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The tripeptide glutathione (GSH) is one of the most important non-enzymatic defense molecule against oxidative stress, caused by peroxide generating agents in many organisms including yeast. Although the role of glutathione in glutathione in oxidative stress tolerance has been investigated for some time the role of glutathione in the induction of tolerance and heat shock protein synthesis (hsp) has received little attention. The role of glutathione in the induction of tolerance by a mild heat shock (37 º C/ 45 min) and heat shock protein synthesis was studied by depleting GSH using iodoacetamide. Iodoacetamide depletes glutathione by forming glutathione by forming glutathione-S conjugates.

Glutathione concentrations were substantially reduced on treatment of cells with IAA, whereas a heat shock alone at 37 ºC 42 ºC for 45 min significantly increased glutathione levels. Pretreatment of cells with IAA sensitized cells to peroxide producing agent $H_2 O_2$ (10 mM/ 2h at 25 ºC), alkyl peroxide producing agent azobis (2-amidinopropane) dihydrochloride (AAPH 15 mM/ 2h at 42 ºC) and heat 48 ºC/ 2h) stresses as compared to control, non-IAA treated cells.

A mild heat shock (37ºC/ 45 min) increased tolerance to all stressors. However, a mild heat shock in the presence of iodacetamide blocked the classical observation of heat shock induced stress tolerance and rendered cells more sensitive than the intrinsic tolerance. And rendered cells more sensitive than the intrinsic tolerance of synthesis of hsp 104, 90, 70 & 36. In contrast the treatment of cells with iodoacetamide at 37 ºC appeared to increase the synthesis of proteins corresponding to hsp 60 and 47. These observations were confirmed by densitometric analysis and western immunoblots.

The above observations, taken in conjunction with previous other studies in mammalian systems, support the proposal of a relationship between glutathione metabolism and stress protein synthesis and induction of stress tolerance. This intern would make a substantial contribution towards our understanding of the role of glutathione in the yeast stress response.