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Breaking the Silence: How to Make Small Plant Mouths that Support Our Sustenance

Plants support our civilization through providing the air we breathe, the foods we consume, the clothing we wear, the shelters we build, the medicines and other chemicals that contribute to our health. Stomata are microscopic valves on the land plant epidermis for efficient gas exchange for photosynthesis while minimizing water loss. The presence of stomata are critical for plant growth and survival, and the evolution of stomata is considered one of the key developmental innovation of the land plants. Our lab studies how stomata are formed and patterned during plant leaf development. Specifically, using model plant *Arabidopsis thaliana*, we are investigating the mechanisms by which the master-regulatory transcription factors specify lineage-specific stem cell initiation, proliferation, and differentiation, how extrinsic peptide-signaling 'select' which cell to assume stomatal-lineage identity, and how cell cycle and cell fate are interconnected to elaborate cell fate. Our work reveals a conserved logic of cell-fate decision and cell fate specification processes between plant stomatal development and specialized cell-type differentiation in animals.

Recent Papers:

Han, S.K. et al. (2021) Deceleration of cell cycle underpins a switch from proliferative-to-terminal division in plant stomatal lineage. ***BioRxiv*** doi.org/10.1101/2021.05.17.442671

Zeng, S.M. et al. (2020). Effective range of non-cell autonomous activator and inhibitor peptides specifying plant stomatal patterning. ***Development*** 147: dev192237

Putarjunan, A., et al. (2019) Bipartite anchoring of SCREAM enforces stomatal initiation by coupling MAP Kinases to SPEECHLESS. ***Nature Plants*** 5: 742-754

Han, S.K et al. (2018) MUTE directly orchestrate cell-state switch and the single symmetric division to create stomata. ***Developmental Cell*** **45:** 303-315