

Growth inhibition of *Saccharomyces cerevisiae* caused by expression of alpha-glucoside transporters tolerant to glucose-induced degradation

The first step of assimilation of sugars is their uptake. Maltose and maltotriose are transferred into the cells with proton by alpha-glucoside transporters. *S.cerevisiae* has several kinds of alpha-glucoside transporters. Transcription of alpha-glucoside transporters is repressed by glucose and induced by maltose. Besides the transcriptional regulations, the transporters are subject to immediate degradation in the presence of glucose. Aiming at characterization of the alpha-glucoside transporters, we obtained some mutant transporters. Some exhibited tolerance to the glucose-induced degradation, while others had almost no sugar uptake activity. Yeast cells have clear preference for sugar assimilation; they utilize glucose with priority, and do not assimilate maltose until glucose is exhausted from the medium. We constructed some yeast strains overexpressing mutant transporters tolerant to the glucose-induced degradation. They grew well on medium containing either glucose or maltose, but on the contrary, showed an extremely long lag time when they grew in the presence of both sugars at the same time. This was not observed when the cells were overexpressing non-active mutant transporters. The intracellular accumulation of maltose seemed to be a major cause of the lag time. We attempted to clarify the mechanism of this phenomenon using metabolome and transcriptome analyses.