Osmotic pressure or the net movement of water across a membrane causes cells to swell or shrink in different solutions.

Cells containing dissolved molecules are almost always hypertonic to fresh (pure) water.

Cells are usually bathed in isotonic fluids or blood, but if cells experience high osmotic pressure, they can burst.

Active Cell Transport

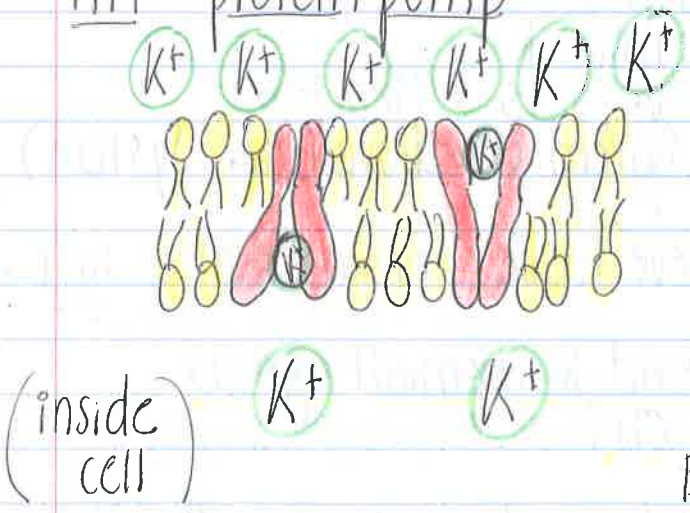
Active transport is the movement of materials against a concentration difference (low → high).
Uses energy (ATP)!

Small molecules or ions (Ca^{2+}, K^+, Na^+) can move through protein pumps fueled by ATP energy.

Larger molecules are imported or exported through endocytosis (IN) & exocytosis (OUT).

The cell membrane forms a vesicle around larger particles to move them in or out.

ATP - protein pump



ATP → ADP
creates/releases energy

Energy is used to open the protein pump.