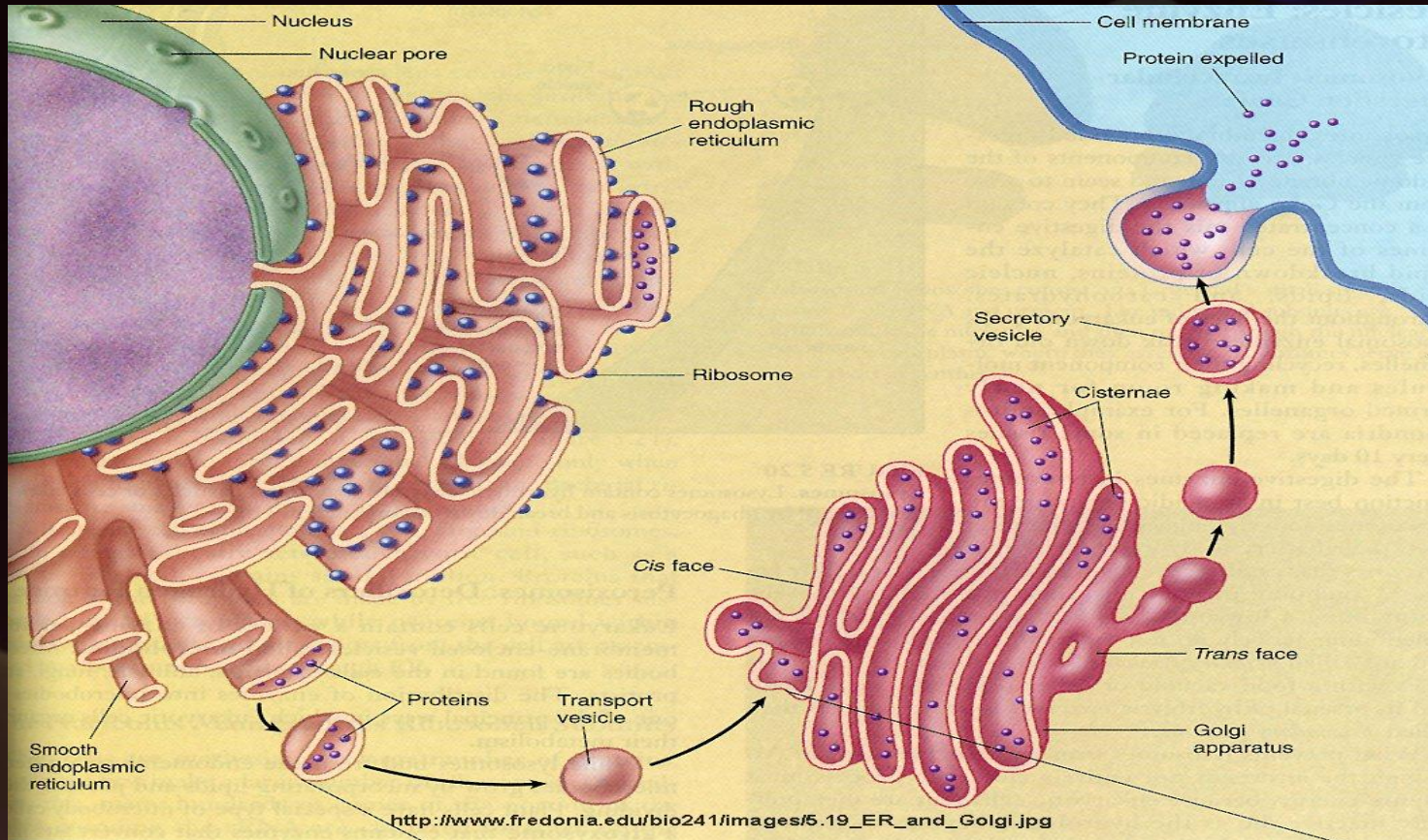


Organelles

- ***Golgi Bodies**** – are a series of flattened unconnected tubes (resembles smooth ER) and are involved in the storage and secretions of chemicals from the cell (read page 127)

