# Quantification of oxidative stress phenotypes based on high-throughput growth profiling of protein kinase and phosphatase knockouts - DTU Orbit (08/11/2017)

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Cellular responses to oxidative stress are important for restoring redox balance and ensuring cell survival. Genetic defects in response factors can lead to impaired response to oxidative damage and contribute to disease and aging. In single cell organisms, such as yeasts, the integrity of the oxidative stress response can be observed through its influences on growth characteristics. In this study, we investigated the time-dependent batch growth effects as a function of oxidative stress levels in protein kinase and phosphatase deletion backgrounds of *Saccharomyces cerevisiae*. In total, 41 different protein kinases and phosphatase mutants were selected for their known activities in oxidative stress or other stress response pathways and were investigated for their dosage-dependent response to hydrogen peroxide. Detailed growth profiles were analyzed after the induction of stress for growth rate, lag time duration and growth efficiency, and by a novel method to identify stress-induced diauxic shift delay. This approach extracts more phenotypic information than traditional plate-based methods due to the assessment of time dynamics in the time scale of minutes. With this approach, we were able to identify surprisingly diverse sensitivity and resistance patterns as a function of gene knockout.

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