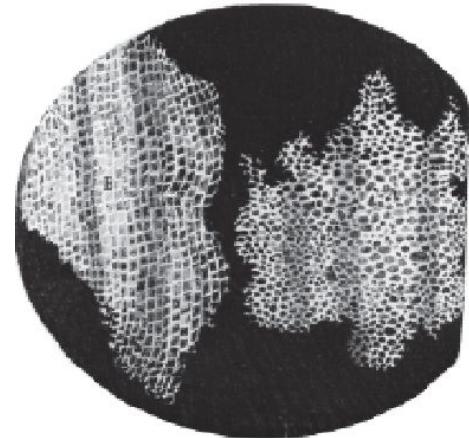


The Living World

Cell Structure

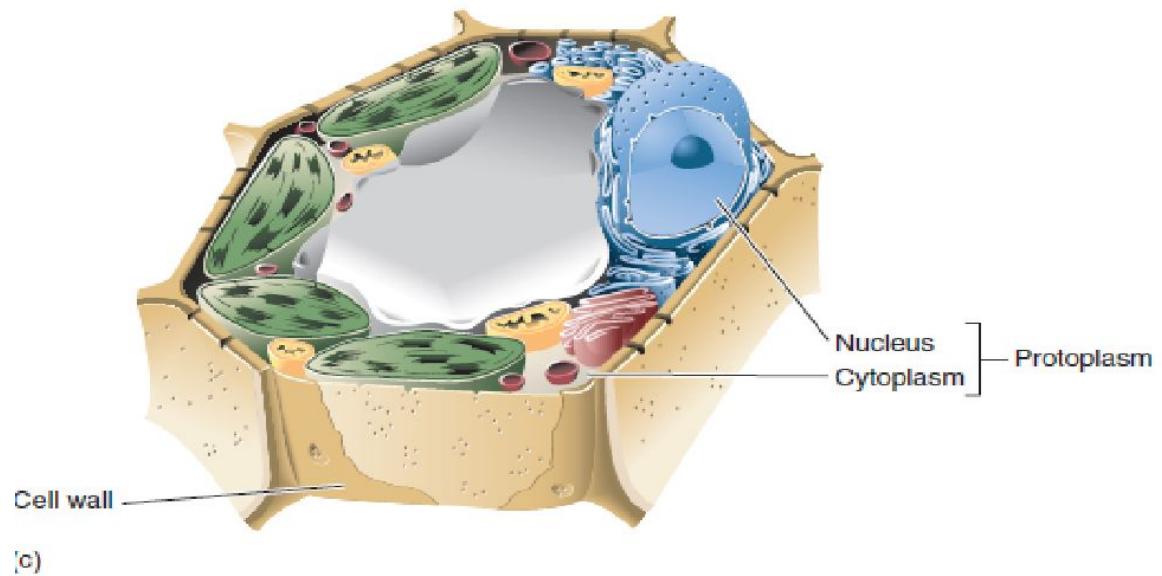
Cell



(a)



(b)



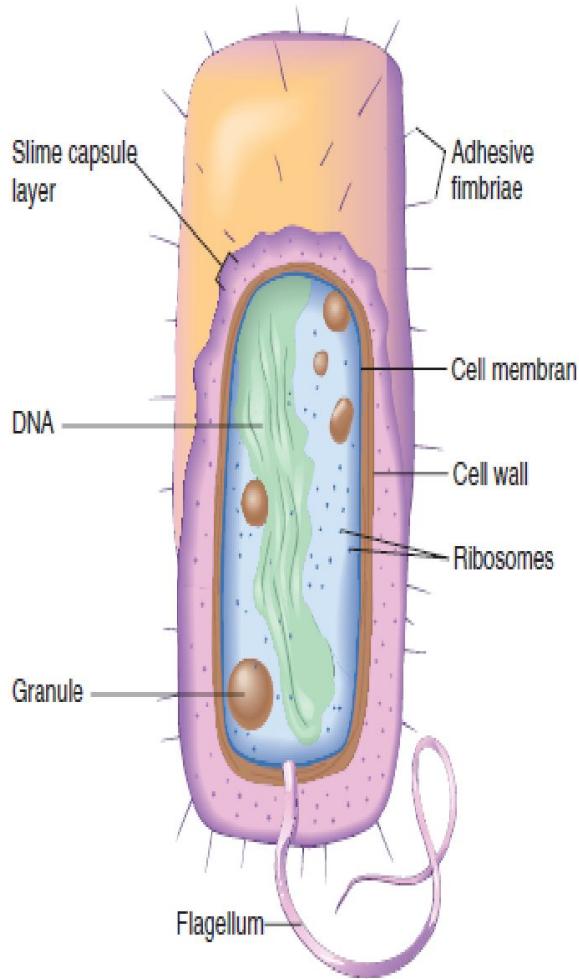
(c)

- ✓ Anton van Leeuwenhoek (1632–1723) first to observe biological samples
- ✓ Robert Hooke (1635–1703) first to study plant cork and identify cells.