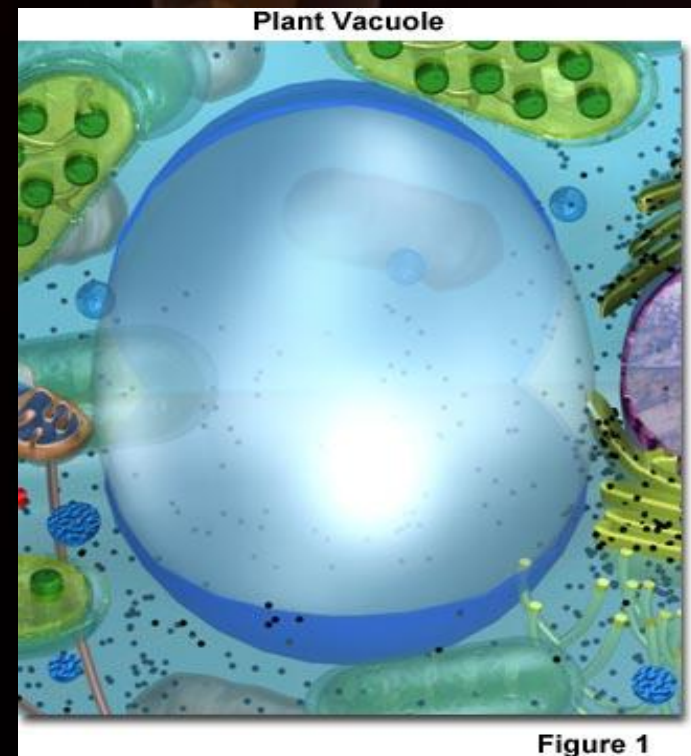


Golgi Diagram*



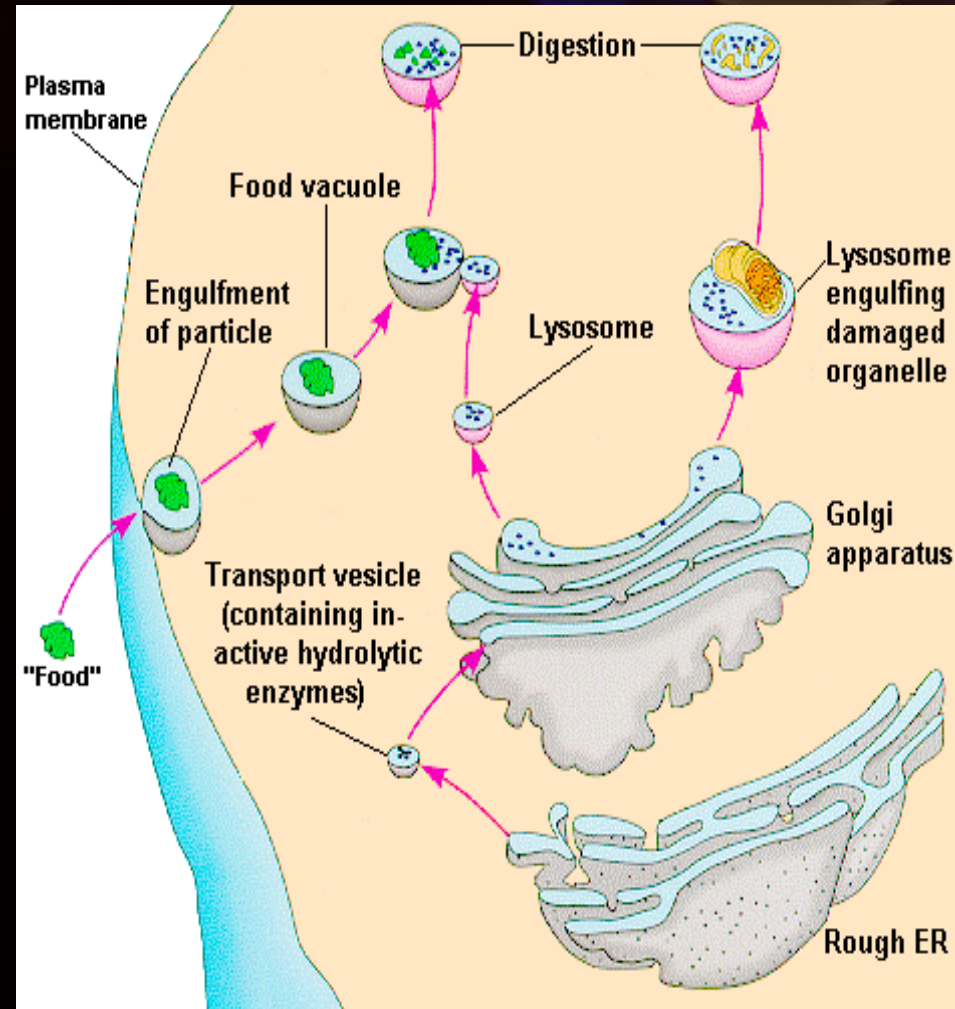
Organelles

- ***Vacuoles**** – clear fluid filled sacs used for food, water and mineral storage.
- **Vacuoles** result from phagocytosis and pinocytosis*
- **Contractile vacuoles*** are vacuoles that serve as pumps for removing excess water

