

ITbM-IGER



Seminar

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***Direct role of MUTE
in orchestrating stomatal differentiation***

Date: Friday, Sep 15, 2017,

Time: 17:00~18:00

Lecture Room, ITbM

Language: English

Abstract

Plant stomata are cellular valves composed of paired guard cells that impact plant growth, sustenance, and atmospheric environment. For the differentiation of a functional stoma, a single symmetric division of an immediate precursor is absolutely essential. Yet, the mechanism governing the single division event remains unclear. We have revealed the complete inventories of transcriptional changes driven by the Arabidopsis bHLH protein MUTE, a potent inducer of stomatal differentiation. MUTE switches the gene expression program initiated by its sister bHLH, SPEECHLESS, thereby 'locking in' the differentiation program while taking over the shared targets. MUTE directly induces a suite of cell-cycle genes, and their direct transcriptional repressors. The architecture of the gene regulatory network initiated by MUTE represents an Incoherent Type 1 Feed-Forward Loop, which yields a robust, sharp pulse of output response. Our mathematical modeling and a series of experimental perturbations support a notion that MUTE orchestrates the transcriptional cascade leading to a tightly-restricted, robust pulse of cell-cycle gene expression, thereby ensuring the single cell division to make stomata.

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