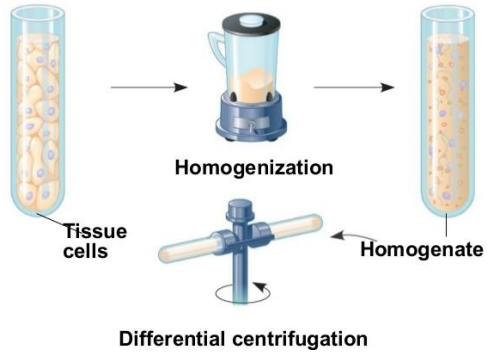
Cell fractionation

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

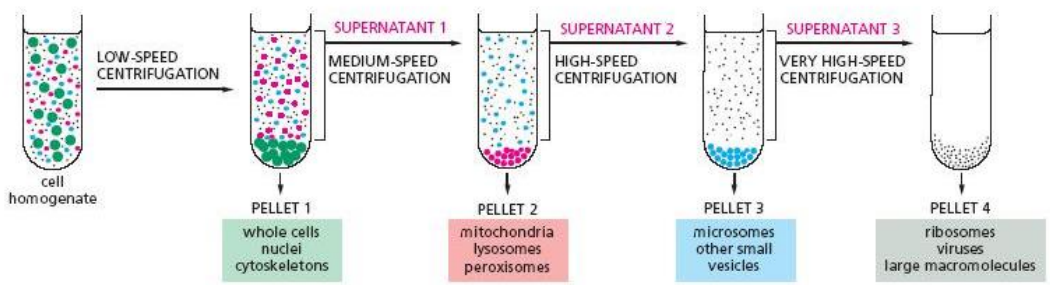
Homogenization



- 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 3D 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



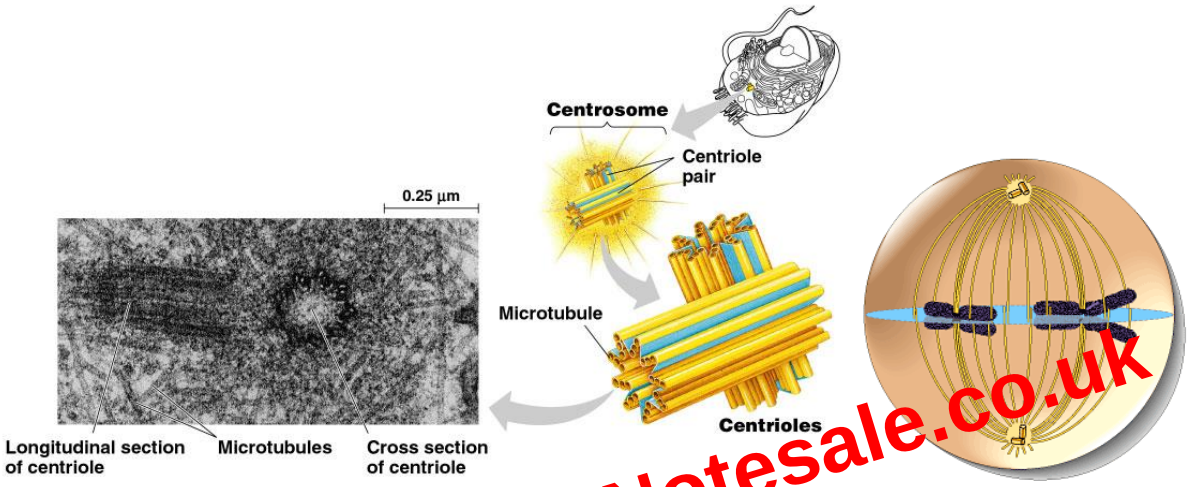
b) Centrioles

Description

- Pair of hollow cylinders located near nucleus; 0.2µm 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



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

Other Parts

Cytoplasm

- Refers to all the organelles + cytosol (**without nucleus**)
- Cytosol → 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