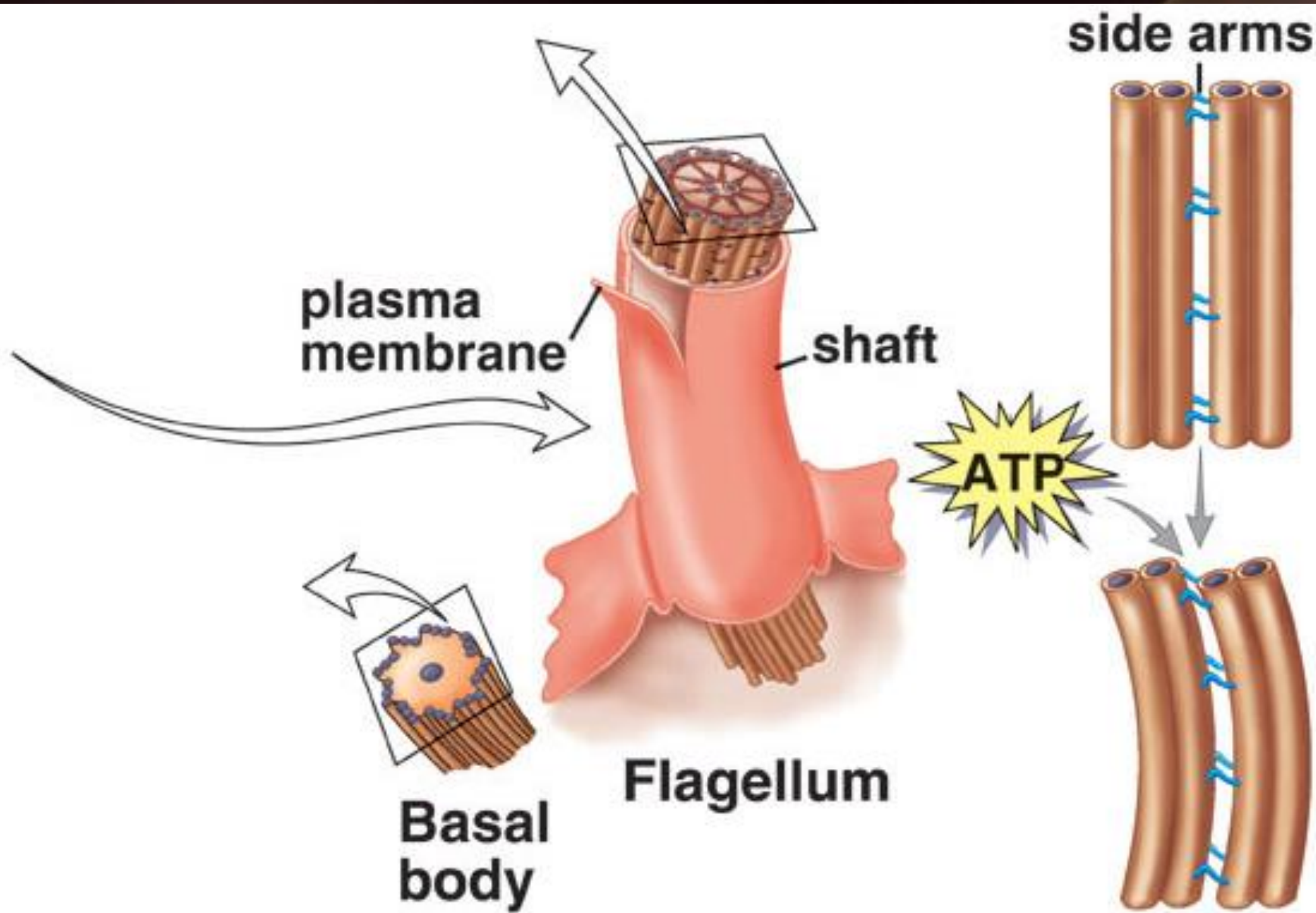


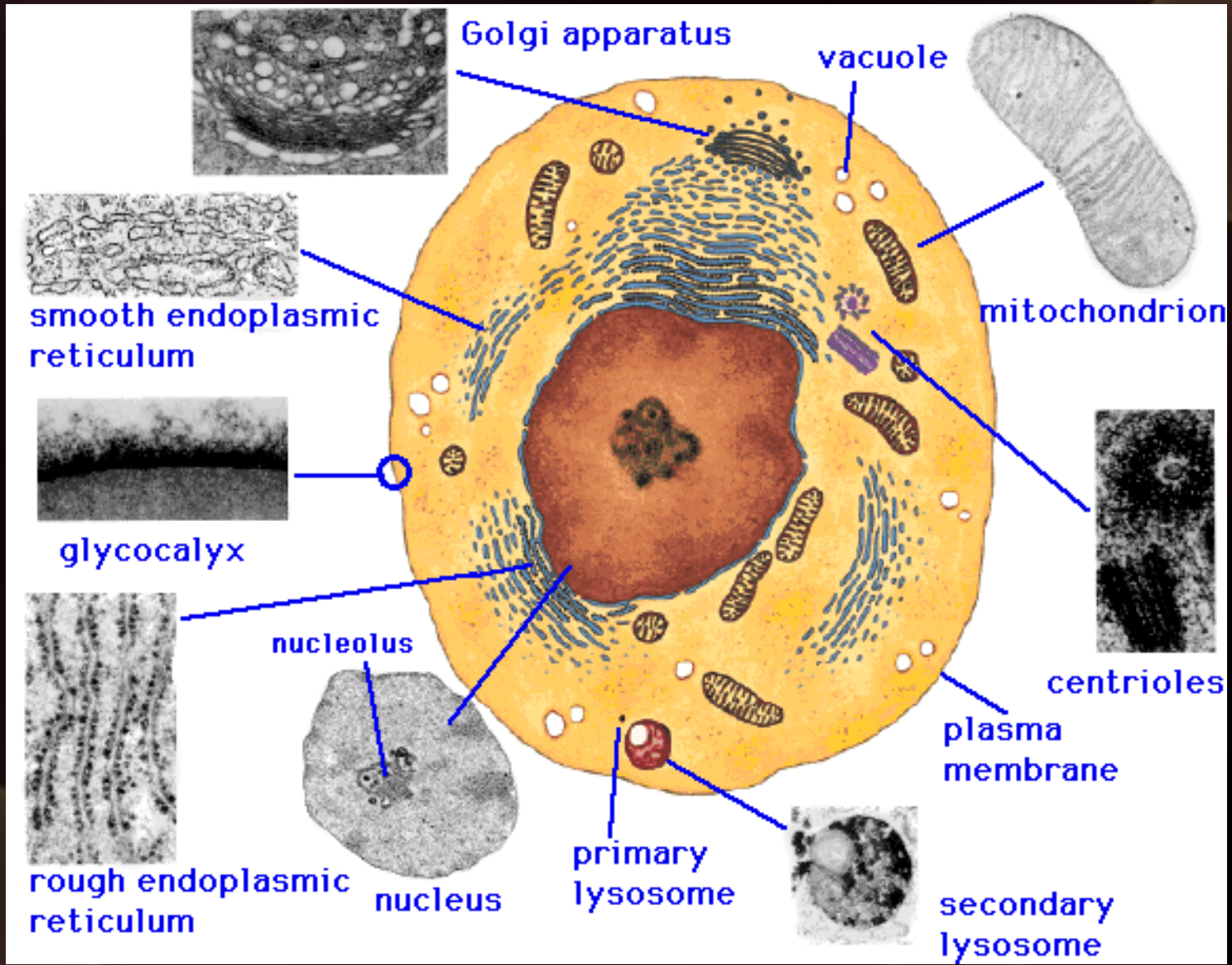
Organelles

- **Lysosome** * – small spherical organelles that contain digestive enzymes used for digestion of large phagocytised particles and old cell parts
- The lysosome membrane protects the cell from digesting itself



