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Different perturbation profiles induced by glutathione during ultradian metabolic oscillation of *Saccharomyces cerevisiae*

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We have reported that pulse injection of glutathione (GSH) and glutathione disulfide (GSSG) into aerobic chemostat culture of *Sacchaomyces cerevisiae* resulted in perturbation of oscillation. Based on redox change and metabolites analysis during GSH-mediated perturbation in standard sulfate medium containing 46 mM sulfate (SSM), it was postulated that glutathione redox balance is involved in oscillation regulation. In this study, we investigated the perturbation effect of glutathione in low sulfate medium containing 2.5 mM sulfate (LSM) and thiosulfate medium containing 4.2 mM thiosulfate (TSM). Interestingly, pulse injection of GSH or GSSG into LSM culture did not induce a burst production of H_2S and apparent perturbation in respiration and redox. Furthermore, perturbed oscillation was observed in only GSH in TSM. However, cysteine showed similar perturbation effects irrespective of change of sulfur source and concentrations. Based on these results and our previous reports, we suggest that dynamic control of H_2S production by sulfate assimilation pathway, not redox change by addition of GSH or GSSG, is essential in oscillation regulation.

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