FLS2-RBOHD Module Regulates Changes in the Metabolome of Arabidopsis in Response to Abiotic Stress

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Abstract

Through crosstalk, FLAGELLIN SENSITIVE 2 (FLS2) and RESPIRATORY BURST OXIDASE HOMOLOG D (RBOHD) are involved in regulating the homeostasis of cellular reactive oxygen species (ROS) and are linked to the metabolic response of plants towards both biotic and abiotic stress. In the present study, we examined the metabolome of *Arabidopsis* seedlings under drought and salt conditions to better understand the potential role of FLS2 and RBOHD-dependent signaling in the regulation of abiotic stress response. We identified common metabolites and genes that are regulated by FLS2 and RBOHD, and are involved in the response to drought and salt stress. Under drought conditions, D-aspartic acid (DAA) and the expression of associated genes, such as *ASPARAGINE SYNTHASE 2* (*ASN2*), increased in both *fls2* and *robed/f* double mutants. The accumulation of amino acids, carbohydrates, and hormones, such as L-proline, D-ribose, and indoleacetaldehyde increased in both *fls2* and *rbohd/f* double mutants under salt conditions, as did the expression of related genes, such as *PROLINE IMINOPEPTIDASE* (*PIP*), *PHOSPHORIBOSYL PYROPHOSPHATE SYNTHASE 5* (*PRS5*), and *NITRILASE 3* (*NIT3*). Collectively, these results indicate that the FLS2-RBOHD module regulates plant response to drought and salt stress through ROS signaling by adjusting the accumulation of metabolites and expression of genes related to metabolite synthesis.

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