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An insight into the molecular mechanism of glutathione-ethylene interplay in plant defense

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Plutathione (GSH) is a major antioxidant and plays a central role in plant defense against biotic and abiotic stresses. It is synthesized from glutamate and cysteine via a series of enzymatic steps involving gamma-glutamylcysteinyl synthase (GCS) and glutathione synthase (GS). GSH is involved in the detoxification of reactive oxygen species (ROS) and reactive sulfur species (RSS) through conjugation and subsequent degradation. The ethylene (ET) signaling pathway is a key component of plant defense, involving the conversion of methionine to ethylene by the enzyme ACC synthase (ACS) and ACC oxidase (ACO). The interplay between GSH and ET is complex, with GSH playing a role in the regulation of ET biosynthesis and signaling. Key enzymes involved in this pathway include ACS2, ACS6, and ACO1. The WRKY33 transcription factor is known to regulate the expression of ACS2 and ACS6. The GSH S-conjugate (GS-S) is a major product of GSH conjugation with electrophilic species, and its degradation is mediated by the enzyme GS-S hydrolase (GS-SH). The GSH ET pathway is also regulated by the GSH ET hydrolase (GSH-ET-H) and the GSH ET synthase (GSH-ET-S). The GSH ET pathway is a critical component of plant defense, and its dysregulation can lead to increased susceptibility to biotic and abiotic stresses.

Biography

of Glutathione and its role in plant defense since 2011 and has recently submitted her PhD thesis from CSIR-Indian Institute of Chemical Biology, India. She has published 14 papers in reputed international journals. At present, she is an Assistant Professor in Botany, Govt. General Degree College, New Town, India and a Visiting faculty in the Post-graduate Department of Botany, Barasat Govt. College, India.

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