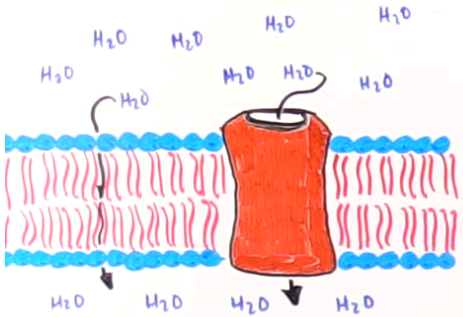
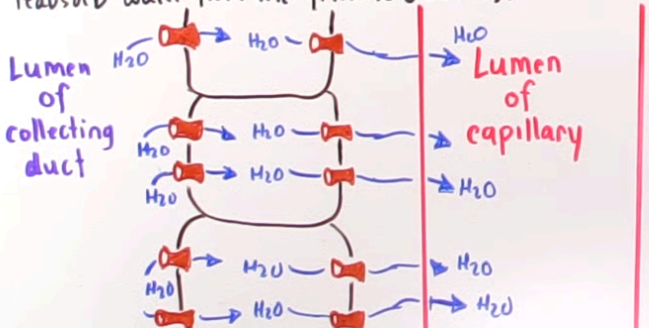
- For a while we believed that water moved across the cell membrane via simple diffusion. Although the membrane is relatively permeable to water, cells of certain tissue also contain special membrane channels called <u>aquaporins</u> that selectively funnel the movement of water across the cell membrane.

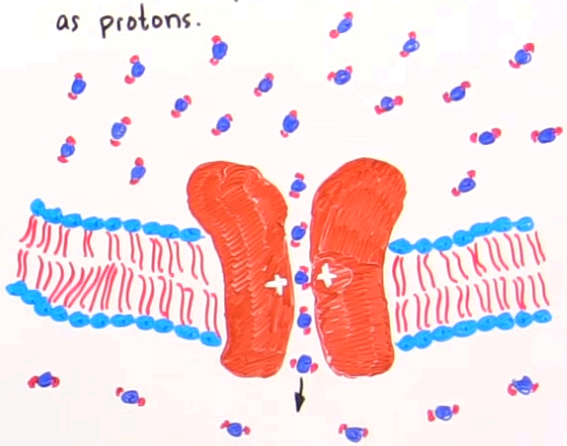


- Aquaporins are <u>not</u> ion channels They are water channels that allow the movement of H_2O molecules down their concentration gradient at times of need.

- Aquaporins are found abundantly in the membrane of red blood cells where they are used to control volume and pressure. We also find aquaporins in the cells of the kidney, where they are used to quickly and effeciently reabsorb water from the filtrate (urine).



- The structure of aquaporin consists of six membrane-spanning α helices. The inner region of aquaporin consists of a a narrow cavity that is lined with hydrophilic amino acids. At the center of the narrow passageway are positively charged residues. These prevent the movement of charged ions such as protons.



- Water molecules pass along the hydrophilic narrow passageway in single file. They move at a rate of 1,000,000 molecules per second.

- Ions such as H^+ will not be able to pass across due to the presence of the positive charges in the passageway. This means aquaporins will not disrupt gradients such as the hydrogen ion gradients used for ATP production.