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Arabidopsis Gene *AtCdT2* Plays a Role in Increasing Cadmium Tolerance in *S. cerevisiae.*

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Objectives

Heavy metal pollution of soils is a critical environmental problem. Plants can be used to remove or reduce heavy metals from contaminated soils. To study the molecular mechanism of cadmium accumulation in *Saccharomyces cerevisiae*, we characterized the CdS4 related in tolerating cadmium and transformed with an yeast expression library of Arabidopsis (*A. thaliana*)

Materials and Methods

1. Materials
- Yeast strain - Y800
- *E.coli* strain - DH5*a*

2. Methods

For northern blot analysis, total RNA was extracted from yeast using glass beads method. Plasmid was introduced into yeast by the LiAc/PEG method.

Results and Discussion

Cadmium-sensitive yeast CdS4 was isolated from mini-Tn mutagenized pools of *S. cerevisiae.* CdS4 exhibited a reduced growth rate , but an increased accumulation of Cd compared to WT(Y800). This suggests that the decreased tolerance to Cd in CdS4 is due to an increased accumulation of Cd. To clone plant genes involved in tolerating Cd, CdS4 was transformed with an yeast expression library of Arabidopsis (*A. thaliana*), and surviving transformants were selected on agar media with growth-inhibiting concentrations of cadmium. A plasmid was isolated from the surviving transformant, and an insert was sequenced and named as *AtCdT2*(392 aa). *AtCdT2* is an unknown sequence with a lysosome targeting motif. To confirm the role of *AtCdT2* it was over-expressed in CdS4 mutant and Y800(WT). CdS4 transformants expressing *AtCdT2* gene exhibited an increased tolerance to Cd, but a reduced accumulation of Cd with respect to those of CdS4. *AtCdT2*-expressing Y800 showed increased tolerance and accumulation of Cd with respect to those of Y800. Therefore, it was concluded that a novel gene of *A. thaliana AtCdT2* , plays a role in elevating Cd-tolerance in *S. cerevisiae.*

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