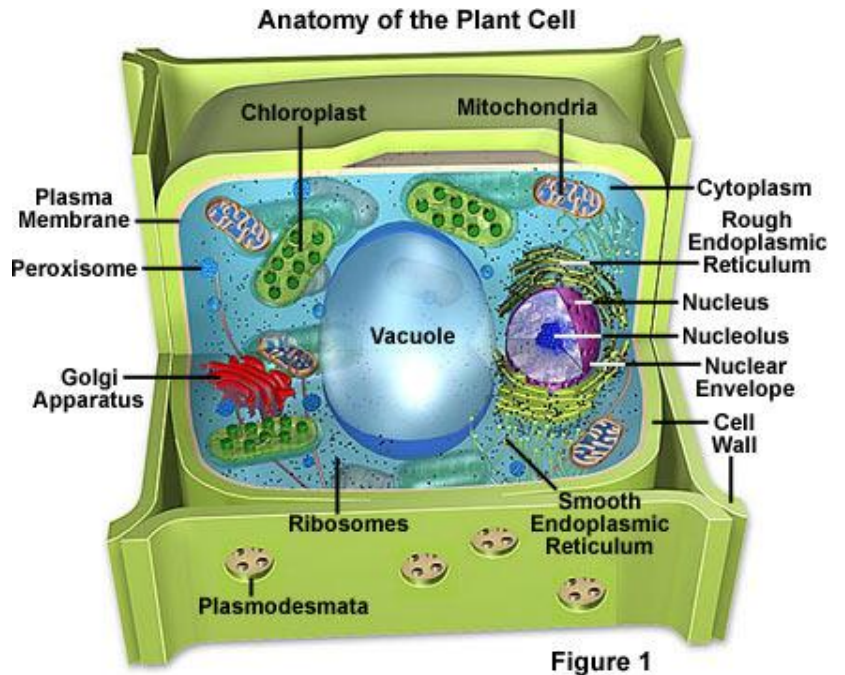
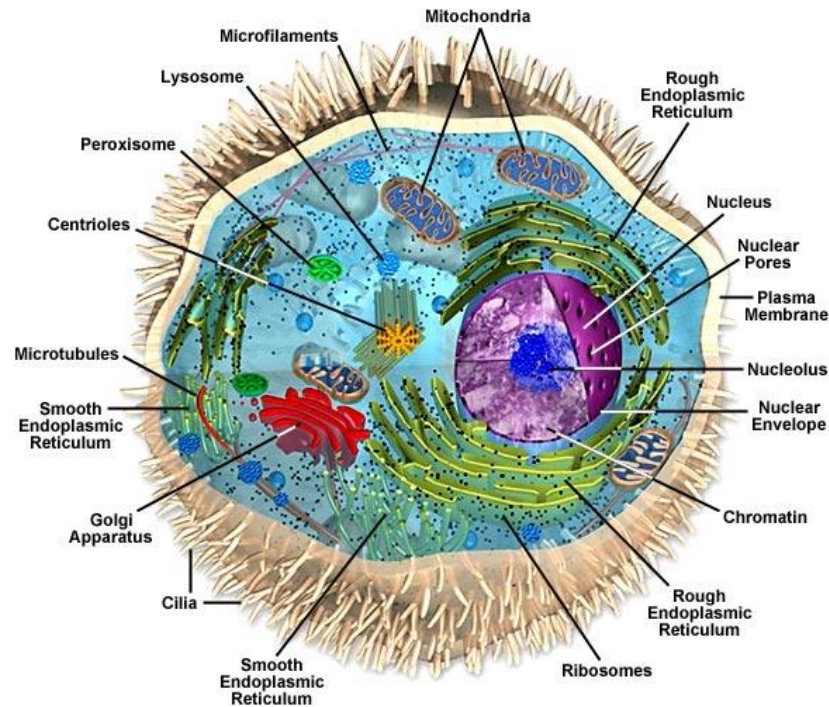


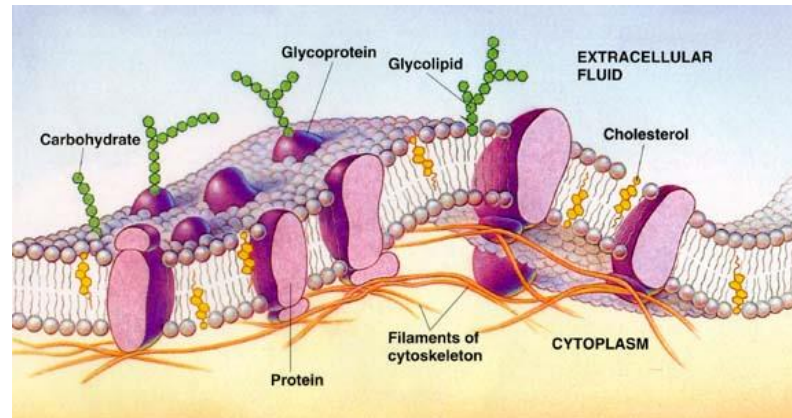
CELL'S ANATOMY



ANIMAL VS. PLANT



THE CELL MEMBRANE



- The Fluid Mosaic model – molecules can move about allowing the membrane to adjust/change.
- *All membranes are alike, but some are single and some are double.

