AQP1, also known as Aquaporin 1, is a membrane protein that functions as a water channel. Aquaporins are a family of proteins that facilitate the movement of water molecules across cell membranes.

AQP1 is particularly abundant in tissues involved in fluid transport and exchange, such as the kidney, red blood cells, and the lining of blood vessels. It is responsible for the rapid movement of water across these membranes, enabling efficient fluid balance and maintaining osmotic equilibrium.

Here are some key points about AQP1:

Water transport: AQP1 forms water channels in cell membranes, allowing water molecules to pass through selectively. This function is essential for maintaining proper water balance and osmotic regulation in various tissues and organs.

Role in the kidney: AQP1 plays a crucial role in the reabsorption of water in the kidney. It is primarily found in the proximal tubules, where it facilitates the movement of water from the tubular fluid back into the bloodstream, contributing to the concentration of urine.

Function in red blood cells: AQP1 is also present in the membrane of red blood cells, where it assists in the movement of water across the cell membrane. This helps maintain the appropriate shape and volume of red blood cells, ensuring efficient oxygen and nutrient transport.

Expression in the brain: Although AQP1 is less abundant in the brain compared to other aquaporins, it is expressed in certain regions, including the choroid plexus, which produces cerebrospinal fluid (CSF). AQP1 facilitates the movement of water across the choroid plexus epithelium, contributing to CSF production.

Clinical significance: Mutations or dysregulation of AQP1 have been associated with certain medical conditions. For example, defects in AQP1 function can lead to a condition called congenital nephrogenic diabetes insipidus, characterized by impaired water reabsorption in the kidney and excessive urine production.

In summary, AQP1 is a membrane protein that functions as a water channel, facilitating the movement of water across cell membranes in various tissues. Its role in fluid balance, osmotic regulation, and water transport in the kidney and other organs underscores its significance in maintaining physiological homeostasis.