NUS National University of Singapore

Department of Biological Sciences
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SEMINAR

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CUL3-based E3 Ligases and Their Role in Transcriptional Control



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Plant development depends on a complex and flexible regulatory network that integrates environmental cues with specific developmental programs. A mechanism that provides plants with the ability to quickly and precisely respond is given by the ubiquitin proteasome pathway. Within the pathway, E3 ligases are key regulators that recognize specific substrate proteins and mark them for degradation through the 26S proteasome. A particular class of E3 ligases, $CRL3^{BPM}$, is composed of a scaffolding protein, Cullin3 (CUL3), and substrate adaptor proteins that contain a MATH-BTB/POZ domain (BPM). *Arabidopsis thaliana* encodes for six BPM (BPM1 to 6) and two CUL3 proteins (CUL3a and 3b). Here we show that $CRL3^{BPM}$ E3 ligases are widely involved in transcriptional processes by affecting stability of members of major transcription factor families in Arabidopsis. As a consequence, these E3 ligases alter diverse processes such as fatty acid biosynthesis and flowering time point control. Our work establishes $CRL3^{BPM}$ E3 ligase as a major regulatory tool plants can use to facilitate controlled gene expression through specific protein degradation: a mechanisms that allows plants a high degree of flexibility to quickly modulate their physiological and developmental processes as needed.

Artwork by Ann Nee, DBS, NUS