THE CELL MEMBRANE

- Separates cell from its external environment.
- It regulates what enters and leaves the cell.
- It mainly consists of:
 - 1) phospholipid bi-layer
 - 2) embedded proteins
 - 3) Glycoproteins
 - 4) Cholesterol

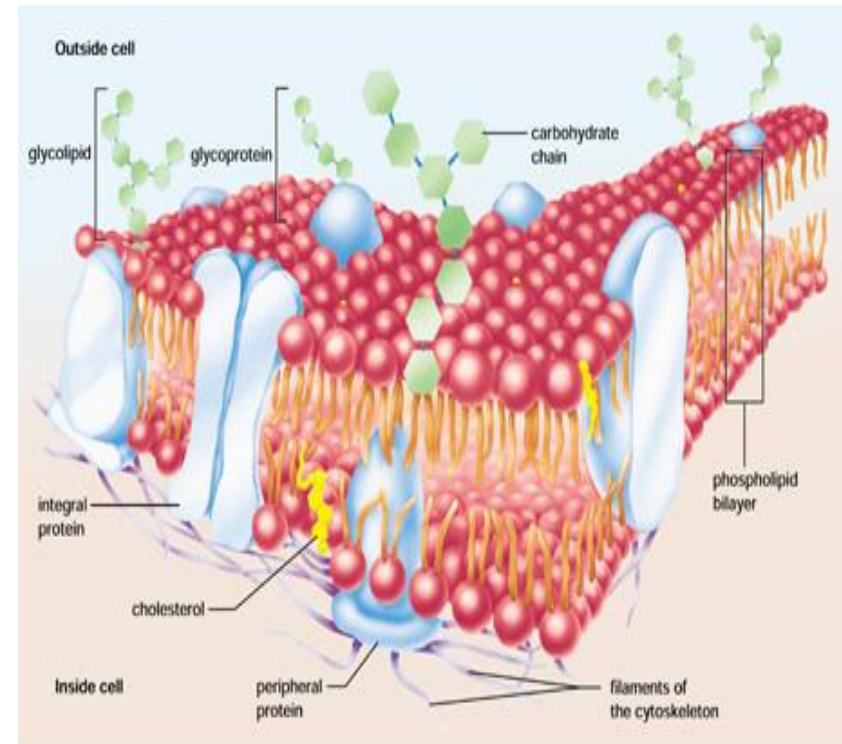


Figure 1.29. Fluid-mosaic model of membrane structure. Notice that many lipids and proteins facing the exterior of the cell have carbohydrate chains attached to them, while on the interior of the cell, parts of the cell's skeleton (called the cytoskeleton) support the membrane. Each type of cell has its own unique "fingerprint" of carbohydrate chains that distinguish it from other kinds of cells.

1. THE PHOSPHOLIPID BI-LAYER

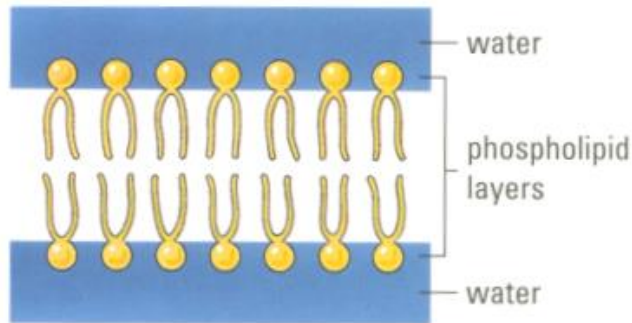


Figure 1

The cell membrane is composed of two layers of phospholipids.

- Structure:
 - 2 layers of *phospholipid* molecules
- Function:
 - Keeps cell intact
 - *Hydrophilic* heads and *Hydrophobic* tails regulate what enters and leaves the cells.

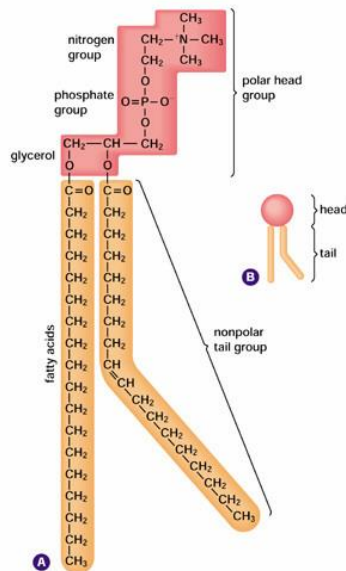
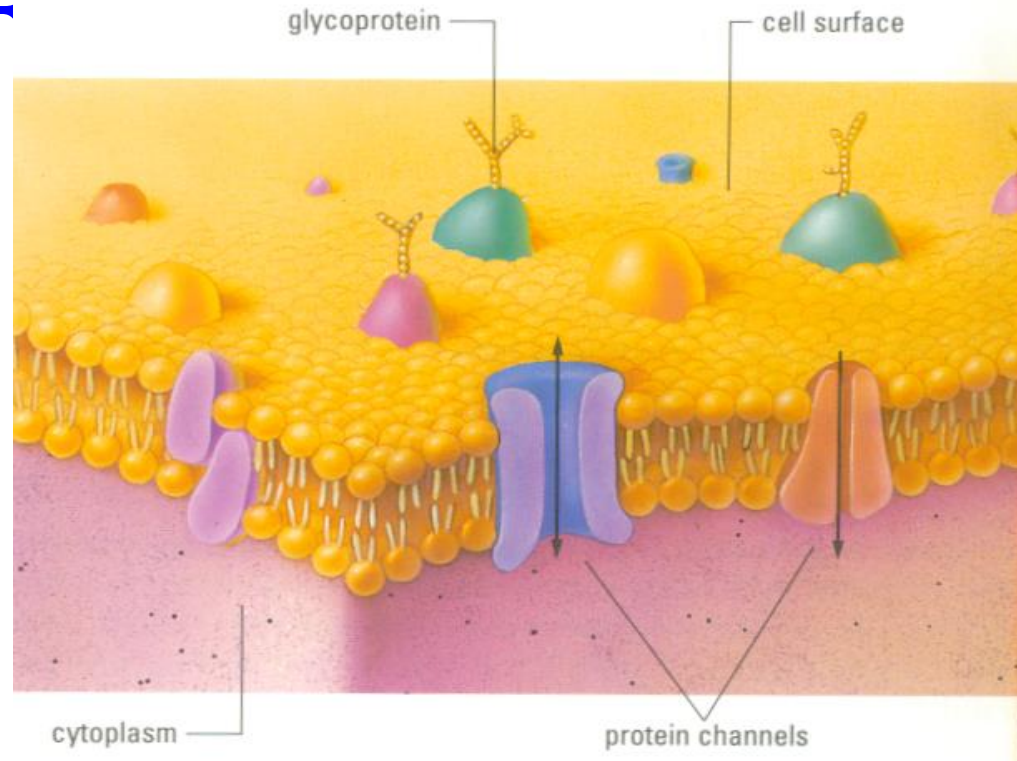