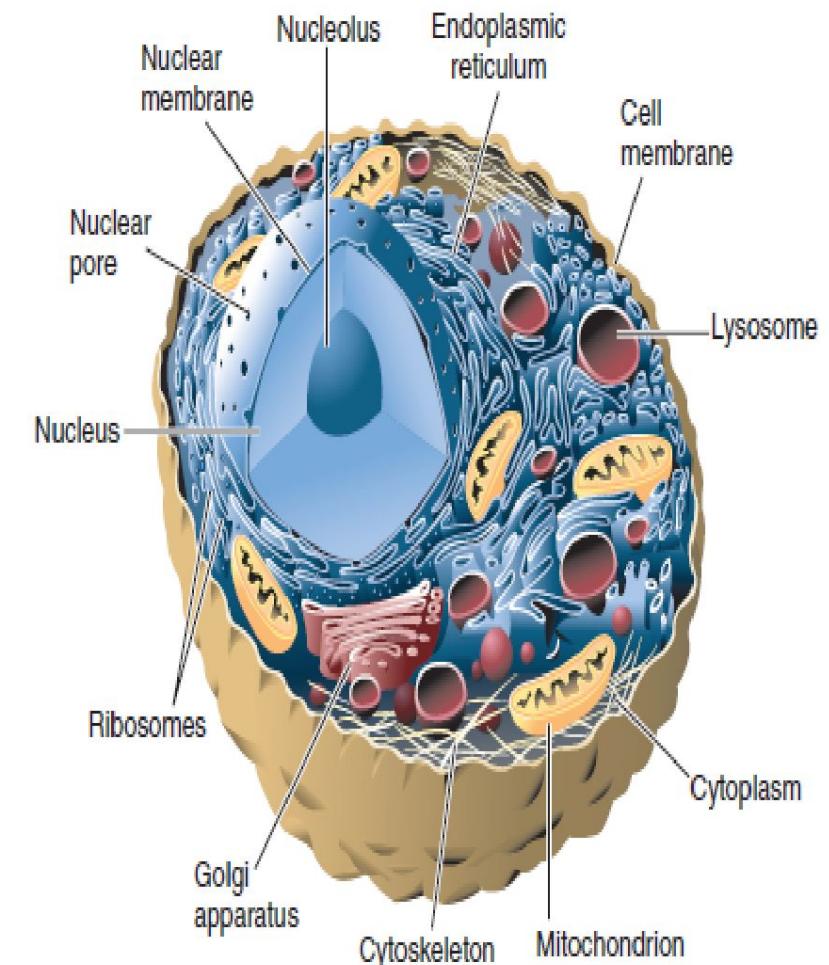
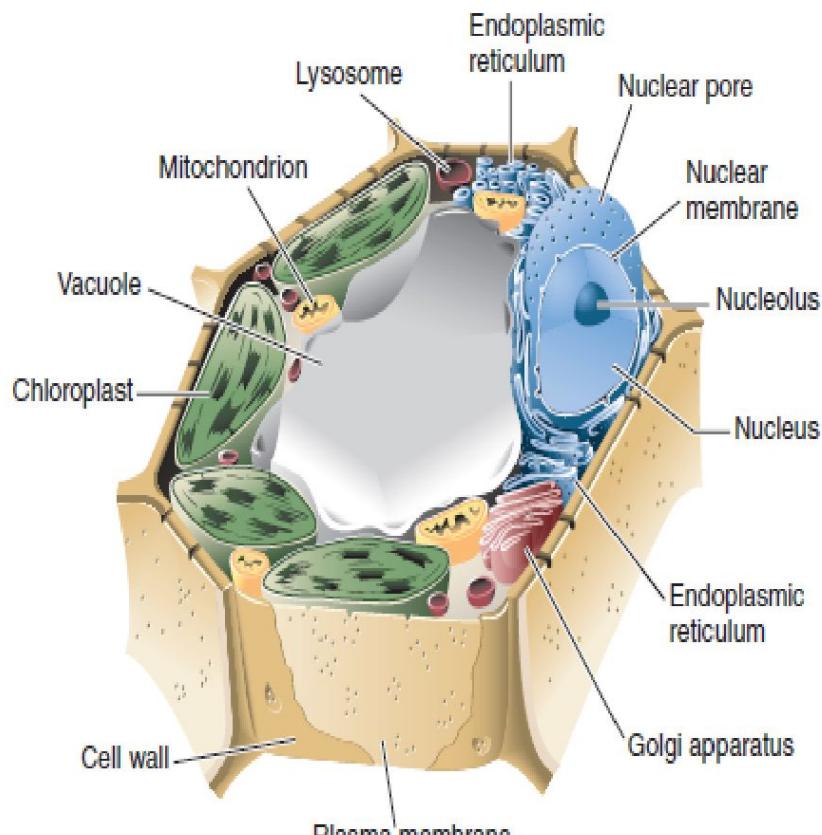
Cell Theory

- All living things are made of cells
- Smallest living unit is the cell
- Structural and functional Basis of all cellular organisms
- All cells arise from pre-existing cells

Prokaryotic

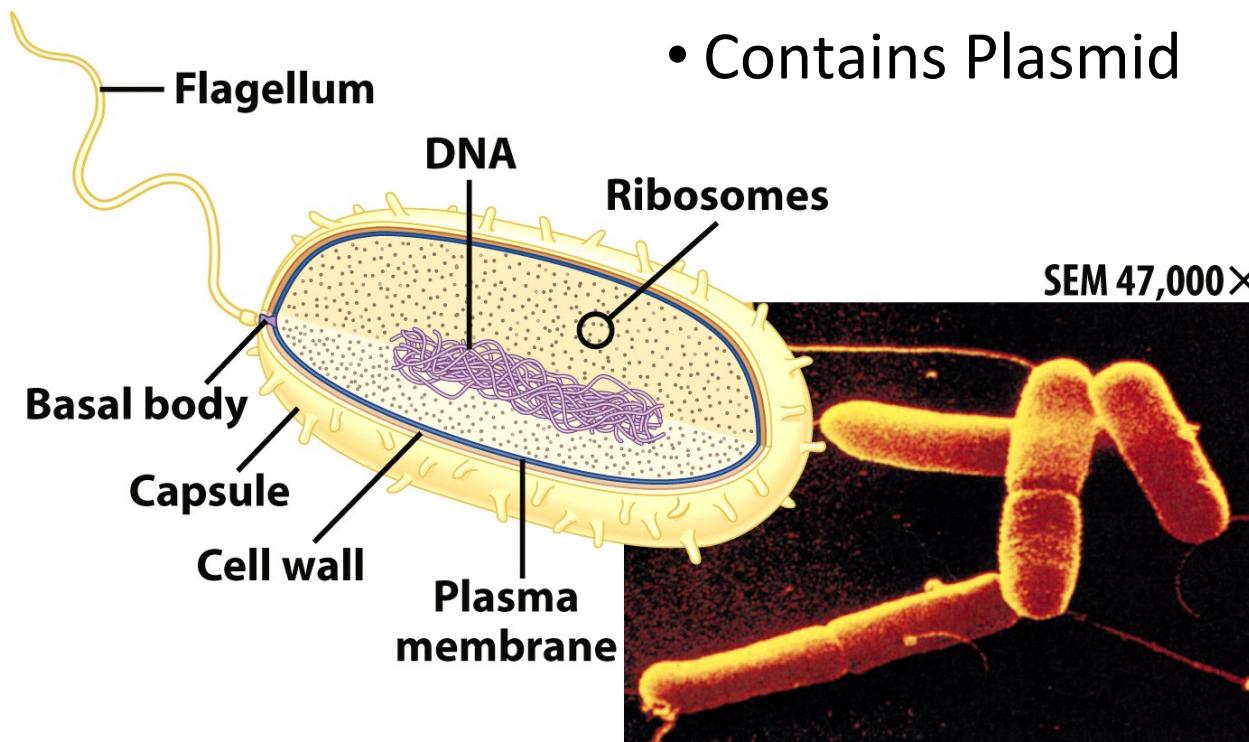


Eukaryotic



Prokaryotic Cells

- First cell type on earth
 - Cell type of Bacteria and Archaea
 - Single Circular Chromosomes
- No membrane bound nucleus
 - Nucleoid = region of DNA concentration
 - Organelles not bound by membranes
 - Contains Plasmid



