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Positive Regulator, a Rice C3H2C3-type RING Finger Protein H2-3(OsRFPH2-3), in Response to Salt Stress

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[Abstract]

Salinity is a major abiotic stress that limits rice productivity in many regions of the world. In order to develop salt stress tolerant rice plants, genetic engineering is a promising approach. We characterized the molecular function of rice C3H2C3 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 salinity conditions, *OsRFPH2-3*-overexpressing plants exhibited higher chlorophyll, proline, SOD, POD, CAT, and soluble sugar contents and lower H₂O₂ accumulation than wild-type plants, supporting transgenic plants with enhanced salinity tolerance phenotypes. *OsRFPH2-3*-overexpressing plants exhibited low Na⁺ accumulation and Na⁺/K⁺ ratios in their roots. These results suggest that overexpression of OsRFPH2-3 can make plant insensitivity about salinity conditions.

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