Figure 1.27. Constructed much like a triglyceride (fat), phospholipids contain a phosphate group and sometimes also a nitrogen group.

2. PROTEINS

- Structure:
 - embedded randomly b/w the phospholipids
- Function:
 - Transport larger items through the membrane
 - Allow hydrophilic particles through.

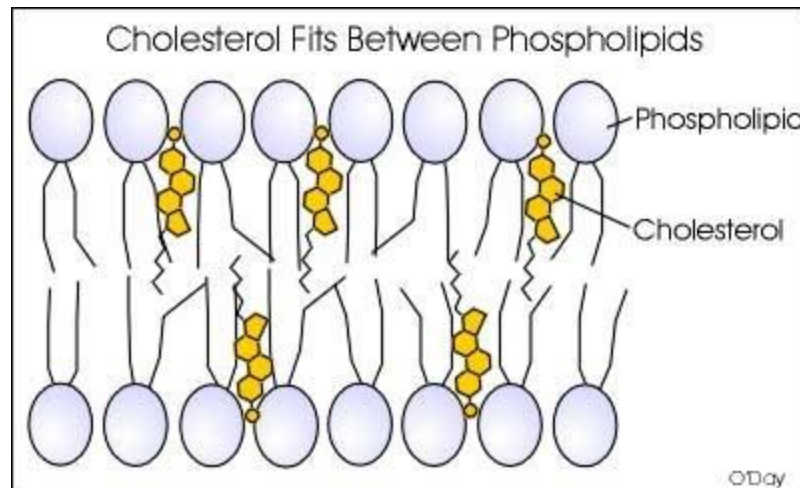


3. GLYCOPROTEINS

- Structure:
 - Proteins with attached sugar molecules.
- Function:
 - Attachment sites for molecules needing to enter, or for messenger molecules such as hormones.
 - These are very specific to each person and play a role in recognizing our own cells (organ transplants).

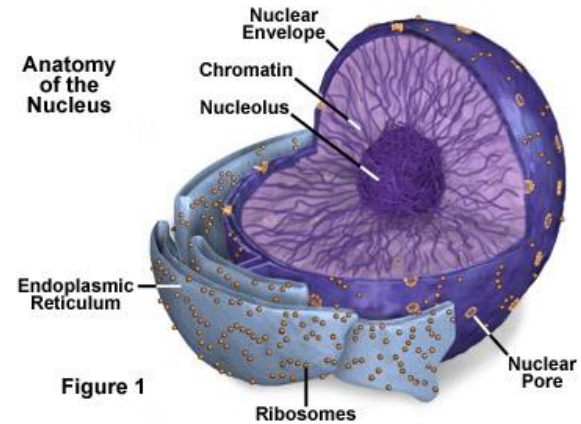
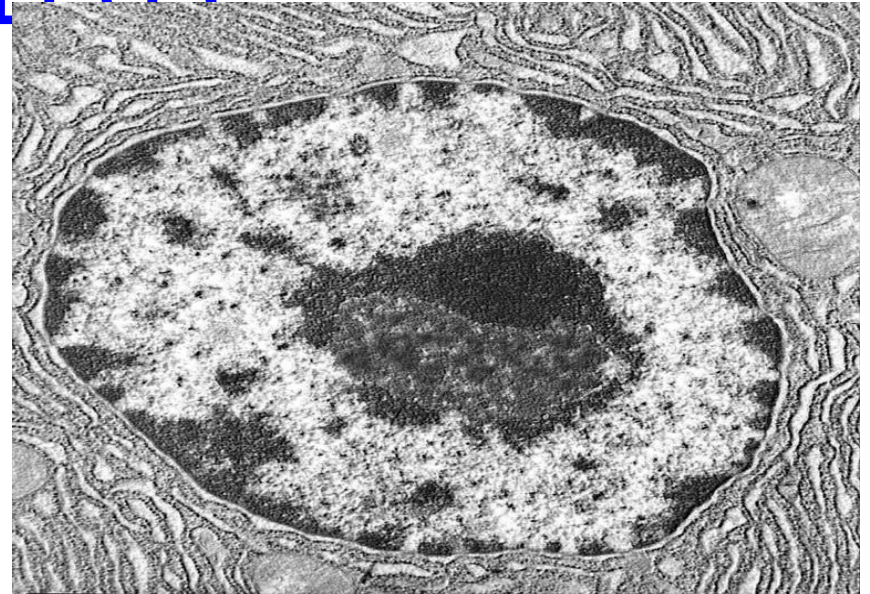
4. CHOLESTEROL

- It is an essential structural component of cell membranes, where it is required to establish proper membrane permeability and fluidity



