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**Water Dynamics in Living Cells and Tumor Cell Migration in Confined Microenvironments**

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More than 70% of the total mass in living cells is water. In most biological scenarios water serves as a passive medium responsible for solvation and proper functioning of proteins. However, it has been long recognized that there are situations where dynamic transport of water in cells is important. First, cells actively transport water in order to maintain its volume, and because cell volume directly influences cell shape and internal hydrostatic pressure, it is a critical aspect of cell mechanics. Furthermore, cell volume is coupled to protein synthesis which ultimately determines the cell size. Therefore water transport and cell volume dynamics ultimately impact cell growth and division. Second, epithelial cells in organs such as the eye and kidney actively transport water across the cell membrane and the epithelial layer. Indeed, water channels such as aquaporins increase water permeability of the membrane and facilitate this transport. Recent, we have shown that in confined microenvironments, active transport of water is responsible for actin-independent cell movement in confined spaces, especially for cancer cells. These results suggest that cells actively control its water content. The active regulation of water content is a crucial aspect of cell dynamics. We will discuss a theoretical model of cell pressure/volume control. Implications of this model for active cell dynamics in multi-cellular epithelial sheets will be discussed.