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A CaM-regulated vacuole Ca^{2+}-ATPase in *Arabidopsis*

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Objectives

We have isolated and characterized a cDNA from *Arabidopsis*, designated *ACA11* (for autoinhibited Ca^{2+}-ATPase 11) that encodes a Ca^{2+}-ATPase located in vacuole membrane.

Materials and Methods

1. Material

Plant *Arabidopsis thaliana*

Yeast (*Saccharomyces cerevisiae*) k473 (*pmc1*), k616 (*pmr1, pmc1, cnb1*)

Agrobacterium strain GV3101

2. Methods:

Images of green and red fluorescent proteins were examine by on an Olympus Fluoview FV1000 confocal system attached to a BX61 microscope using the X 100 objective (observation of root tips) and X 100 objective X 3-fold zoom (observation of protoplasts, planApo 1.35 oil Iris lens).

Results and Discussion

As one of active Ca^{2+} transporter, Ca^{2+}-ATPases attribute to the removal of Ca^{2+} from cytosol so that the cytosolic Ca^{2+} concentration can be maintained a low level. Here, we isolated a cDNA from *Arabidopsis*, designated *ACA11* (for autoinhibited Ca^{2+}-ATPase 11) that encodes a Ca^{2+}-ATPase. Only N-terminal deleted ACA11p (de-regulated) was able to complement not only a yeast vacuole Ca^{2+} pump mutant (K473) in high Ca^{2+} media but also a yeast triple mutant (K616) in Ca^{2+} depleted media. The *ACA11* transcript was detected in all tissue examined. The vacuolar membrane localization of ACA11p was determined by the localization of ACA11p tagged with green fluorescent protein in the protoplast and plant root tips by confocal fluorescence microscopy. Our results imply that ACA11p belongs to a vacuole localized Ca^{2+} pumps that is regulated by the N-terminal regulatory domain (calmodulin binding domain).

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