



## *Cell Structure and Function*

Cells are the basic functional units of all living things

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## *Outline of Today's Lecture*

1. Cell Theory
2. Prokaryotic and Eukaryotic Cells
3. Animal Cells and Plant Cells
4. Functions of cell components
5. Hammerling's experiments:  
Acetabularia

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## *Cell Theory*

### **Cell Theory**

- a. All organisms are cellular.
- b. Cells are the basic functional units of all living things.
- c. Cells come from pre-existing cells.

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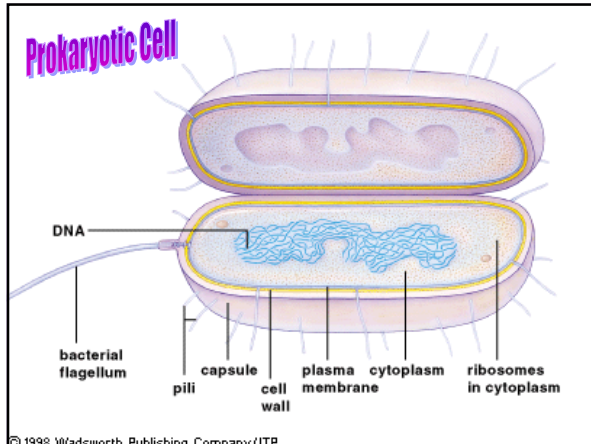
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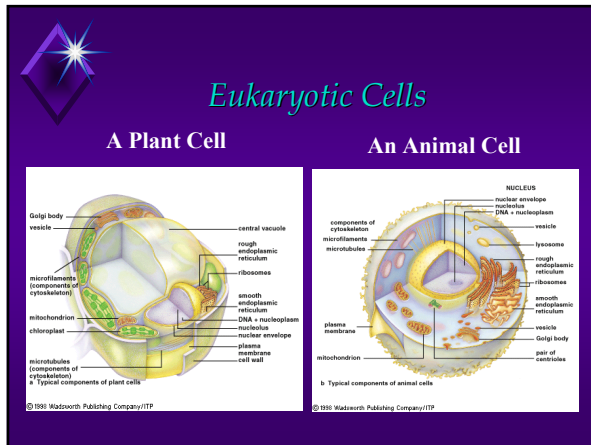
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## Animal Cells and Plant Cells

Size: 10-30  $\mu\text{m}$  (1 micrometer = 1/1,000,000 m)

- a. Plasma membrane (cell membrane)
- b. Nucleus (chromosomes, nucleolus and nuclear envelope)
- c. Cytoplasm (every thing inside the cell membrane, exclusive of the nucleus) **Organelles:** mitochondria, Golgi complex, rough and smooth endoplasmic reticulum, ribosomes, lysosomes, vesicles, etc.

**Plant cells have: I. Chloroplast II. Cell wall III. Central vacuole.**

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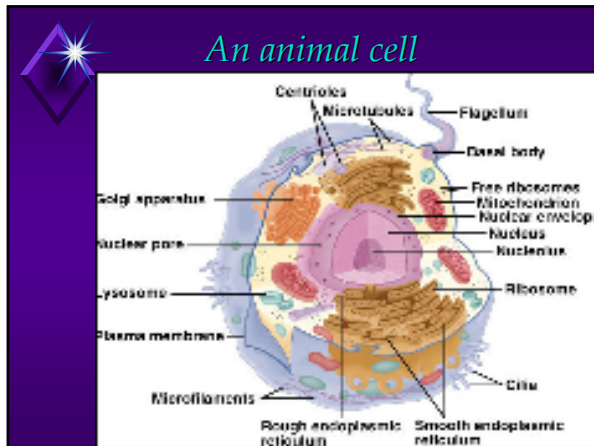
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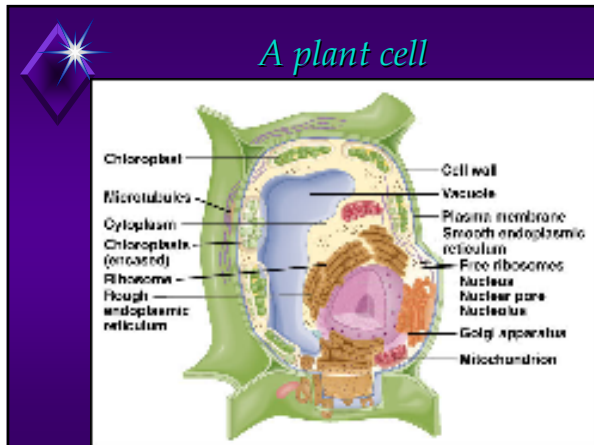
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### Functions of cell components

