

A Novel Gene Encoding Ankyrin-Repeat Protein, SHG1, Is Indispensable for Seed Germination under Moderate Salt Stress

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Abstract : Salt stress adversely affects plant growth at various stages of development including seed germination, seedling establishment, vegetative growth and finally reproduction. Because of their immobile nature, plants have evolved mechanisms to sense and respond to salt stress. Seed dormancy is an adaptive trait that enables seed germination to coincide with favorable environmental conditions. We identified a novel locus of Arabidopsis, designated SHG1 (salt hypersensitive germination 1), whose disruption leads to reduced germination rate under moderate salt stress conditions. SHG1 encodes a transmembrane protein with an ankyrin repeat motif that has been implicated in diverse cellular processes such as signal transduction. The SHG1-disrupted Arabidopsis mutant died at the cotyledon stage when sown on salt-containing medium, although wild type plants could form true leaves under the same conditions. On the other hand, this mutant showed similar phenotypes to wild type plants when sown on medium without salt and transferred to salt-containing medium at the vegetative stage. These results suggested that SHG1 played indispensable role in the seed germination and seedling establishment under moderate salt stress conditions. SHG1 may be involved in the release of seed dormancy.

Keywords : germination, ankyrin repeat, arabidopsis, salt tolerance

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