

Osmolality and Tonicity:

Osmolality: the concentration of stuff in relation to the cell, particles that draw water. Not about water movement.

Osmotically active particles: particles that influence water movement, Cl, glucose, Na etc.

- Iso: concentration of osmotically active particles (stuff) in a solution is the same as inside a cell.
- Hypo: concentration of stuff in a solution is less than inside a cell.
- Hyper: concentration of stuff in solution is more than inside a cell.

Tonicity: What a solution does to cell volume

- Iso: a solution causes no change to cell volume
- Hypo: a solution that causes cell volume to increase (cellular swelling)
- Hyper: a solution that causes cell volume to decrease (cellular shrinking)

Examples: B is ALWAYS the cell. Answer as -> A is something to B.

Examples in notebook.

Clinical example: someone has brain swelling because brain membrane is allowing water to move through, which it is not supposed to. Chemical Mannitol has a large size so it cannot move across cells.

Humans have around 290-300 mOsm osmotic pressure. If a mannitol solution is used that is lower than the human osmotic pressure, water will leave the brain to dilute mannitol. Mannitol is not permeable.

Not semi permeable, but differentially permeable. There is some stuff that is not permeable, and some stuff that is.

Osmolality may be in the same inside and outside of the cell, but actual stuff can be different.

Must know: Na concentration cannot reach equilibrium, or K.

Extracellular Na: 142 mEq/L

Intracellular Na: 10 mEq/L

Extracellular K: 4 mEq/L

Intracellular K: 140 mEq/L

There must be something that maintains gradients.