**The Nucleus** - Regulates the cell activities

1. Eukaryotic DNA resides in the nucleus
2. Chromosomes
3. Nuclear envelope ( 2 membranes) controls exchange of substances between nucleus and cytoplasm

**Plasma membrane** - Isolates cell contents from environment; regulates movement of materials into and out of cell; communicates with other cells

1. Lipid bilayer
2. Proteins: Channels, transport, pumps, receptors

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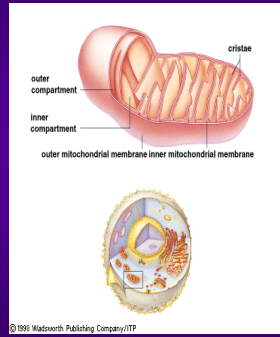
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## Mitochondria

Production of ATP  
Double-membrane system  
Have their own DNA  
Divide on their own  
Have ribosomes



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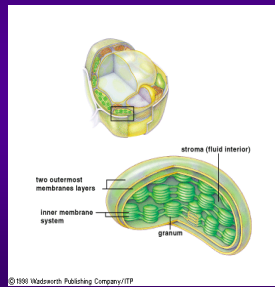
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## Chloroplast

Photosynthetic  
Two outer membrane layers  
  
Chlorophyll



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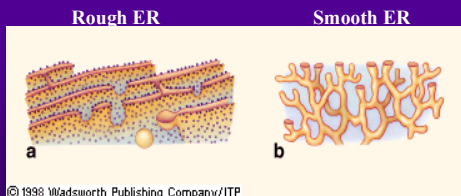
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## The Endoplasmic Reticulum

Rough and Smooth  
Presence or absence of ribosomes  
Rough: Proteins  
Smooth: Lipids



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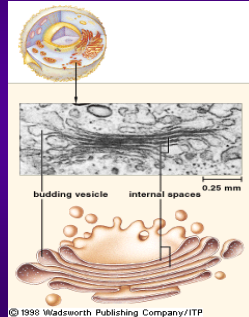


## Golgi Bodies

Enzymatic finishes on proteins and lipids, and packaging in vesicles

Vesicles : one membrane-bound sac, transport, storage, or digestion

Lysosomes : intracellular digestion



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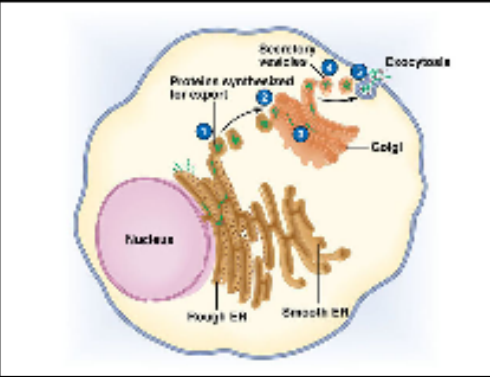
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## movement



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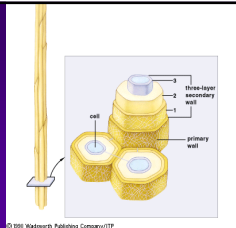
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## Cell Walls

- Structure:
  - cellulose
- Function:
  - support and rigidity
  - protection from drying environment



Deposition of layers inside primary wall

Stiffen wall  
Maintain shape

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## Central Vacuole

Large, fluid-filled organelle of living, mature plant cell.

Stores amino acids, sugars, ions, and toxic wastes.

As it enlarges during the growth, it forces the primary cell wall to expand and cell surface area to increase - maintaining turgor pressure.

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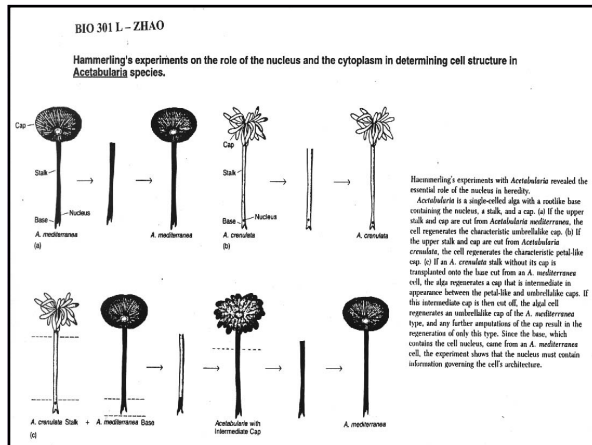
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