Regulation of lateral organ initiation by transcription factors (TFs) involved in dorso-ventral (DV) patterning in *Arabidopsis*

Dorso-ventral (DV) patterning at the Shoot Apical meristem (SAM) is essential for organogenesis in Arabidopsis, as it has been shown that disruption of DV patterning by ectopic expression of dorsal transcription factors such as REVOLUTA (REV) or ventral transcription factors such as KANADI (KAN) blocks the organogenesis (Yu et al., unpublished). At SAM, dorsal and ventral gene expressed domains are separated by DV boundaries, and new organ initiation occurs only at DV boundaries. My postdoctoral work aimed to answer the question that how these DV transcription factors regulate DV boundaries, and hence organogenesis. Hereby combining cell-types specific transcriptomics approach, and cell-type specific over-expression of DV TFs, I identified novel regulators of organ initiation, and their role was confirmed by their functional analysis, such as their spatiotemporal controlled knock-down by amiRNA, and their spatiotemporal controlled overexpression in SAM. Furthermore, to understand how auxin mediated organ formation is regulated by the DV genes, I looked at auxin signaling and auxin levels at high spatiotemporal resolution in SAM using fluorescent reporters, after ectopic expression of DV genes. My results leads to conclusion that DV transcription factors repress auxin signaling through long distance signaling and hence repress organogenesis. Along with this work, I would briefly also talk about my future proposal, which is that how water uses efficient plants can be generated through combining inverse stomata cycling mechanism and nocturnal carbon fixation mechanisms.