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UTA1 locus encoding AtVDAC1 regulates the competency of Arabidopsis to Agrobacterium-mediated transformation

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Objectives

Agrobacterium tumefaciens-mediated plant transformation is complex molecular cellular reactions in which many bacterial and host plant factors interact cooperatively. We have worked on investigation of the plant genes necessary for Agrobacterium-mediated transformation not only to make significant advances in our understanding of how Agrobacterium transform plant efficiently, but also to develop new methods to transform agronomically important plants that are recalcitrant to Agrobacterium-mediated transformation so far.

Materials and Methods

1. Materials : T-DNA insertion mutant pool of Arabidopsis thaliana
2. Methods : Screening T-DNA insertion mutants for resistance in response to Agrobacterium infection using an in vitro root inoculation and flower bolt innoculation. Plasmid rescue and complementation test of mutation phenotype.

Results and Discussion

Agrobacterium tumefaciens-mediated transformation is the most widely used genetic transformation system in plants. As a first step to identify such a plant factors and determine their functions in the Agrobacterium-mediated plant transformation, We first screened T-DNA insertion mutant lines of Arabidopsis thaliana for resistance in response to Agrobacterium infection using an in-vitro root inoculation assay. uta mutants (untransformed by Agrobacterium) resistant to infection by Agrobacterium were identified. First of all, we characterized the uta1 mutant that has T-DNA insertion into the sixth exon region of voltage dependent anion channel gene VDAC locating a mitochondrial outer membrane ion channel. Overexpression of VDAC1 in uta1 plants increased Agrobacterium transformation efficiency of transient T-DNA gene expression rather than wild-type did. Our results demonstrate that the expression of the AtVDAC1 gene regulates the competency of Arabidopsis to Agrobacterium tumefaciens-mediated transformation.

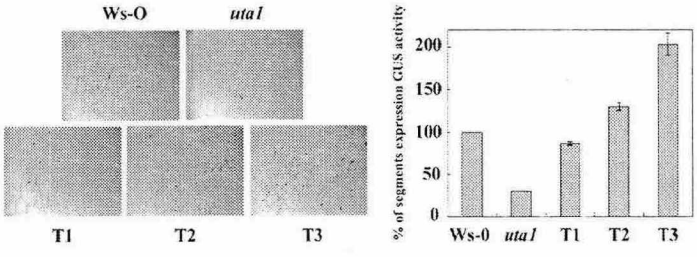

Figure 1. Overexpression of UTA1 enhanced transient GUS expression.

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