Plant redox proteomics

In common with other aerobic organisms, plants are exposed to reactive oxygen species resulting in formation of post-translational modifications related to protein oxidoreduction (redox PTMs) that may inflict oxidative protein damage. Accumulating evidence also underscores the importance of redox PTMs in regulating enzymatic activities and controlling biological processes in plants. Notably, proteins controlling the cellular redox state, e.g. thioredoxin and glutaredoxin, appear to play dual roles to maintain oxidative stress resistance and regulate signal transduction pathways via redox PTMs. To get a comprehensive overview of these types of redox-regulated pathways there is therefore an emerging interest to monitor changes in redox PTMs on a proteome scale. Compared to some other PTMs, e.g. protein phosphorylation, redox PTMs have received less attention in plant proteome analysis, possibly due to technical challenges such as with maintaining the in vivo redox states of proteins and the lability of certain PTMs, e.g. nitrosylations, during sample preparation and mass spectrometric analysis. The present review article provides an overview of the recent developments in the emerging area of plant redox proteomics.

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