Study provides insights into motor organ of model legume Medicago truncatula

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Plants have evolved multiple movement behaviors to optimize their development and environmental adaptation. Previous study has found that a defection of pulvinus development would result in abnormal leaf

movement. However, no public transcriptome or proteome data on the model legume Medicago truncatula pulvinus has been reported.

In a study published in *International Journal of Molecular Sciences*, researchers from the Xishuangbanna Tropical Botanical Garden (XTBG) of the Chinese Academy of Sciences provided a rich resource to uncover the multiple layers of the gene regulatory network involved in pulvinus development and signal transduction in the model legume M. truncatula.

The researchers used wild type (WT) pulvinus and the equivalent tissue in the ELONGATED PETIOLULE1 (ELP1) mutant to carry out transcriptome and proteome experiments. They simultaneously profiled transcriptome and proteome analysis.

The transcriptome and proteome analyses between WT pulvini and the elp1 mutant elucidated that there are thousands of mRNA expressions with significant changes, which are probably related to pulvinus development and signal transduction.

In addition, comparison analysis of pulvinus-specific gene expression in compound leaf provided a deeper understanding of the gene regulatory landscape and ELP1 function in pulvinus.

Meanwhile, the auxin pathway, cell wall composition and chloroplast distribution were found altered in elp1 mutants, verifying their involvement in the ELP1-regulated pulvinus development and the powerful value of these omics data.

"This study provides a comprehensive insight into the motor organ of the model legume Medicago truncatula and further supplies a rich dataset to facilitate the identification of novel players involved in nyctinastic movement," said Chen Jianghua of XTBG.

More information: Quanzi Bai et al, Multidimensional Gene Regulatory Landscape of Motor Organ Pulvinus in the Model Legume Medicago truncatula, *International Journal of Molecular Sciences* (2022). DOI: 10.3390/ijms23084439

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