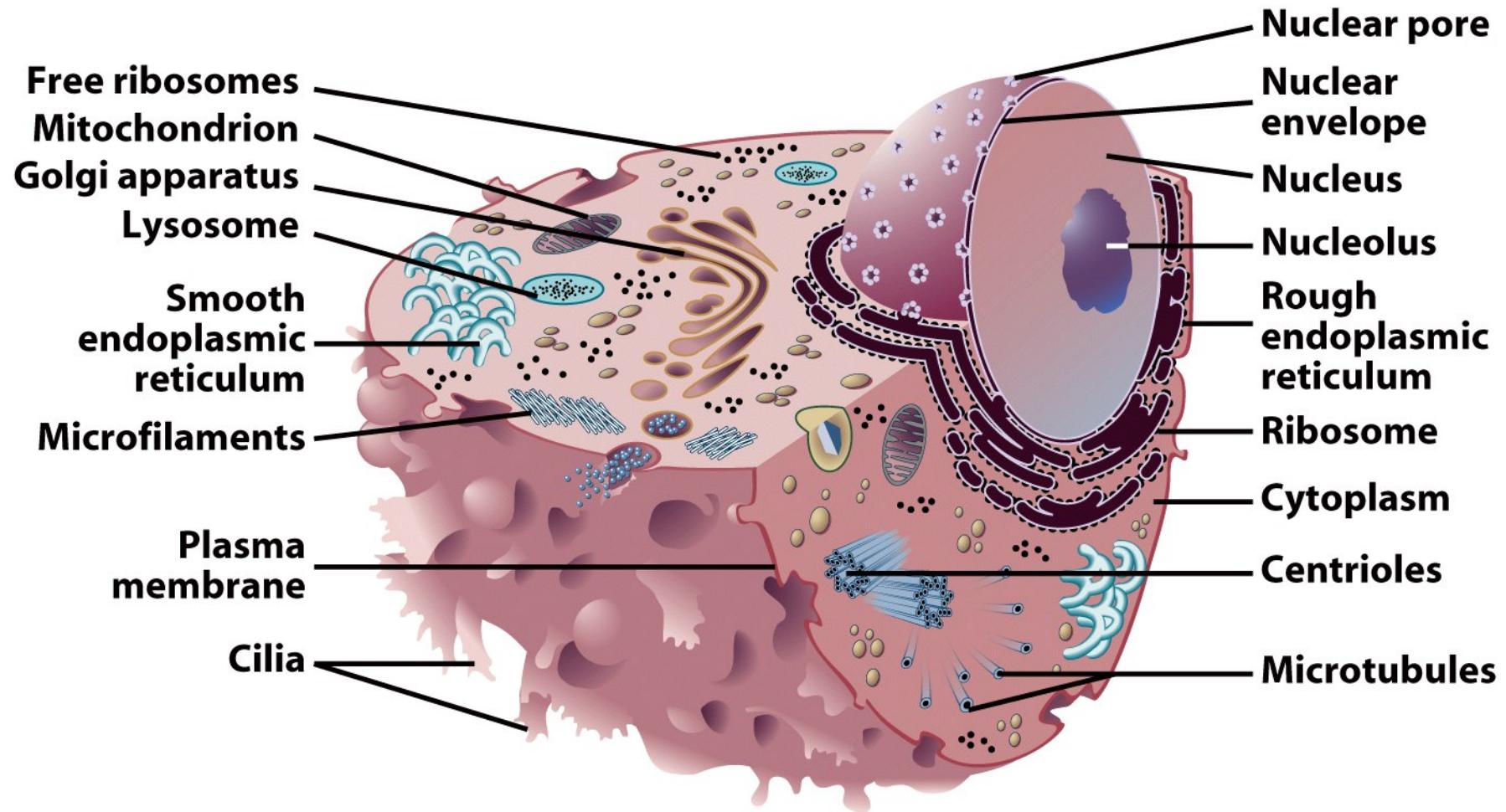
Eukaryotic Cells

- Nucleus bound by membrane
- Include fungi, protists, plant, and animal cells
- Possess many organelles

