    - Cell loses water
- **Hypotonic** : solute concentration is less than inside the cell
    - Cell gains water
- **Osmoregulation** : the control of solute concentrations and water balance (Paramecium)
- Turgid - normal(hypotonic)
- Flaccid - isotonic
- Plasmolyzed - hypertonic

7.4 - Active Transport

- Active transport mechanisms can be divided into:
    - **Directive active transport** - the accumulation of solute molecules or ions on one side of the membrane is coupled directly to an exergonic chemical reaction
    - **Indirect active transport** - requires energy but depends on the simultaneous transport of two solutes, with the favorable movement of one solute down its gradient driving the unfavorable movement of the other solute up its gradient
    - The **sodium potassium pump** is one type of active transport system (used by neurons to send an action potential through the axon, received by another cell)
    - The resulting **electrochemical potentials** for potassium and sodium ions are essential as the driving force for coupled transport as well as for the transmission of nerve impulses
- **Membrane potential** is the voltage difference across a membrane
- Voltage is created by differences in the distribution of positive and negative ions across a membrane
- Two combined forces, collectively called **electrochemical gradient**, drive the diffusion of ions' across a membrane
    - A chemical force (the ions concentration gradient)
    - An electrical force (the effect of the membrane potential on the ions' movement)
- An **electrogenic pump** is a transport protein that generates voltage across a membrane
- The sodium potassium pump is the major electrogenic pump of amical cells
- The main electrogenic pump of plants, fungi, and bacteria is a **proton pump**
- Electrogenic pumps help store energy that can be used for cellular work
- **Cotransport : Coupled Transport by a membrane protein**
- **Cotransport** occurs when active transport of a solute indirectly drives transport of other solutes
- Plants commonly use the gradient of hydrogen ions generated by proton pumps to drive active transport of nutrients into the cell

7.5 - Bulk Transport

- Small molecules and water enter or leave the cell through the bilipid membrane
- **Exocytosis** -transport vesicles migrate to the membrane, fuse with it, and release their contents
- **Endocytosis -** takes in macromolecules by forming vesicles from the plasma membrane
    - Phagocytosis (cellular eating)
    - Pinocytosis (cellular drinking - water/liquid only)
    - Receptor-mediated endocytosis
- **Phagocytosis** - engulfs a particle
- **Pinocytosis -** molecules are taken up when extracellular fluid is gulped
- **Receptor-mediated** - receptor attaches to a ligand and will trigger vesicle formation around a specific molecule

Chapter 36 - Water Potential