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Positive Regulator, a Rice C3HC4-type RING Finger Protein H2-3(OsRFPH2-3), in Response to Salt Stress

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[Abstract]

Soil salinity negatively affects plant growth, productivity, and metabolism. Rice is known to have more sensitive phenotypes than other cereal crops, such as wheat, sorghum, and barley. We characterized the molecular function of rice C3HC4 as a really interesting new gene (RING). *Oryza sativa* RING finger protein H2-3 (*OsRFPH2-3*) was highly expressed in 100 mM NaCl. To identify the localization of *OsRFPH2-3*, we fused vectors that include C-terminal GFP protein (35S::*OsRFPH2-3*-GFP). *OsRFPH2-3* was expressed in the nucleus in rice protoplasts. An *in vitro* ubiquitin assay demonstrated that *OsRFPH2-3* possessed E3-ubiquitin ligase activity. However, the mutated *OsRFPH2-3* were not possessed any E3-ubiquitin ligase activity. Under normal conditions, there is no significant phenotypic difference between transgenic plants and WT plants. However, *OsRFPH2-3*-overexpressing plants exhibited higher fresh weight and length under saline conditions. Also, transgenic plants maintain higher chlorophyll, proline, and soluble sugar contents and lower H₂O₂ and MDA contents than the wild type; these results support transgenic plants with enhanced salinity tolerance phenotypes.

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