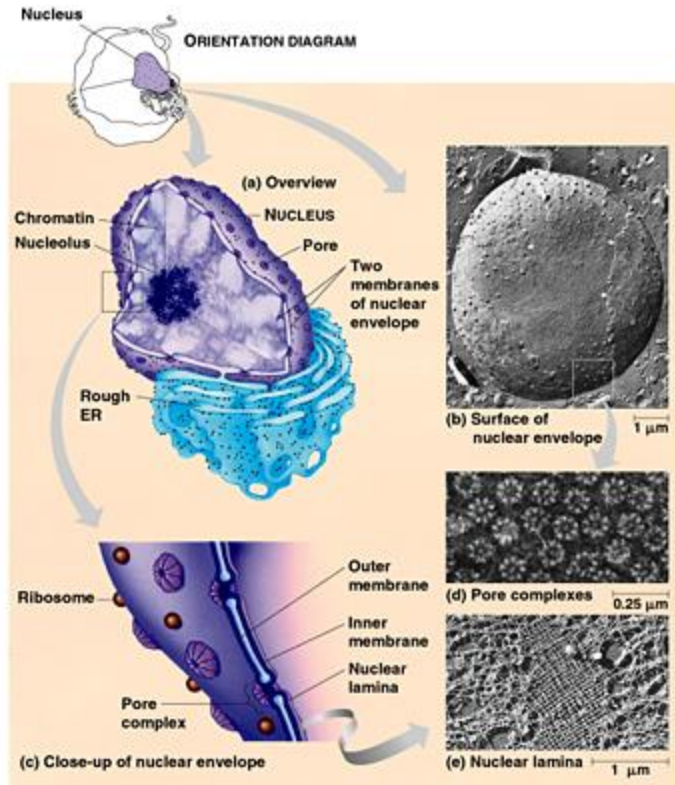
NUCLEUS

- Structure:
 - Contains DNA
 - Envelope is a double membrane with pores.
- Function:
 - Regulates cell functions, esp. PRO Synthesis
 - Pores allow mRNA and ribosomes to pass in and out



NUCLEOLUS

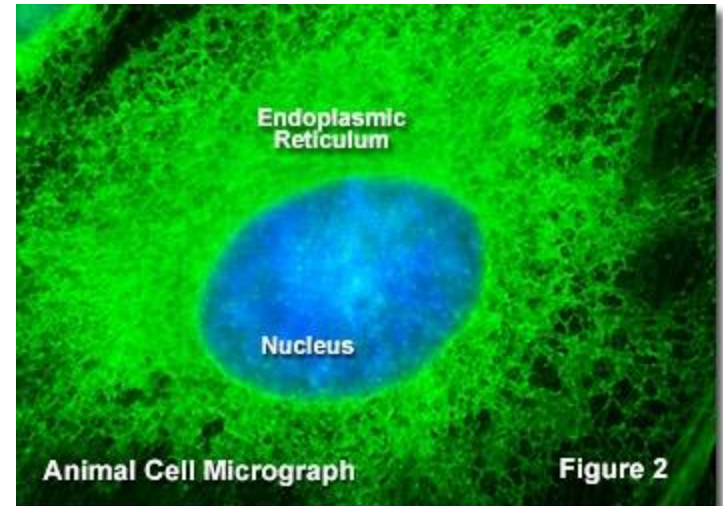
- Structure:
 - Made of DNA, granules and fibers.
- Function:
 - Where ribosomes are made (makes rRNA).



(b) From I. Ori and A. Pamelet, *Freeze-Etch Histology*, Heidelberg: Springer-Verlag, 1975. ©1975 Springer-Verlag
(d) From A.C. Fabergé, *Cell Tiss. Res.* 151(1974):403. ©1974 Springer-Verlag
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ENDOPLASMIC RETICULUM

- Structure:
 - Series of interconnected tubules made of a single membrane.
 - Can run from the nuclear envelope to the cell membrane.
- Function:
 - Transport cell products through the cytoplasm.
 - Provide surface area for chemical reactions.
 - Can produce lysosomes and vesicles.



TWO TYPES OF E.R.

- SMOOTH

S: Has no ribosomes

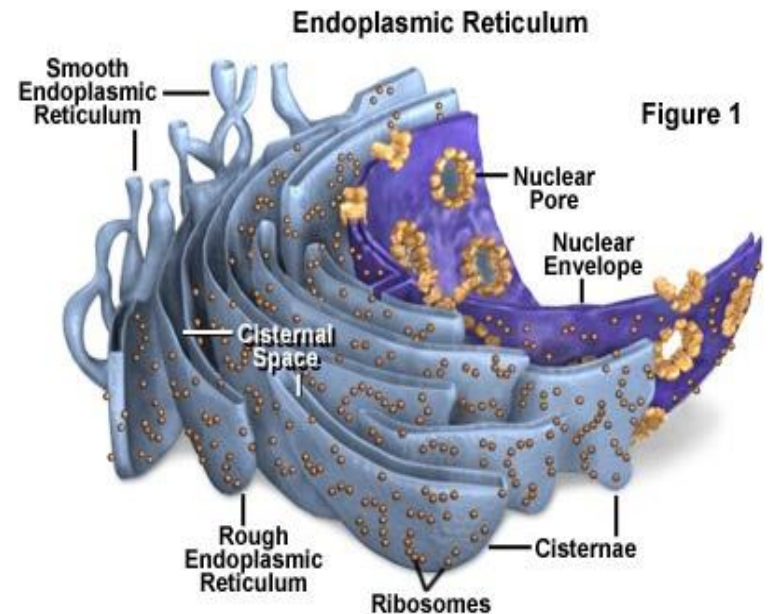
F: Makes lipids (phospholipids and steroids)

