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## ***Arabidopsis* Gene *AtCdT6* Mediates a 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 (MATa/MATalpha leu2- $\Delta$ 98/leu2- $\Delta$ 98 ade2-101/ade-101 HIS3/his3- $\Delta$ 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**

Cadmium-sensitive yeast CdS4 showed a reduced growth rate, but increased accumulation of Cd on Cd-containing media, compared to WT(Y800). 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 *AtCdT6*(810 aa). *AtCdT6* had some homology to ER ATPase and 26S proteasome. To confirm the role of *AtCdT6* it was over-expressed in CdS4 mutant and Y800(WT). *AtCdT6*-expressing CdS4 displayed an increased tolerance to Cd, but an reduced accumulation of Cd with respect to those of CdS4. Y800 transformants expressing *AtCdT6* also showed an increased Cd tolerance, but Cd accumulation was not altered. Taken together, we concluded that a novel gene of *A. thaliana*, *AtCdT6*, plays a role in elevating Cd-tolerance in *S. cerevisiae*.

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