

## RNA Chaperone-Mediated Salt Stress Tolerance in Plants

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### Summary

Plants and microbes have common adaptation mechanisms to abiotic stresses such as cold, salt, and drought. In response to cold, *E. coli* produces cold shock proteins (CSPs) that have essential roles in cold adaptation by function as RNA chaperones. Arabidopsis COLD SHOCK DOMAIN PROTEIN 3 (AtCSP3) shares a domain with bacterial CSPs and is involved in acquisition of freezing tolerance. Here, we characterize *AtCSP3* function in salt and drought stress tolerance. Expression analysis revealed that AtCSP3 is induced by salt, and drought stresses and ABA treatments. Transgenic plants overexpressing AtCSP3 showed improved tolerance against salt and drought stresses. A knockout mutant of AtCSP3, *atcsp3-2*, was sensitive to salt and drought stresses. Down regulated-genes in the *atcsp3-2* mutant identified by a microarray analysis showed elevated expression in *AtCSP3*-overexpressing lines. These AtCSP3-regulated genes were inducible upon salt and drought stresses, suggesting their functions in the stress tolerance. Together, our data revealed that AtCSP3 is an important determinant for adaptation to salt and drought stress tolerance as well as cold stress. We propose that AtCSP3 functions as a RNA chaperone to regulate RNA processing and alter gene expression of stress-related proteins.