- ROUGH

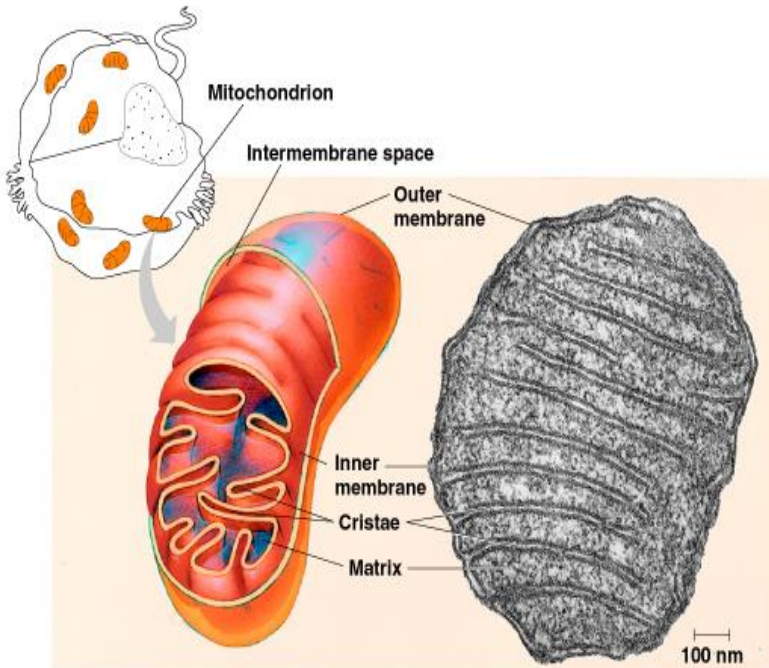
S: Has ribosomes

F: Makes protein, for export

- Often connected to Golgi for packaging into vesicles



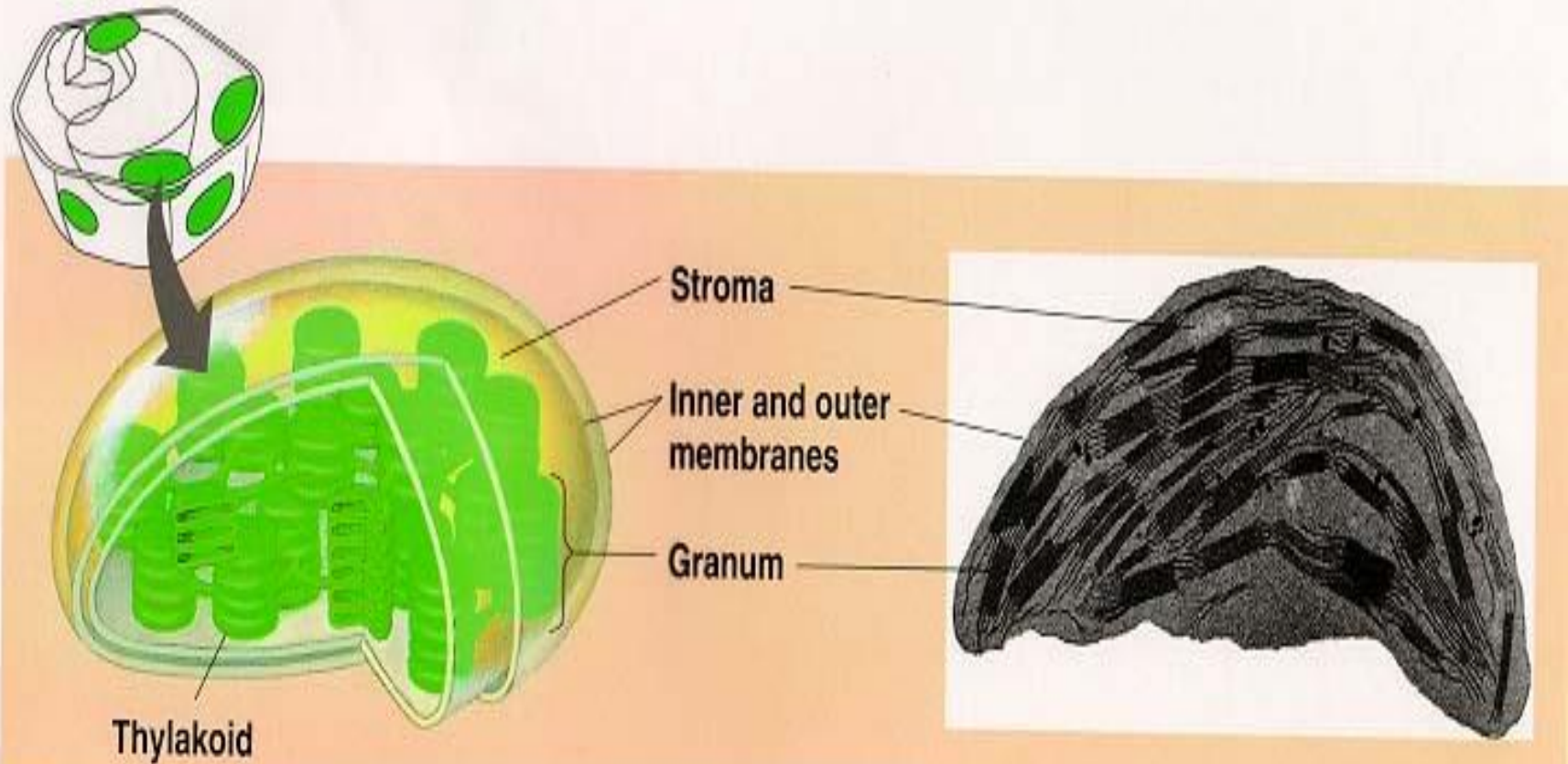
MITOCHONDRIA



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- Structure:
 - 2 membranes: smooth outer, inner folded into cristae.
 - Filled with a liquid called matrix.
- Function:
 - Site of “Cellular Respiration”.
 - Converts food energy (glucose) into ATP.
 - Folded cristae provide maximum surface area for these chemical rxns.

