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Functional identification of homeodomain leucine zipper 1 (AtHLZ1) as a regulator of abscisic acid signaling pathway in Arabidopsis thaliana

Ga Yun Jeong
Chonnam National University, South Korea

The phytohormone Abscisic Acid (ABA) is the major component of abiotic stress tolerance in plants and coordinates a complex regulatory network enabling plants to cope with the stress. The precise roles of the homeodomain leucine zipper family of transcription regulator in plant stress are largely unclear. Here, we characterize the biological function of the AtHLZ1 Arabidopsis thaliana homeodomain leucine zipper-type: In ABA and dehydration responses. The expression of AtHLZ1 was strongly induced by ABA and osmotic stress. AtHLZ1 RNAi lines resulted in increased sensitivity to ABA and dehydration stress during seed germination and the cotyledon greening process. In contrast, The AtHLZ1-overexpressing transgenic plants were less sensitive to ABA and osmotic stress compared to Wild Type (WT). Interestingly, in the presence of ABA, the transcript levels of ABA receptor Pyrabactin Resistance-like 4 (PYL4) and PYL7 genes were enhanced reduction in AtHLZ1- overexpressing transgenic plants rather than in the WT and AtHLZ1 mutant. Thus, AtHLZ1 is involved in ABA and osmotic stress response through the ABA-dependent signaling pathway. The data show that AtHLZ1 is an important regulator in response to both ABA and dehydration stress in Arabidopsis.

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