

CSB DEPARTMENTAL SEMINAR

The Daily Cycle of Plants: Using Quantitative Proteomics to Understand Diel Plant Biology



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To date, our understanding of the molecular mechanisms underpinning the daily growth and development of plants has been driven by a combination of genetics and transcriptomic technologies. This includes developing a picture of anticipatory (circadian) and responsive (diel) changes in gene expression as well as the role of core circadian clock transcription factors that time the 24 h photoperiod. However, transcript-level data alone is insufficient in its ability to provide a complete description of circadian / diel plant cell regulation, potentially overlooking more complex protein-level events that directly impact plant physiology and agronomic traits of interest (e.g. climate resiliency). To address this, we have developed plant-centric quantitative proteomic sample processing and mass spectrometry acquisition workflows that allow the plant community to better utilize quantitative proteomics to understand plant biology. Our pursuit of these development efforts has also enabled us to more effectively undertake time-course analyses and better define the daily dynamics of the plant proteome in response to perturbations such as abiotic stress. With proteins representing the functional effectors of the cell, our results argue for the need to focus on protein-level circadian / diel dynamics in order to more comprehensively understand the daily activities of plants.

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11.AM - RW432

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