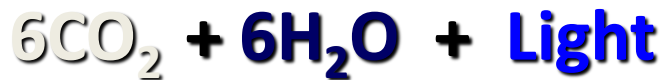
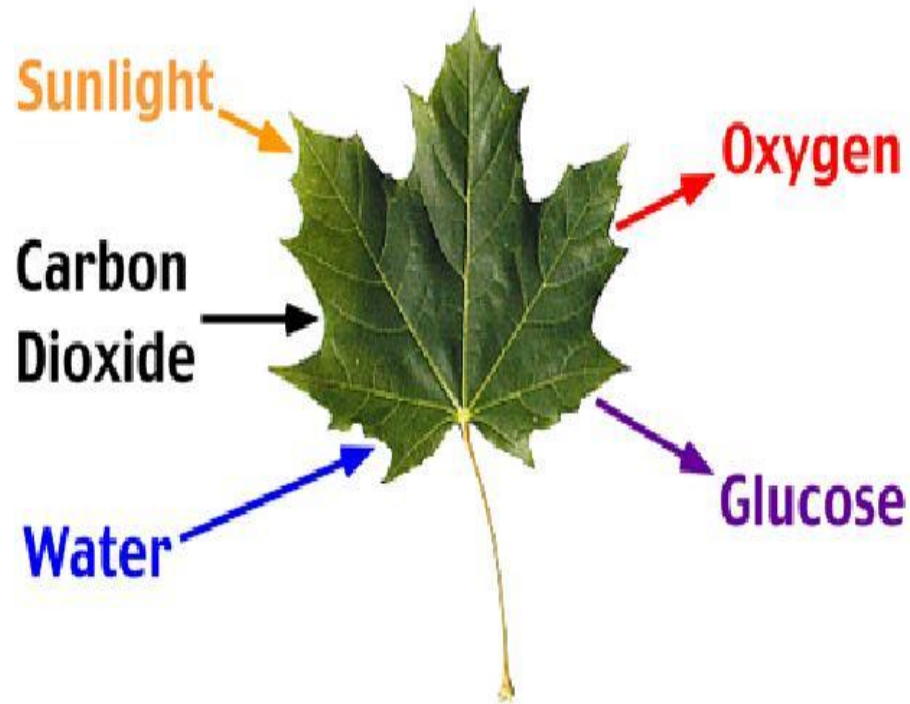
CHLOROPLAST



CHLOROPLAST

- Structure:
 - Green (b/c they contain chlorophyll)
 - Found only in plant cells and a few protists
 - Double membrane on outside and a series of stacked internal membranes called “Grana”
 - Filled with a fluid called “Stroma”
- Function:
 - Site of Photosynthesis (Converts light E into glucose)
 - Chlorophyll traps the sunlight
 - Membranes provide a large surface area for the reactions

PHOTOSYNTHESIS



RAW MATERIALS



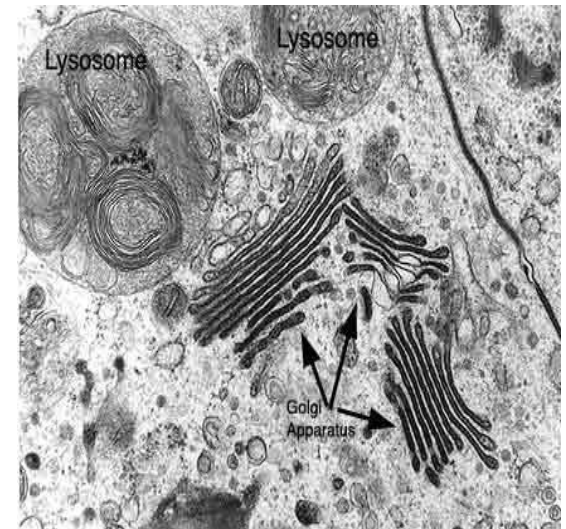
PRODUCTS

GOLGI APPARATUS



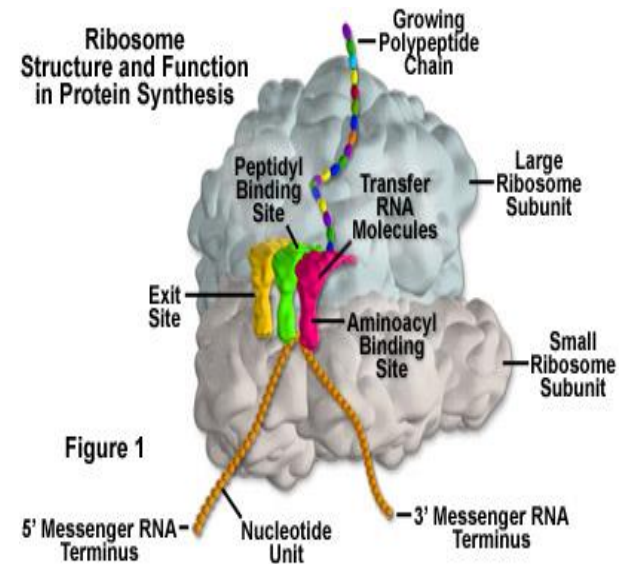
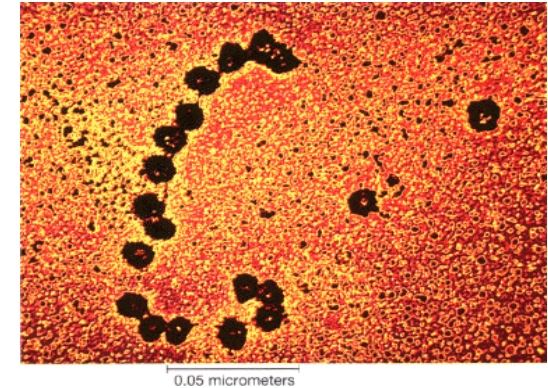
- Structure:
 - Flattened stacks of membrane.
- Function:
 - Receive, modify and transport proteins of polypeptides made by the ER.
 - Membranes provide surface area for chemical rxns.
 - Various polypeptides are combined here to make 1 large protein molecule.
 - These are stored in vesicles and are released when needed.

