Molecular dissection of a rice salt-induced RING finger protein 3 (OsSIRP3) and its potential role in salt stress

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[Introduction]
As sessile organisms, plants always exposed to various abiotic stresses. For these reasons, plants develop their defense mechanisms against to abiotic stresses. Ubiquitin-mediated proteasomal degradation is an important mechanism to control protein for regulation the balance of plants. Here, we describe Oryza sativa salt-induced RING finger protein 3 (OsSIRP3), a functional RING E3 ligase that is likely involved in a salt related mechanism. Transcript level of OsSIRP3 gene highly expressed in whole rice samples, such as root and shoot, after exposed to high salinity stress. In addition, in vitro ubiquitination assay demonstrated that OsSIRP3 showed E3 ligase activity by RING H2 domain. Interestingly, we found that the OsSIRP3 interaction with both two salt-induced and non-induced two proteins and then led to protein degradation via ubiquitin (Ub)/26S proteasome-dependent pathway. Overexpression of OsSIRP3 in Arabidopsis resulted in hypersensitivity for salinity stress during seed germination and root growth. Our finding suggest that OsSIRP3 acts as a negative regulator of salinity stress response by modulating levels of its target proteins.

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