Systematic Investigation of Yeast Adaptation to Hyperosmotic Stress

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Upon increased external osmotic pressure, yeast cells lose a substantial part of their volume, due to water outflow. To counteract this effect, *Saccharomyces cerevisiae* activates a complex adaptation mechanism. Sensor molecules perceive the hyperosmotic stress and convey the signal to effectors, which activate glycerol production and reduce glycerol export, thus increasing the intracellular osmotic pressure and allowing the cell to regain its initial volume. Although this mechanism is extensively investigated, one of the key pathways, glycolysis, is often neglected in osmoadaptation studies. Since glycerol is a glycolysis intermediate, correct regulation of glycolysis in face of increased glycerol demand is crucial for cell survival, especially in the context of energy supply and redox potential.

Incorporating new experimental data into a mathematical model of osmoadaptation, we analyze the roles of glycolysis and its regulation during osmoadaptation. Preliminary results suggest that the current picture of osmoadaptation by glycerol accumulation alone might need extension.