Eg. Adrenalin



RIBOSOMES

- Structure:
 - 2 spheres
 - Made of rRNA and protein
 - Found on E.R. floating free in cytosol
- Function:
 - Site of “Protein Synthesis”
 - mRNA is held b/w 2 spheres. Proteins are coded for and built using amino acids.
 - Proteins are then either used by or exported from the cell.



VACUOLES

- Structure:
 - Single membrane bags, filled with water and dissolved molecules.
 - Mainly in plant cells
- Function:
 - STORAGE
 - Starch molecules or hold water to create TURGOR pressure to support the plant.

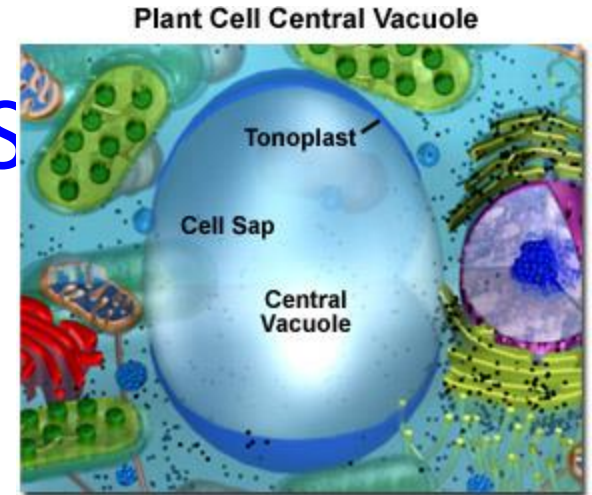
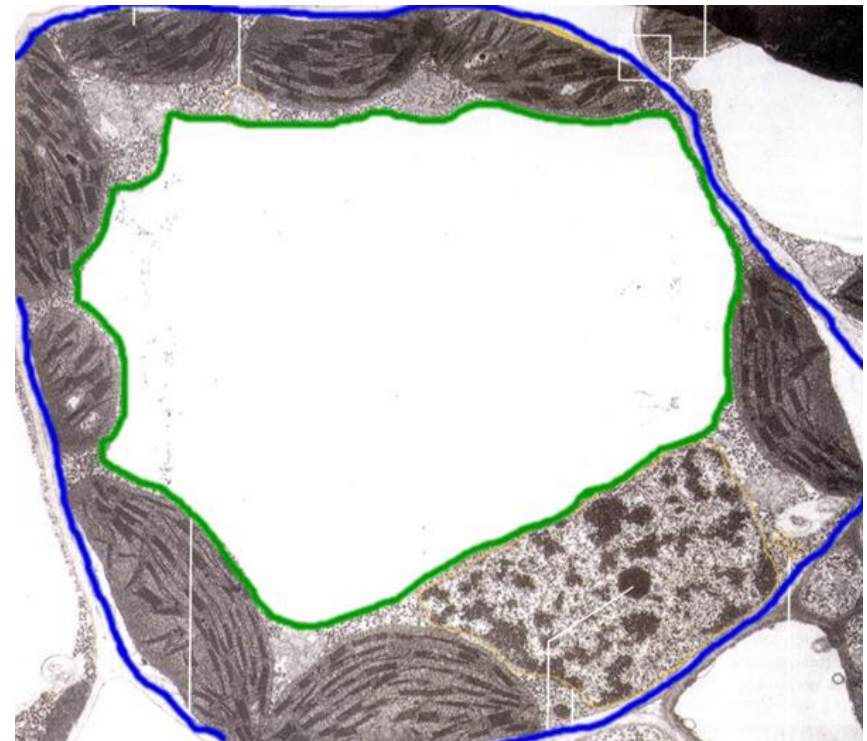
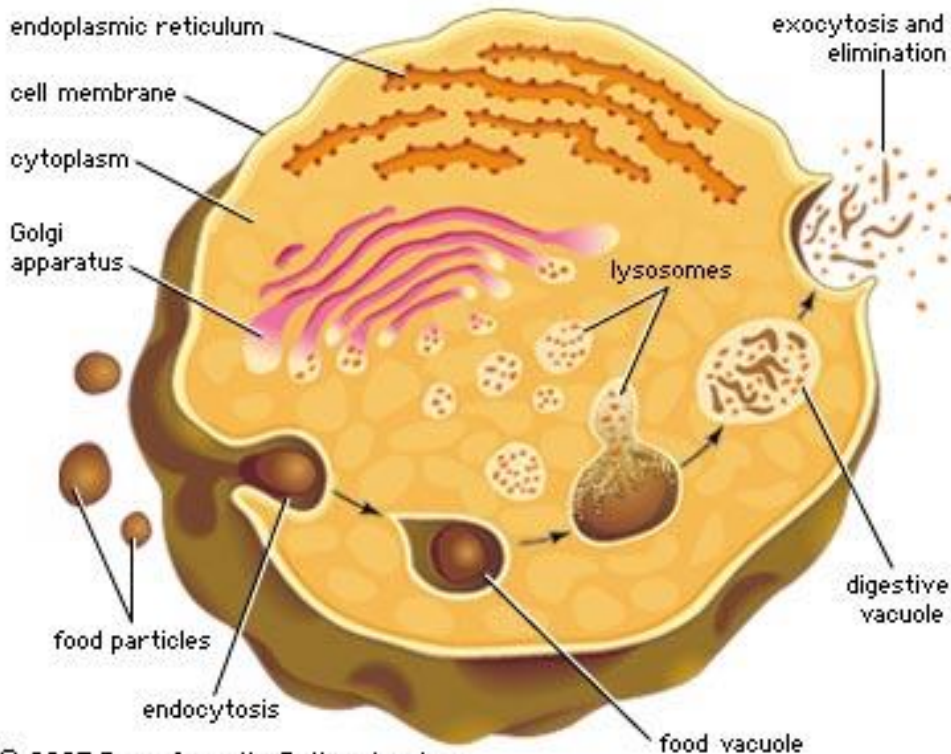


