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Expression of Tobacco Gene *NtCdT1* Elevates Accumulation of Cadmium and Arsenite 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 heavy metals such as cadmium and arsenite accumulation in *Saccharomyces cerevisiae*, we isolated *NtCdT1* from an yeast expression library of tobacco (*N. tabacum*).

Materials and Methods

1. Materials

- Yeast strain - Y800 (MATa/MATalpha leu2- Δ 98/leu2- Δ 98 ade2-101/ade-101 HIS3/his3- Δ 200 ura3-52/ura3-52 can1/CAN1 lys2-801/lys2-801 CYH2/cyh2 trp1-1/TRP1)
- *E. coli* strain - DH5a

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

To clone plant genes involved in tolerating Cd, *ycf-delta* mutant yeast DTY167 was transformed with an yeast expression library of tobacco (*N. tabacum*), 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 *NtCdT1*. To confirm the role of *NtCdT1* it was over-expressed in DTY167 mutant and DTY165(WT). Both DTY 167 and 165 transformants expressing *NtCdT1* gene exhibited an increase in Cd tolerance and accumulation with respect to those of DTY167 and 165. This was also the same for As tolerance and accumulation. Therefore, a novel gene of *N. tabacum*, *NtCdT1*, seems to play a role in elevating both tolerance and accumulation of Cd and As in *S. cerevisiae*.

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