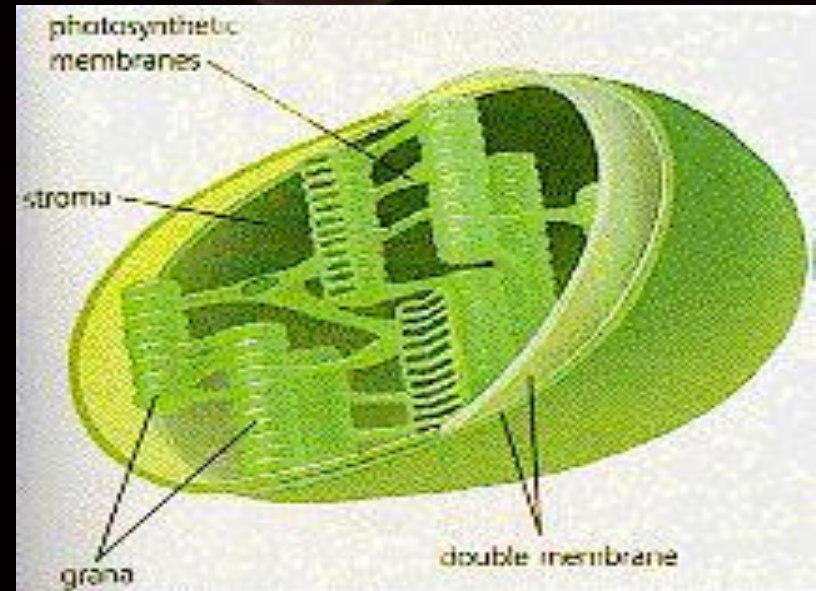
- ***Microfilaments* *** – long thread like structures involved in movement of the cell and cell parts
- ***Microtubules* *** – long thin structures that provide support and shape to the cell
 - Help with movement of genetic material when the cell divides during mitosis and meiosis
- ***Centrioles* *** – Sets of microtubules arranged in a circle and are important in cell division
- ***Flagella & cilia* *** – are similar structures because they are made of microtubules and are attached to an interior of a cell called Basal Body. Flagella are longer and usually only one or two per cell. There are many shorter cilia/ cell.