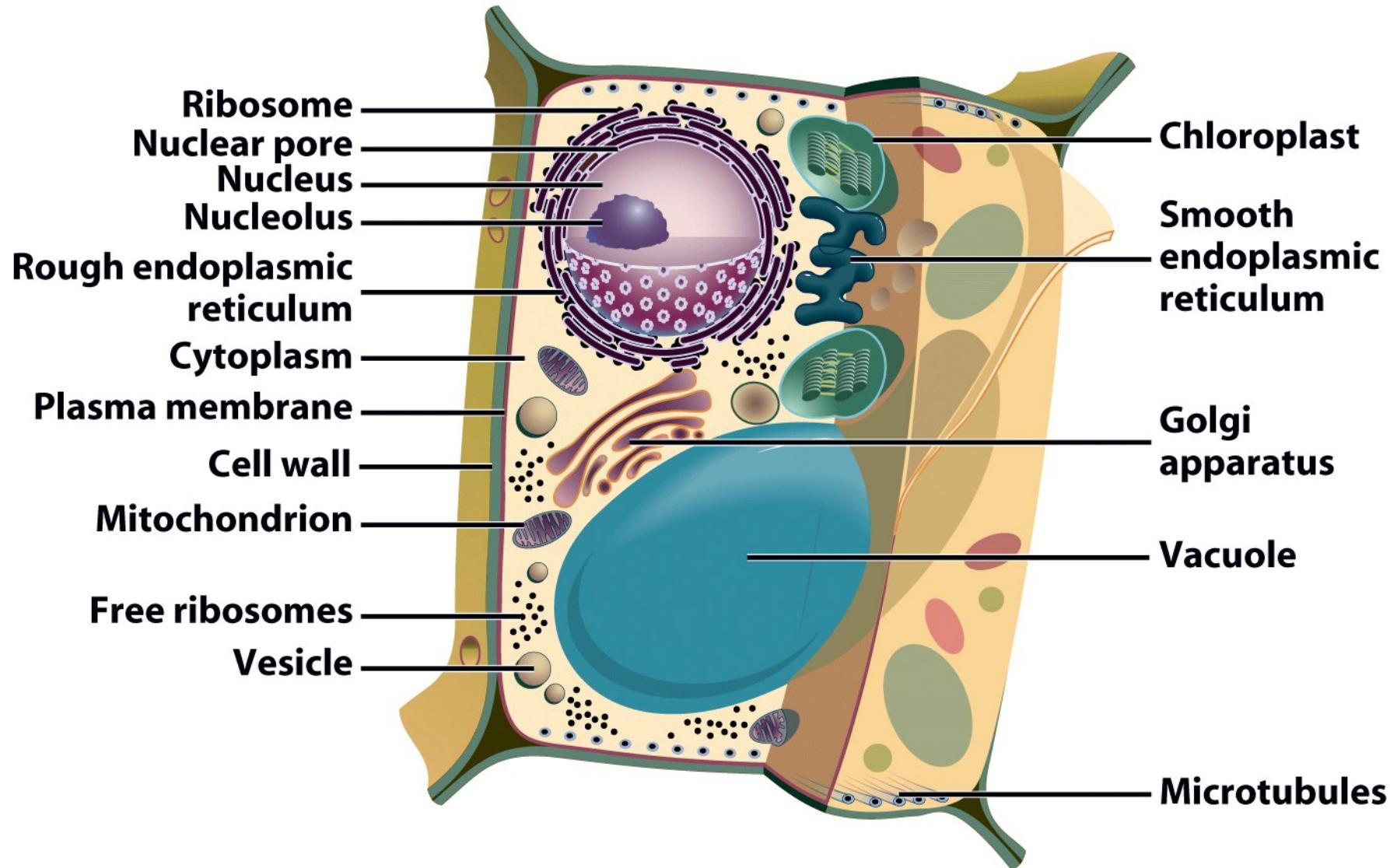


Protozoan

Representative Animal Cell

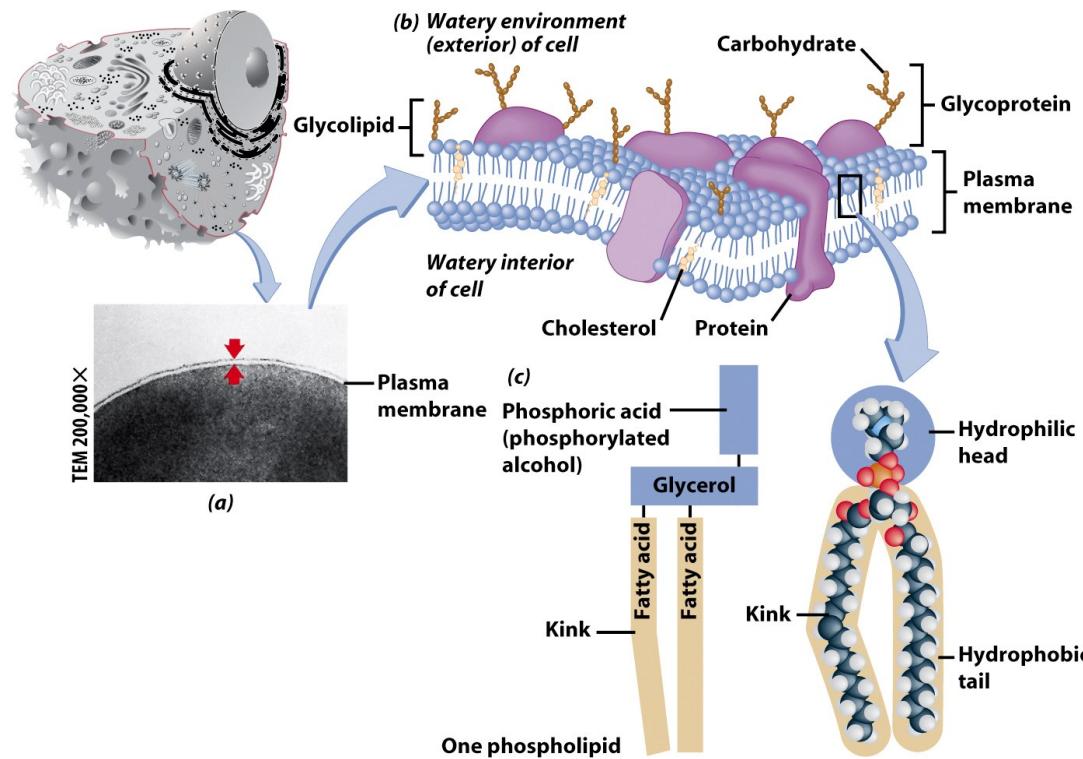


Representative Plant Cell



Cell Membrane

- Contains cell contents
- Double layer of phospholipids & proteins



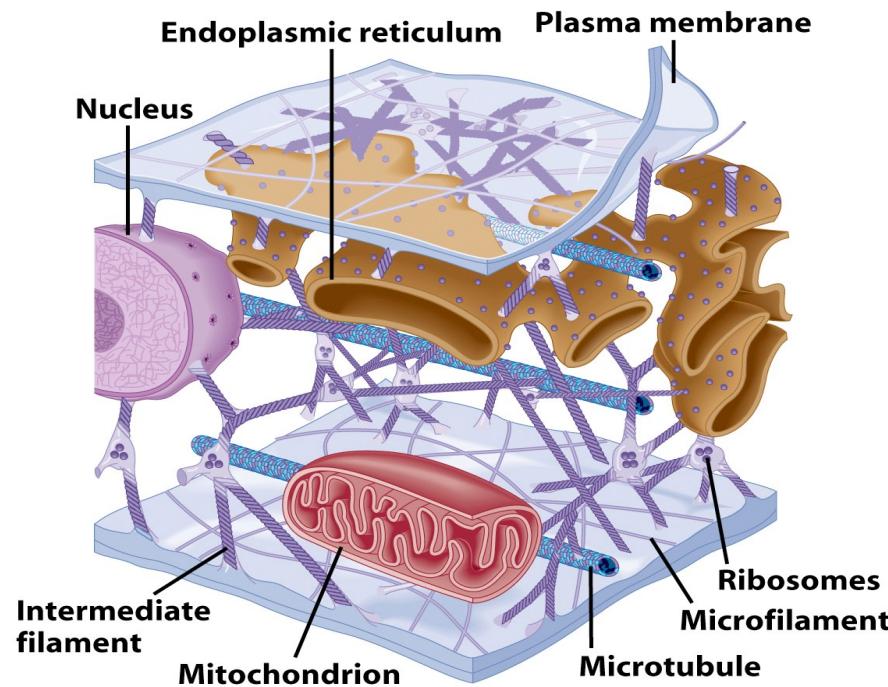
Cell Walls

- Found in plants, fungi, & many protists
- Surrounds plasma membrane



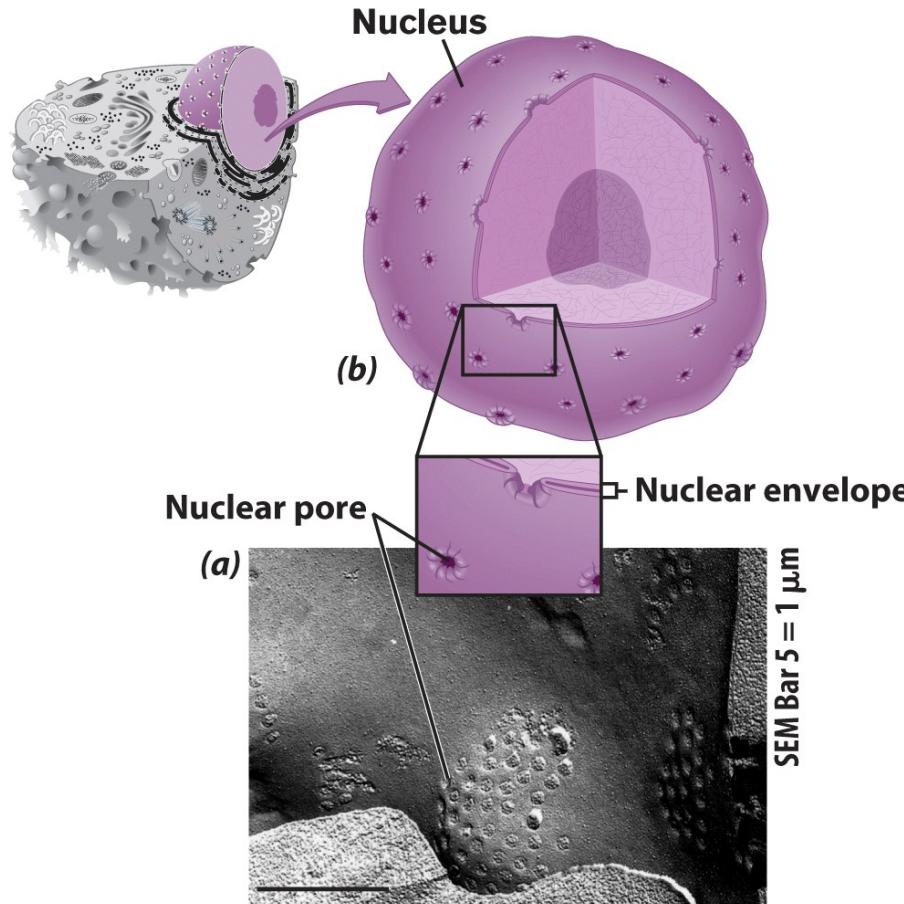
Cytoplasm

- Viscous fluid containing organelles
- components of cytoplasm
 - Interconnected filaments & fibers
 - Fluid = cytosol
 - Organelles (not nucleus)
 - storage substances



