Water channels in the body help cells remain in balance

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microscopical water channels are also present in the cells of the body, where they ensure that water can be transported through the protective surface of the cell. Scientists at the University of Gothenburg, Sweden, have discovered that one type of the body's water channels can be modified such that it becomes more stable , which may be significant in the treatment of several diseases.

"It's important to understand how the water channels, which are known as 'aquaporins', in the body work, since they control many of the processes in our cells and tissues. They also determine what is to be transported into and out of the cell, and they are thus highly significant in the development of new treatments for various diseases, such as eczema, cerebral oedema, obesity and cancer", says Kristina Hedfalk of the Department of Chemistry at the University of Gothenburg.

Aquaporins are vital

There are 13 different types of aquaporins in the human body. One of these, AQP2, is found in the kidney where it is responsible for a large-volume recirculation of water from the primary urine every day. Without this, we would urinate nearly 10 litres every day. Another variant, AQP4, is found in the brain where it contributes to regulation of the osmotic pressure in the sensitive brain tissue. This regulation is particularly important in those who are affected by cerebral oedema, which is a life-threatening condition that can follow a blow to the head or a stroke.

The research group, which consists of Fredrik Öberg, Jennie Sjöhamn, Gerhard Fischer, Andreas Moberg, Anders Pedersen, Richard Neutze and Kristina Hedfalk, describes their studies of one of the most recently discovered aquaporins in an article in the scientific journal The Journal of Biological Chemistry. This aquaporin, AQP10, is preferentially found in the intestine, and is particularly interesting since it transports both water and sugar alcohols.

Carbohydrates stabilise the water channel

"AQP10 differs from other aquaporins by having a large carbohydrate structure of branched sugar molecules, somewhat similar to a tree, attached on its outer surface. This makes it significantly more stable. This may be because aquaporins in the intestine need to be particularly stable. What we have shown is that AQP10 retains its transport ability, even if the carbohydrate structure is removed."

More information: The article 'Glycosylation Increases the Thermostability of Human Aquaporin 10 Protein' has been published in the September edition of *The Journal of Biological Chemistry*.

Provided by University of Gothenburg