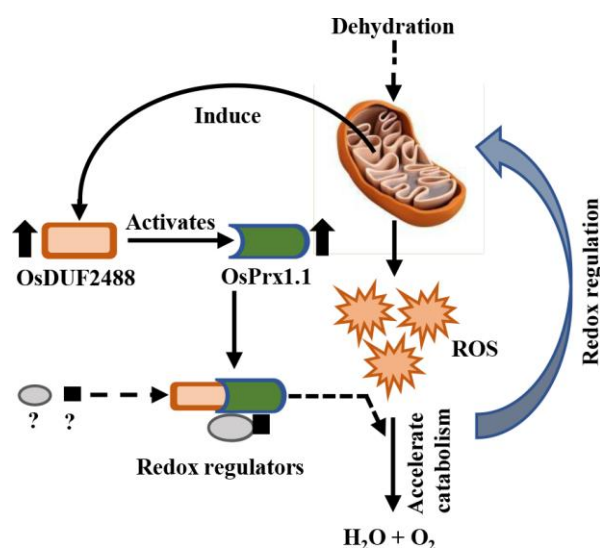


OsDUF2488 acts synergistically with OsPrx1.1, regulates ROS metabolism and promotes dehydration tolerance in rice

Dehydration greatly limits crop productivity, particularly in rain-fed areas across the world. Despite extensive research over the past several decades, little is known about dehydration-responsive regulation of mitochondrial energy metabolism and adaptation in plants. In this study, we mapped the global changes in protein expression of mitochondrial landscape of rice. The comparative mitochondrial proteome analysis of a resilient rice cultivar revealed an array of dehydration-responsive proteins (DRPs). Prominent among the DRPs was an uncharacterized DUF (domain of unknown function) protein, designated OsDUF2488. We demonstrated that OsDUF2488 interacts with a redox protein, OsPrx1.1 and markedly accelerates ROS catabolism. We showed that the OsDUF2488-OsPrx1.1 interaction is fundamental to maintain redox homeostasis and attenuate stress-induced cell damage. In addition to elucidating the dehydration-responsive mitochondrial proteome, this study offers a promising novel candidate, OsDUF2488, which would aid climatic adaptation in plants.



Predicted redox homeostasis involving OsDUF2488. Dehydration-induced perturbation of mitochondrial redox homeostasis promotes mtROS accumulation, causing oxidative damage. One of the intricate strategies which represses mtROS production is orchestrated by increased expression of OsDUF2488. OsDUF2488 interacts with, and activates OsPrx1.1 and forms a redox-complex with yet to be identified regulators. This regulatory complex accelerates mtROS catabolism and rescues mitochondrial dysfunction. The question marks represent unidentified regulatory proteins. Upward arrows indicate upregulated expression.

Dipak Gayen, Sunil Kumar, Pragya Barua, Nilesh Vikram Lande, Subhasis Karmakar, Amit K. Dey, Saurabh Gayali, Tushar Kanti Maiti, Kutubuddin Ali Molla, Snehal Murumkar, Subhra Chakraborty, Niranjana Chakraborty: **OsDUF2488 acts synergistically with OsPrx1.1, regulates ROS metabolism and promotes dehydration tolerance in rice.** *Plant Biotechnology Journal*, <https://doi.org/10.1111/pbi.70182>