Nucleus

- Control center of cell
- Double membrane
- Contains
 - Chromosomes
 - Nucleolus



DNA

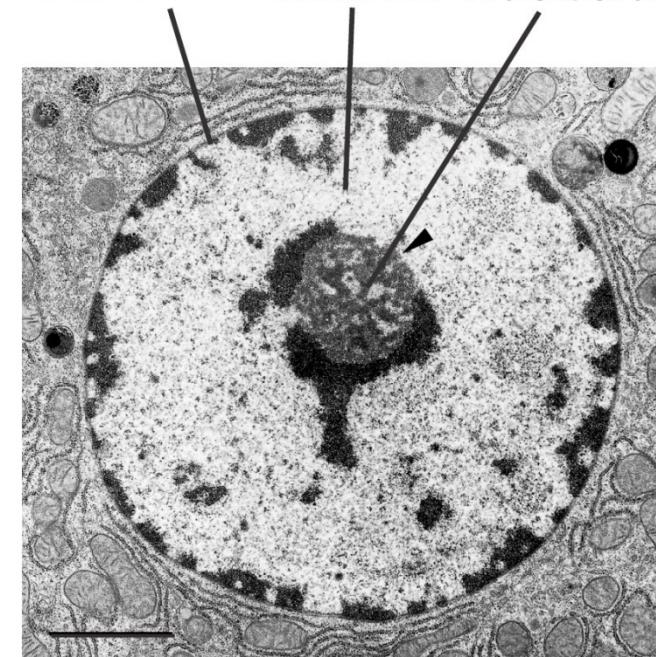
- Hereditary material
- Chromosomes
 - DNA
 - Proteins
 - Form for cell division
- Chromatin



Nucleolus

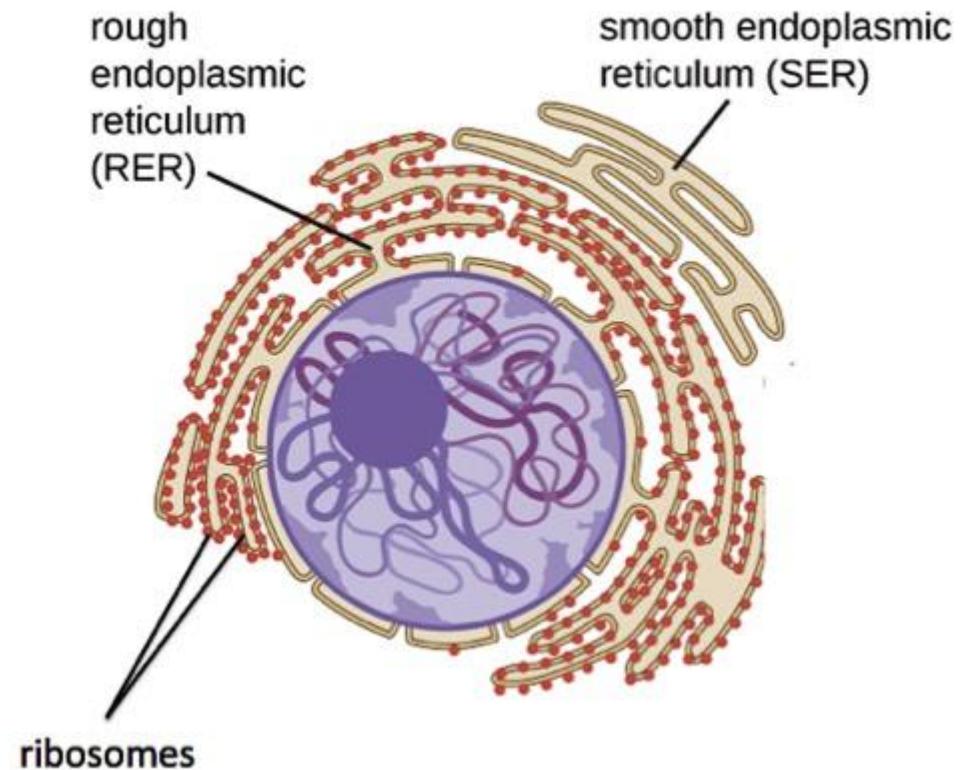
- Most cells have 2 or more
- Directs synthesis of RNA
- Forms ribosomes

**Nuclear
membrane Nucleus Nucleolus**



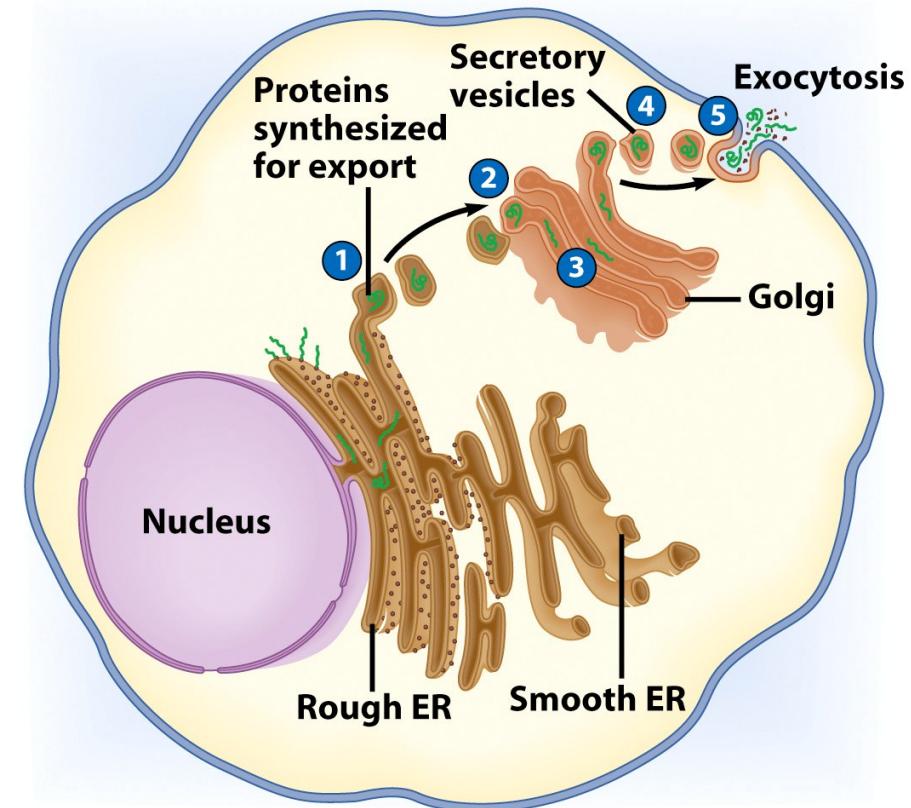
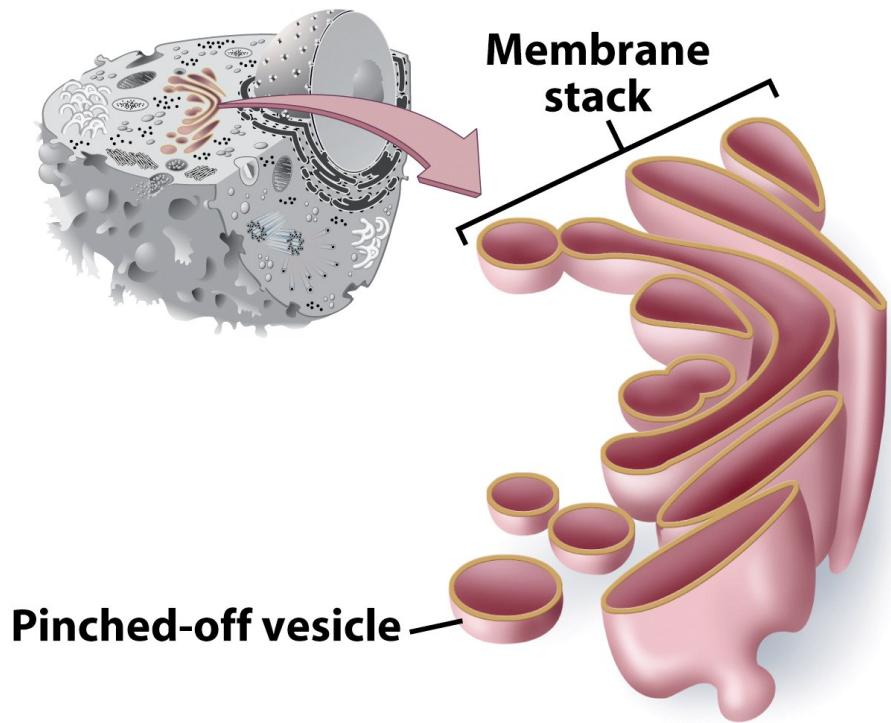
Endoplasmic Reticulum

