**Cell fractionation**
(Used to separate cellular components while preserving individual functions of each component)

**Homogenization**
- To break tissues into small fragments, disrupt cells and release individual organelles by lysing the cell surface membrane
- Maintenance of the integrity of cellular organelles
  - ___________ medium to ensure that cells do not crenate/plasmolyze or undergo haemolysis/become more turgid due to osmosis caused by a net movement of water molecules from a less negative water potential to a more negative water potential.
- A buffer solution to maintain pH
- A low temperature of 4°C to inhibit __________ activity and preserve the unique conformation of proteins in organelles
- Methods of mechanical rupturing of cell membrane
  - Ultrasound
  - Osmotic Lysis (rupture protoplasts)
  - Pressure
  - Homogeniser (abrasive equipment)

**Differential Centrifugation**
- Used to separate organelles and cellular components as a function of their ____________ coefficient, dependent on size and density (as well as viscosity of the medium)
- Allows for the study of isolated organelles to study cell structure and function.
- Bottom of tube → Pellet, Remaining fluid → Supernatant
- The homogenate is subjected to **progressively increasing speeds**, which causes particles to separate in descending order of _______ and ___________.
- A series of pellets containing cell organelles of decreasing sizes can therefore be obtained
- **Nuclei, Mitochondria/Chloroplasts/Peroxisomes & Lysosomes, Plasma Membrane/Microsomes (fragmented ER)/Polyribosomes, Ribosome Subunits, Cytosol**
b) **Centrioles**

**Description**
- Pair of hollow cylinders located near nucleus; 0.2\(\mu\)m in diameter and 0.3 to 0.5nm in length
- Found in pairs at right angles to each other,
- From the transverse section of the centriole as seen under the TEM, 9 triplets of microtubules are fused together to give a rod-like structure.

**Function**
- Organize spindle fibres during cell division.
- Anchorage for cilia and flagella

![Centrioles Diagram]

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c) **Cell wall**

**Description**
- Rigid and inflexible structure that is mainly made up of cellulose
- Supports and defines the shape of plant tissues
- Freely permeable to all but very large molecules

**Functions**
- Protecting the cell from mechanical injury and invasion
- Withstanding the ________________ exerted by the uptake of water by the cell

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**Other Parts**

**Cytoplasm**
- Refers to all the organelles + cytosol (\textbf{without nucleus})
- Cytosol \rightarrow \text{Aqueous solute rich matrix that contains}
  - Essential Ions & soluble organic molecules such as sugars and amino acids
  - Soluble proteins
  - Cytoskeleton
- Bounded by ______________________
- Various metabolic reactions needed to sustain life takes place here