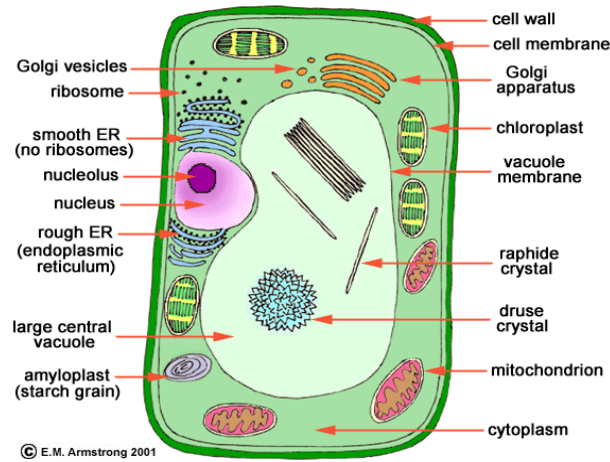
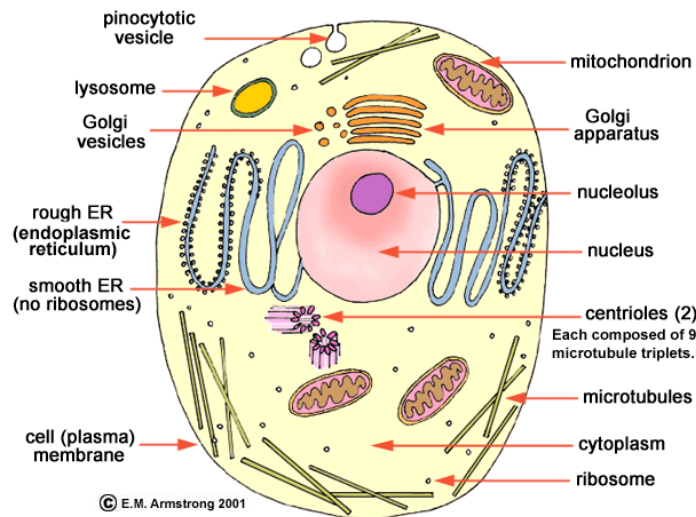


1. Plant cells:



- **Cell wall:** made of cellulose non-living cell wall.
  - It protect the cell from injury
  - It gives the cell a fixed shape.
  - It is fully permeable
- **Chloroplast:** contain green pigments called chlorophylls essential for photosynthesis process

2. Animal cells:



- **Centriole:** small hollow cylinder in pairs usually found near to the nucleus. They play an important role during cell division (Mitosis and Meiosis)

### 3. Common Organelles in animal and plant cells

- **Cell surface membrane:** partially permeable to control the entry and exit of substances to the cell.
- **Nucleus:** contain nucleus envelope, chromatin threads, nucleoplasm, and nucleolus.
  - It controls cell activities such as cell growth and repair of worn out cells.
  - It is essential for cell division as it contain DNA genetic information for protein synthesis.
- **Cytoplasm:** surrounds the nucleus and is where most cell activities occur.
  - **Mitochondria:** sites of aerobic respiration for energy release
  - **Ribosomes:** small round structures are sites of protein synthesis
  - **Vacuoles:** contains water and food substances

### 4. Comparing Plant cells and Animals cells

Plant cells	Animal cells
<ul style="list-style-type: none"><li>• Cell wall present</li><li>• Chloroplast present</li><li>• A large central vacuole</li><li>• Centriole absent</li></ul>	<ul style="list-style-type: none"><li>• Cell wall absent</li><li>• Chloroplast absent</li><li>• Vacuoles are small and numerous</li><li>• Centriole (for cell division) present</li></ul>

### 5. Specialized cells, tissues, organs and systems

- **Cells→Tissues→Organs→Organ systems→Organism**
- **Differentiation:** is the process by which a cell becomes specialized for a specific function.
  - **Red blood cells:** no nucleus and flexible, biconcave shape, contains haemoglobin to carry oxygen.
  - **Xylem vessel:** non-living hollow tubes without cross wall. Deposition of lignin to strength the wall to prevent collapse.
  - **Root hair cell:** elongated shape to increase surface area to volume ratio for water and minerals absorption.
  - **Epithelium cells in small intestine:** with villi and microvilli to maximize absorption surface.
- **Epithelium:** is a sheet of cells covering the internal or external surface of the body.
- **Epidermis:** the covering tissue for leaves and stems of plant typically with a layer of waxy cuticle to prevent water loss.

### 6. Experimental Skill

- **Light microscope** magnify object to 1000x cannot see organelles.
- **Electron microscopes** magnify object up to 200,000 x can be used to view organelles in the cytoplasm.