- Helps move substances within cells
- Network of interconnected membranes
- Two types
 - Rough endoplasmic reticulum
 - Smooth endoplasmic reticulum



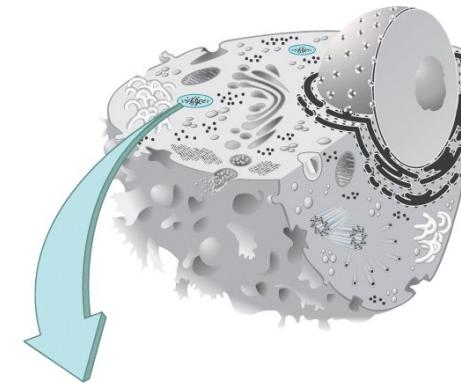
Golgi Apparatus

- Involved in synthesis of plant cell wall
- Packaging & shipping station of cell



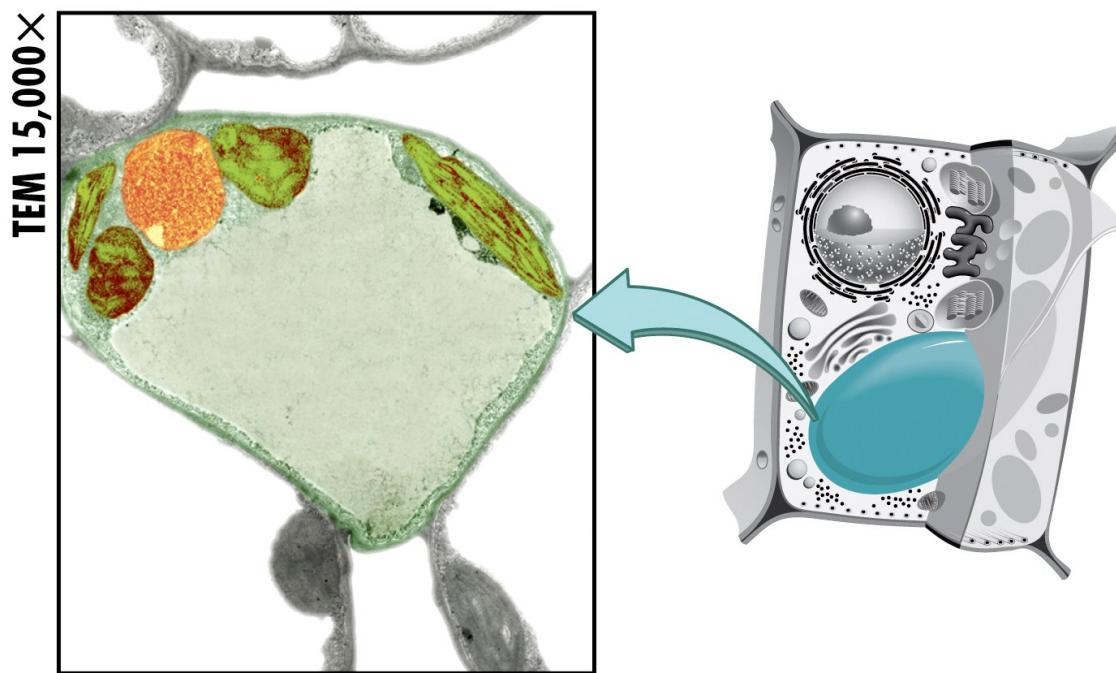
Lysosomes

- Contain digestive enzymes
- Functions
 - Aid in cell renewal
 - Break down old cell parts
 - Digests invaders



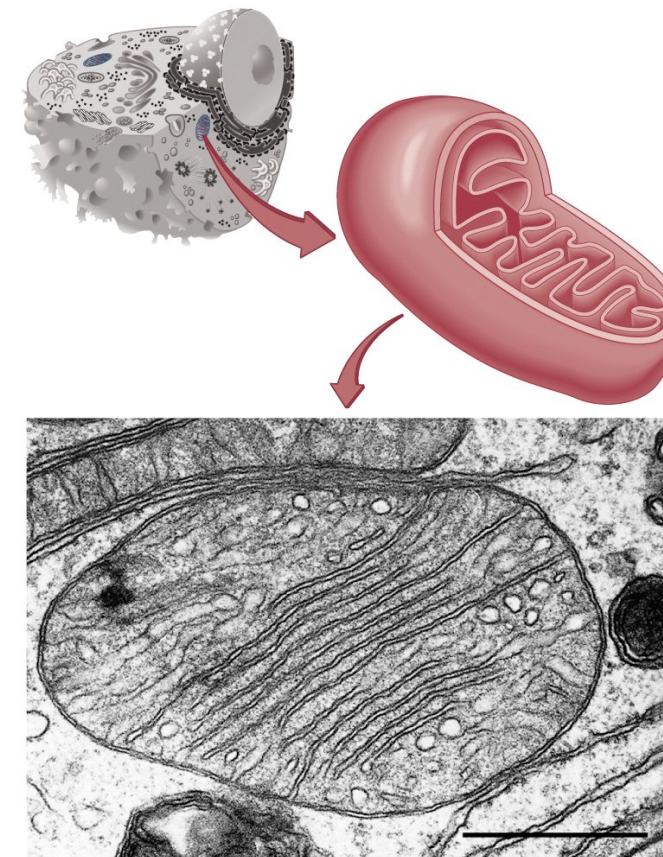
Vacuoles

- Membrane bound storage sacs
- More common in plants than animals
- Contents
 - Water
 - Food
 - wastes



