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Effect of subcelluar localization on the stability of NADP+-dependent glutamate dehydrogenase 1 in *Saccharomyces cerevisiae*

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The yeast *Saccharomyces cerevisiae* has two isoforms of NADP+-dependent glutamate dehydrogenase(Gdh1 and Gdh3) that catalyze the synthesis of glutamate from α-ketoglutarate and NH4+.In the previous study, it was found that *S.cerevisiae* cells lacking Gdh3 show decreased resistance to stress-induced apoptosis at stationary phase. It was also revealed that the apoptotic phenotype of *Δgdh3* mutant is caused by an insufficient supply of glutamate required for biosynthesis of glutathione(GSH) rather than the depletion of reducing power required for reduction of glutathione disulfide(GSSG) to GSH. On the other hand, Gdh1 has been shown to be dispensable to the resistance against stress-induced apoptosis, and furthermore, be subjected to stationary phase-specific degradation(SPSD). In the present study, we attempted to address whether Gdh1, which is normally localized in cytoplasm,can be rescued from SPSD by changing its subcellular localization. In the yeast cells transformed with the plasmid YCpPGDH1-MtGdh1-FLAG,the plasmid-encodedfusion protein MtGdh1-FLAG carrying an N-terminally fused mitochondrial targeting signal (MTS) of Cit1 (mitochondrial citrate synthase), was transported into mitochondria and salvaged fromSPSD. In addition, ectopic expression of MtGdh1-FLAG caused considerably increased resistance to heat and oxidative stress in both the wild-type and *Δgdh1Δgdh3* strains. These results suggest that the mitochondrially targeted derivative of Gdh1, MtGdh1, can play a role in preventing the stress-induced ROSaccumulation and subsequent apoptotic events by supplyingglutamate, one of the precursors for GSH biosynthesis, in stationaryphase cells.

Biography

Sanghyeon An received his BSc in Microbiology and Molecular Biologyfrom Chungnam National University in 2014. He is currently working onthe relationship between stress-induced apoptosis and glutamate metabolism in yeast as a MSc student at the same university under the direction of Professor Pil Jae Maeng.

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