

Investigating the role of auxin signaling in stamen maturation

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The Arabidopsis AUXIN RESPONSE FACTORS ARF6 and ARF8 are transcription factors expressed in multiple floral organs. *arf6 arf8* double mutant flowers arrest as closed buds and have impaired filament elongation, anther dehiscence, and carpel development, resulting in complete infertility. Anther dehiscence in *arf6 arf8* can be induced with exogenous Jasmonic Acid, but this does not rescue the short filament phenotype. Transcriptomic approaches have been used to identify differentially regulated genes in *arf6 arf8* flowers and stamens. However, it is still largely unknown how ARF6 and ARF8 regulate stamen development at cellular level.

To determine the role of ARF6 and ARF8 in stamen maturation, we are comparing the anatomy of wild-type Col-0 and *arf6 arf8* stamens. Through confocal imaging of vasculature fluorescent reporters, we observed that mature *arf6 arf8* anthers have smaller, less branched vascular bundles compared to mature, pre-dehiscence stage 12 Col-0 anthers. However, *arf6 arf8* anthers resemble Col-0 anthers at stage 11, consistent with the hypothesis that *arf6 arf8* flowers are developmentally arrested at stage 11. Although previous work has documented reduced size of epidermal cells in *arf6 arf8* stamen filaments, *arf6 arf8* anthers were observed to have smaller anthers with fewer stomata, indicating potential cell division abnormalities in addition. Future work will be done to determine whether stamen development is impaired in *arf6 arf8* due to defects in cell divisions or cell expansion, through the use of cell cycle reporter lines and live imaging.