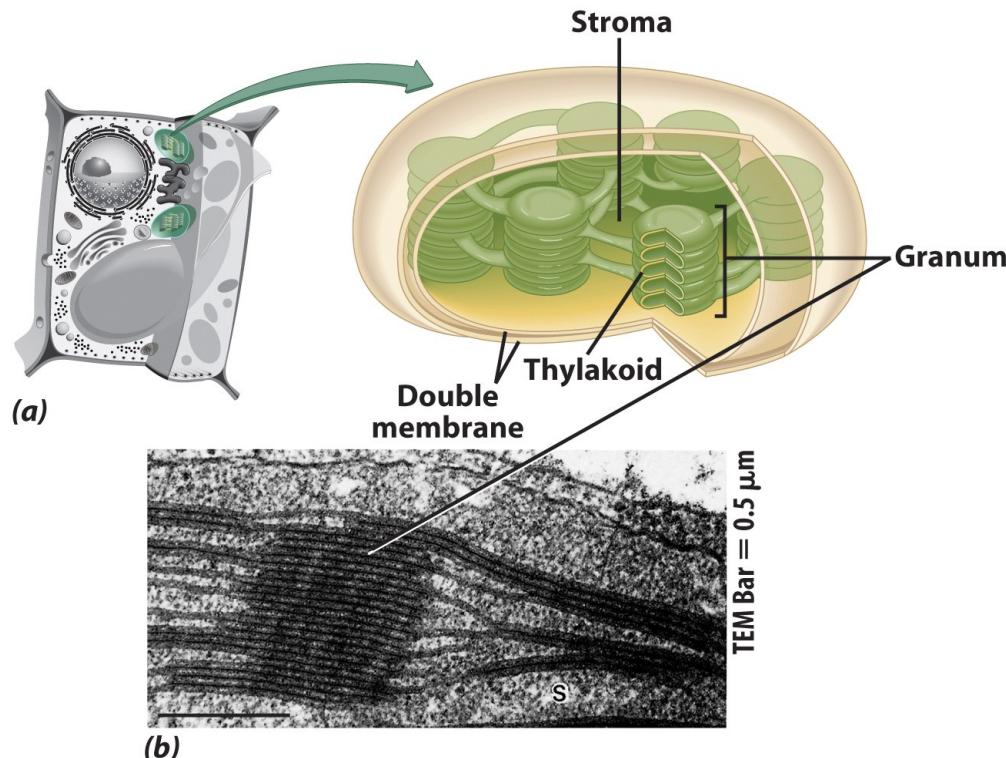
Mitochondria

- Break down fuel molecules (cellular respiration)
 - Glucose
 - Fatty acids
- Release energy
 - ATP



Chloroplasts

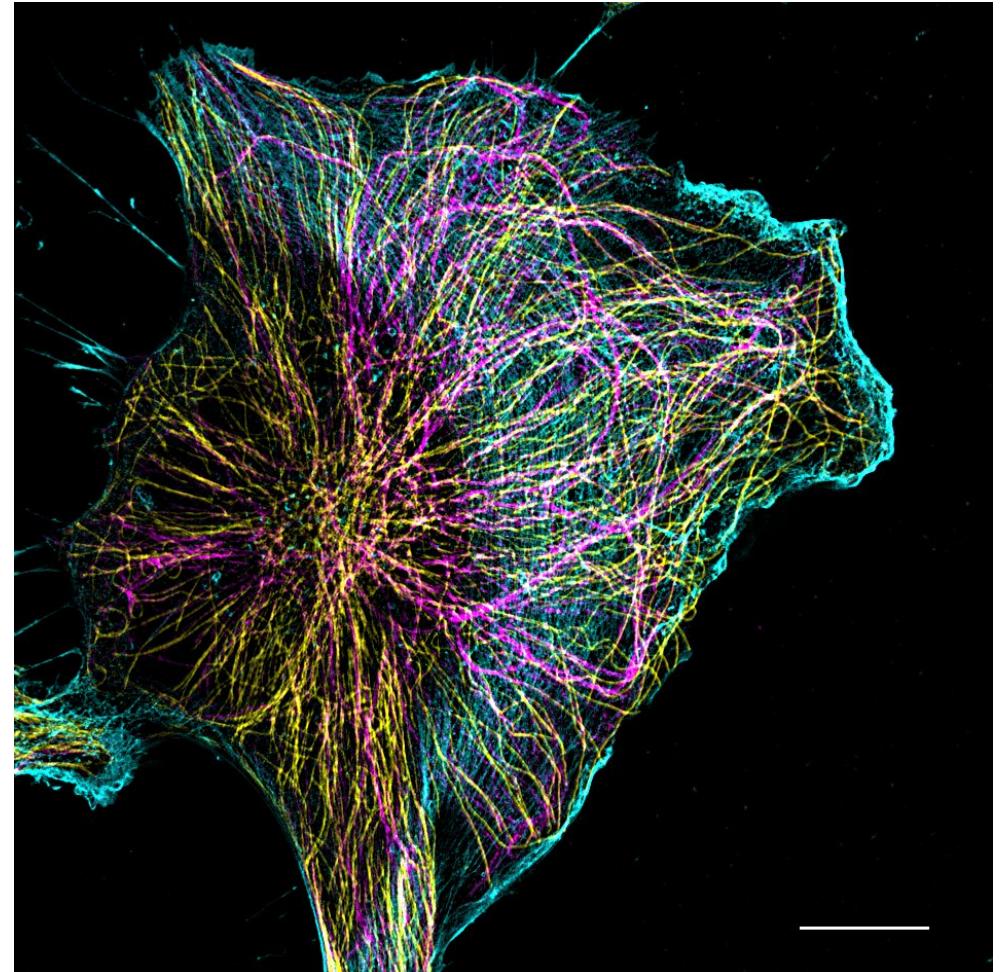
- Derived from photosynthetic bacteria
- Solar energy capturing organelle



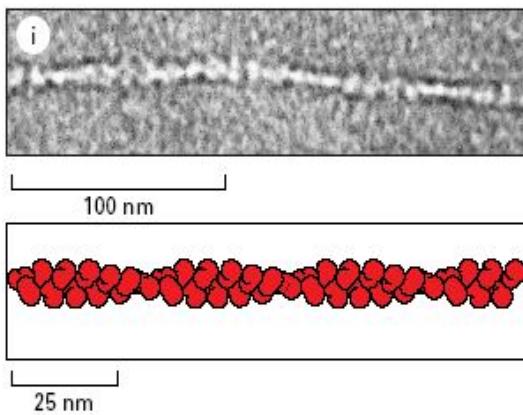
Cytoskeleton

Eukaryotic cells contain protein fibers that are involved in

- Establishing cell shape
- Providing mechanical strength
- Cell movement
- Chromosome separation
- Intracellular transport of organelles

