

P008 Glucose modulation of cell size in yeast

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Saccharomyces cerevisiae cells grown in glucose have larger size than cells grown in ethanol. In order to enter S phase at Start, yeast must reach a carbon source-modulated critical cell size, called Ps. This control is of outmost physiological relevance, since it allows to coordinate cell growth with cell cycle progression and it is responsible for cell size homeostasis.

Here we show that inactivation of extracellular glucose sensing through deletion of either the *GPR1* or the *GPA2* gene causes a marked reduction in the ability to modulate cell size and Ps, since *gpr1Δ* and *gpa2Δ* mutants grown in glucose show a significantly altered protein distribution, with a reduction of both average protein content and average Ps. Growth rate is unaffected, indicating that signaling through the Gpr1/Gpa2 pathway specifically alters the setting of Ps.

The molecular mechanism of Ps entails the overcoming of two sequential thresholds, involving Cln3 and Far1, and Clb5,6 and Sic1, respectively. Carbon source modulation of cell size at Start is completely abolished only when both thresholds are inactivated. Carbon source regulation of proteins active in mechanisms of the thresholds is currently under investigation.

The relevance of these findings to carbon source modulation of Ps will be discussed.