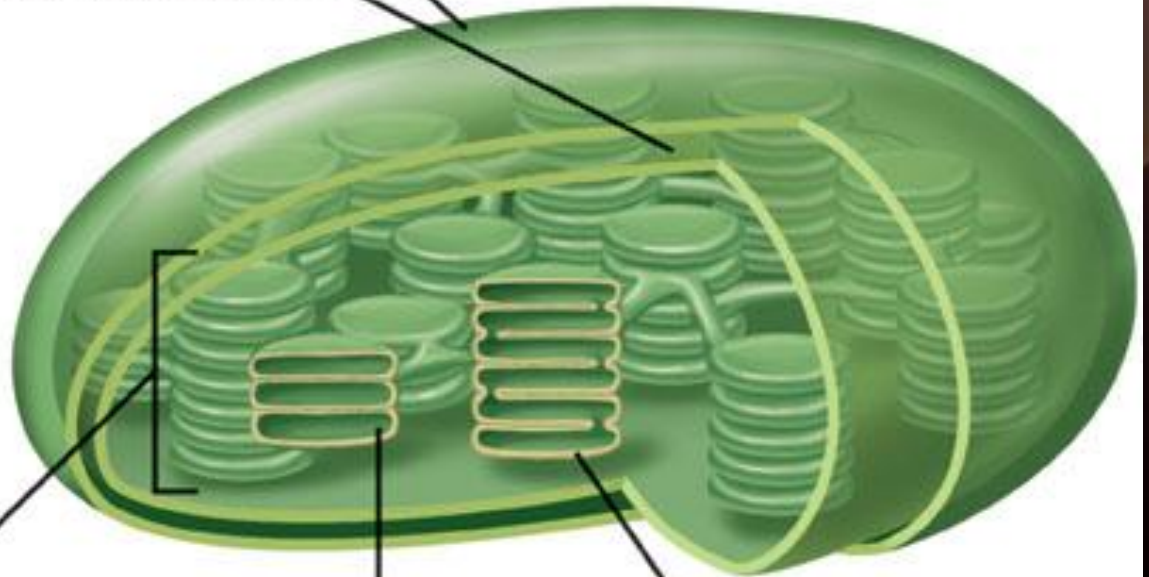


Plant Organelles

- ***Plastids**** – found in green plants and green algae
 - ***Chloroplasts**** – are plastids that contain chlorophyll for photosynthesis
 - Traps light energy and turns it into chemical energy



double membrane { outer membrane
inner membrane

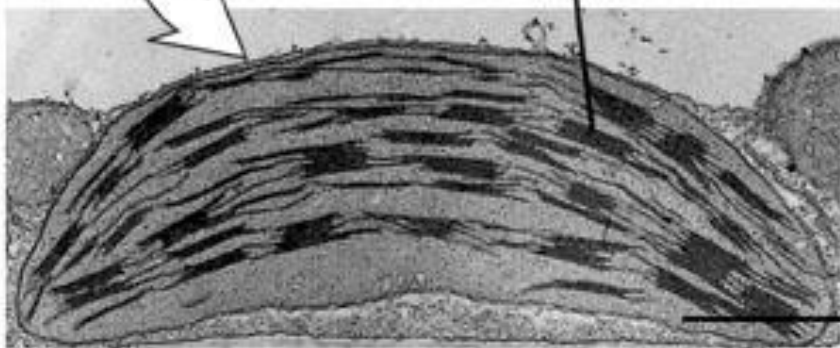


granum

independent thylakoids

overlapping thylakoids

b.



stroma

500 nm

a.

The nucleus

- **spherical central body**
 - ***Nuclear membrane**** – membrane around nucleus that has pores to allow selectively the movement of materials by way of the endoplasmic reticulum.
 - ***Nucleoli**** – the area of the nucleus that makes the RNA of ribosomes
 - ***Chromatin**** – is the chromosomes together in the nucleus
 - Made of chromosomes
 - DNA makes up chromosomes
 - **Page 134 has a list of all of the cell structures and functions (excellent resource)**

Quiz

- Draw a cell and label the following parts: nucleus, cell membrane, mitochondria, endoplasmic reticulum, golgi bodies, vacuole, lysosome, centrioles, nucleolus,