Gating the tides in yeast

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Water is a crucial ingredient for life, but its level inside cells must be carefully regulated to maintain proper cell shape and size. In this week's issue of the open access journal *PLoS Biology*, scientists from the University of Gothenburg describe the highest resolution three-dimensional structure yet of a membrane protein, in this case of a protein channel known as an aquaporin that regulates water flow into and out of yeast cells. Virtually all living organisms use aquaporins to regulate water flow between the cell and its surroundings.

The unique high resolution of the x-ray crystallography data presented here by Karin Lindkvist, Richard Neutze, and colleagues from Germany and Sweden has enabled the scientists to visualise the role of a previously mysterious region of the yeast aquaporin molecule - a long "tail" (or amino-terminal extension) that these authors now show regulates water flow by regulating the opening and closing of the wa ter channel.

"Our study shows that the amino-terminal extensions in yeast act as a gate that can be opened and closed depending on how much water the cell must release or absorb. Computer simulations and biological experiments suggest that the channel is regulated with a combination of mechanical regulation and phosphorylation," says Karin Lindkvist.

Previously published research from studies in mice has shown that inhibiting the function of aquaporins can dramatically reduce the spread and growth of tumours. These authors hope that research such as theirs into the regulation of aquaporins in simpler organisms such as yeast will

provide insight into aquaporin function in higher organisms. Potentially, "The structure of the yeast aquaporin that we have determined can be used to create inhibitors for human aquaporins, and this may in the long term lead to drugs that slow the growth of a cancer tumour," says Karin Lindkvist, senior author on the paper.

Source: Public Library of Science (news : web)