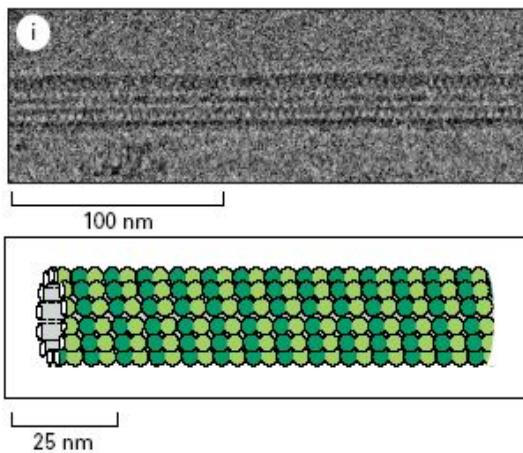


ACTIN FILAMENTS

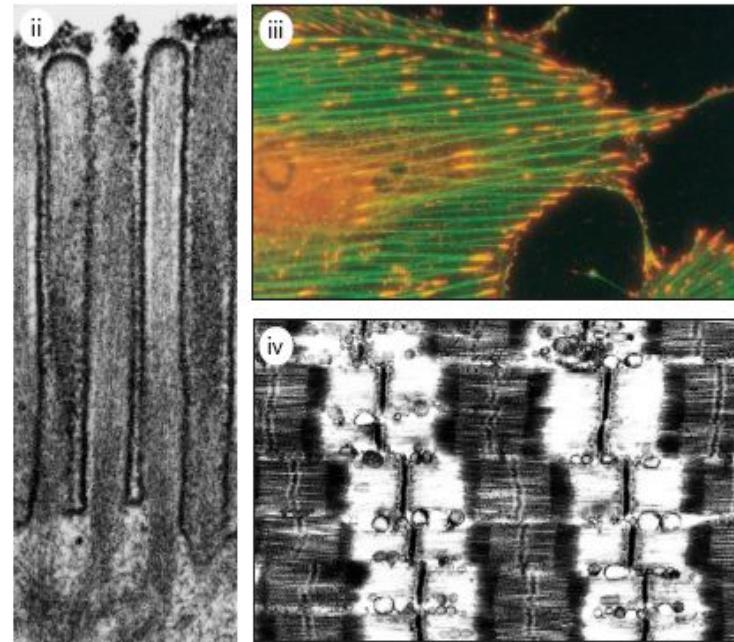


Actin filaments (also known as *microfilaments*) are two-stranded helical polymers of the protein actin. They appear as flexible structures, with a diameter of 5–9 nm, and they are organized into a variety of linear bundles, two-dimensional networks, and three-dimensional gels. Although actin filaments are dispersed throughout the cell, they are most highly concentrated in the cortex, just beneath the plasma membrane.

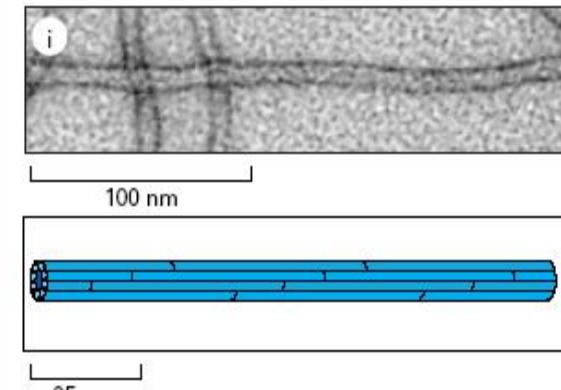
MICROTUBULES



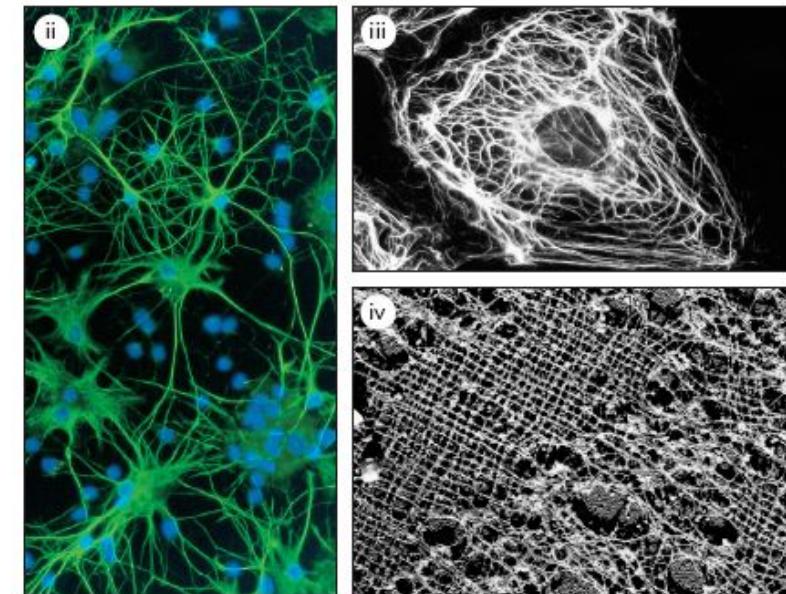
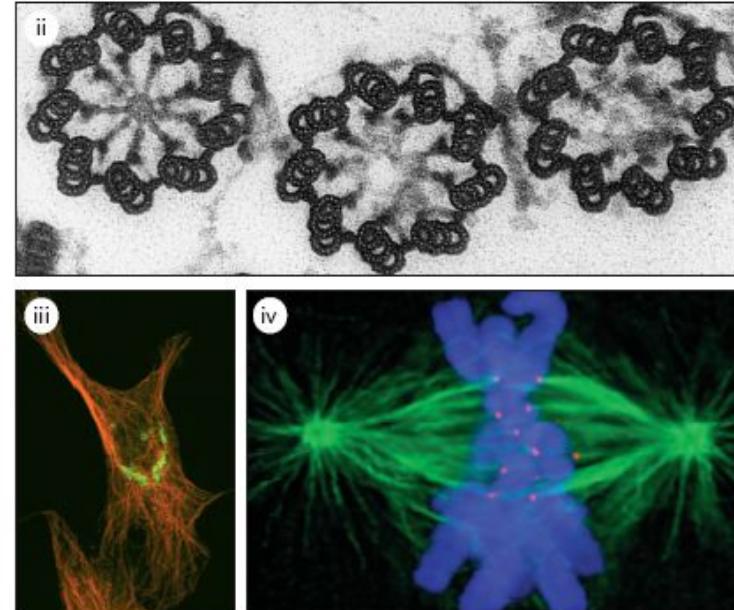
Microtubules are long, hollow cylinders made of the protein tubulin. With an outer diameter of 25 nm, they are much more rigid than actin filaments. Microtubules are long and straight and typically have one end attached to a single microtubule-organizing center (MTOC) called a *centrosome*, as shown here.



INTERMEDIATE FILAMENTS



Intermediate filaments are ropelike fibers with a diameter of around 10 nm; they are made of intermediate filament proteins, which constitute a large and heterogeneous family. One type of intermediate filament forms a meshwork called the nuclear lamina just beneath the inner nuclear membrane. Other types extend across the cytoplasm, giving cells mechanical strength. In an epithelial tissue, they span the cytoplasm from one cell-cell junction to another, thereby strengthening the entire epithelium.



Thank You

