

EFFECTS OF *AtPCS1* OVEREXPRESSION ON CADMIUM TOLERANCE AND ACCUMULATION IN TOBACCO AND ARABIDOPSIS PLANTS

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PCS1 overexpression, tobacco, arabidopsis, cadmium tolerance, cadmium accumulation

Phytochelatin (PCs) are thiol peptides involved in heavy metal tolerance and detoxification in plants. PCs are synthesized enzymatically from reduced glutathione (GSH) and the reaction is catalyzed by a transpeptidase, phytochelatin synthase (PCS). It was reported that in Arabidopsis *AtPCS1* overexpression confers Cd hypersensitivity but increases Cd transport from roots to shoot (1, 2).

We overexpressed the Arabidopsis phytochelatin synthase gene (*AtPCS1*) in the non-accumulator plant *Nicotiana tabacum*. We transformed wild-type plants and plants harbouring the oncogene *rolB*, that induces an expansion of the root system (3). We verified cadmium tolerance and accumulation in relation to the level of PCs and glutathione. We demonstrated that overexpression of *AtPCS1* increased PC content and enhanced Cd tolerance of *rolB* roots and of *rolB* and wild-type seedlings. This effect was greatly enhanced when reduced glutathione was added to the culture medium. An increased Cd accumulation was also observed in roots and shoots of seedlings and adult plants, matched by a higher production of PCs in both organs and also dependent on GSH supply. However plants overexpressing *AtPCS1* show the same ratio of Cd between roots and shoots as in wild-type plants. We conclude that overexpression of *AtPCS1* in tobacco plants causes an increase in Cd tolerance and accumulation directly related to the availability of GSH. In contrast Cd translocation seems to be independent of *AtPCS1* overexpression (4). Currently we are performing tolerance and accumulation experiments with arabidopsis plants overexpressing *AtPCS1*, at the same experimental conditions used for tobacco plants.

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