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Salt stress activates the CDK8-AHL10-SUVH2/9 module to dynamically regulate salt tolerance



14 MARCH 2025 (FRIDAY)



10:30AM – 11:30AM



ROOM297, SCIENCE CENTRE, CUHK

ABSTRACT:

Salt stress has devastating effects on agriculture. Presently, the key regulators that modulate the transcriptional dynamics of salt-responsive genes in plants remain largely elusive. Here, we revealed that salt stress can substantially induce the kinase activity of the Mediator subunit cyclin-dependent kinase 8 (CDK8), which is essential for its positive role in regulating salt tolerance. CDK8 was found to phosphorylate the AT-hook motif nuclear-localized protein 10 (AHL10) at serine 314 through direct interaction, thereby promoting AHL10 degradation under salt stress. Transcriptome analysis further indicated that CDK8 regulates over 20% of salt-responsive genes, with approximately half of these genes being co-regulated by AHL10. Moreover, chromatin immunoprecipitation sequencing (ChIP-seq) demonstrated that AHL10 functions as a repressor by binding to AT-rich DNA sequences located within the nuclear matrix-attachment regions (MARs) of salt-responsive gene promoters, thus negatively regulates salt tolerance. Additional analyses revealed that AHL10 recruits SU(VAR)3-9 homologs (SUVH2/9) to these promoters, facilitating H3K9me2 deposition and repressing salt-responsive genes. Overall, our study has identified the CDK8-AHL10-SUVH2/9 module as a key molecular switch in plants, controlling transcriptional dynamics in response to salt stress.

SPEAKER:

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