Figure 1



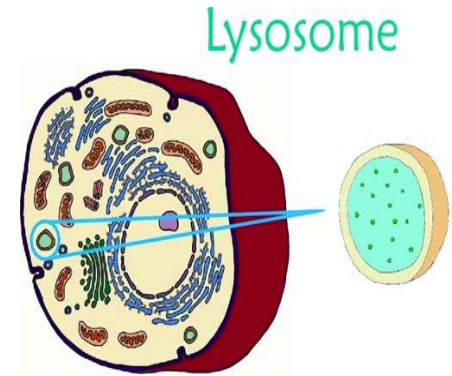
VESICLES



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- Structure:
 - In plant and animal cells.
 - Round, temporary sac made by the Golgi.
- Function:
 - Store hormones and transport materials through cell...messengers.
 - Bring in food (ENDOCYTOSIS) and digest it. Then excrete waste (EXOCYTOSIS).

LYSOSOMES



- Structure:
 - Single membrane sac. Full of Hydrolytic Enzymes (take things apart).
- Function:
 - Found only in animal cells
 - In certain White Blood Cells: Destroy bacteria taken in.
 - In most cells: break down old organelles or destroy dead cells or unwanted tissue for ‘recycling’.

CILIA AND FLAGELLA

- Cilia – Short and very numerous.

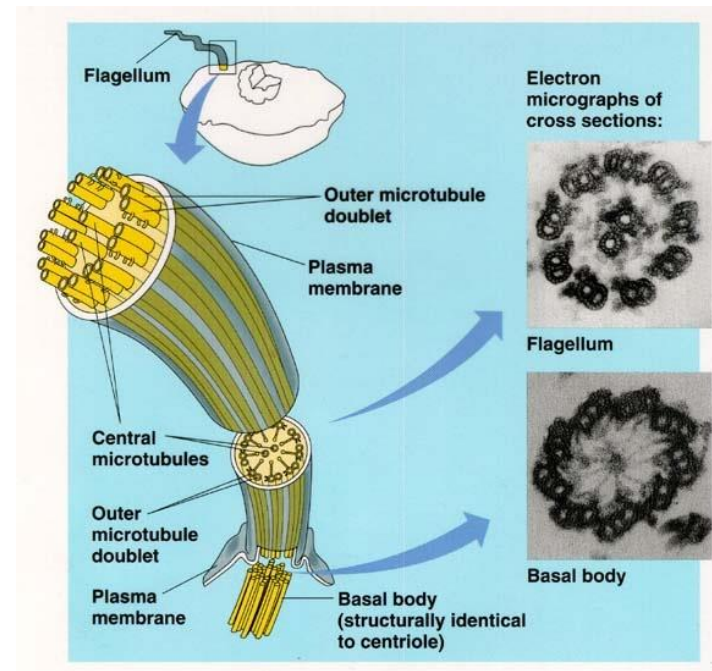
Eg. Paramecium



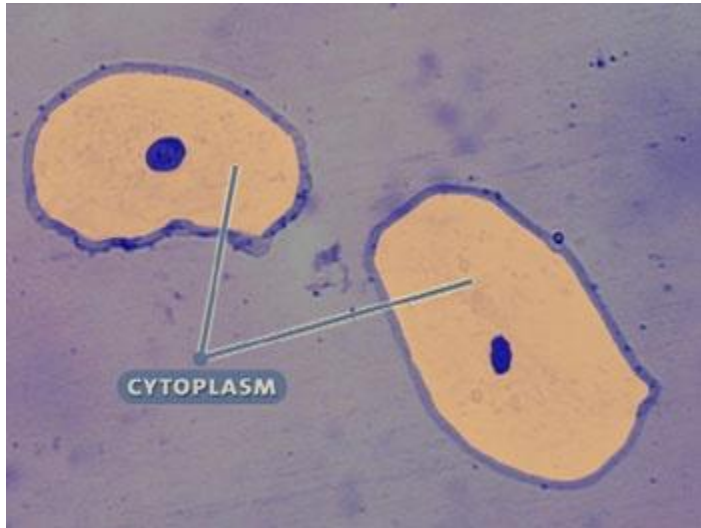
- Flagella – Long and few in number

Eg. Euglena

- Function: Locomotion



CYTOPLASM



- Structure:
 - Everything b/w the nuclear envelope and the cell membrane.
 - Comprised of the organelles and a liquid called “CYTOSOL”.
- Function:
 - Allows mov’t within the cell
 - Cytosol hold all the ions and molecules made by or needed by the organelles.
 - Eg. Enzymes, amino acids, ATP, glucose

CELL WALL

- Structure:
 - Made of a polysaccharide called cellulose.
 - Tough, fibrous box
 - On plant and prokaryotic cells only.
- Function:
 - Gives plant cell support and shape.
 - Permits “Turgor” pressure to be created.

