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Decoding the WIP1-drived carpel determinacy pathway

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Cucumis plants such as melon and cucumber can produce male, female, and monoclinous flowers by selective arrest of spore-bearing organs at the early stages of flower development. The transcription factor *WIP1* is the gynoecious (*G*) gene acting as a core carpel inhibitor that controls female flower development in cucurbits, although its role in the direct regulation of carpel determinacy has been unclear. Publishing in *Science*, Zhang et al. identified a carpel identity gene *CRABS CLAW* (*CRC*) in melon, and they showed that WIP1 recruits a corepressor TOPLESS (TPL) to the *CRC* promoter to suppress its expression by histone deacetylation, delaying floral stem cell termination in male flowers.

By using a sex transition mutant, the authors mapped and validated a single gene coding *Crabs Claw* (*CRC*) controlling female flower developing into males in melon. Interestingly, the authors also found that *CRC* was also involved in WUS-mediated floral meristem determinacy pathway, which was regulated by the *YUC* or *TRN2* gene.

The researchers showed that WIP1 is a direct repressor of *CRC* expression. They also found that the N-terminal domain of WIP1 interacted with the LisH, CTLH, and CRA domains of TPL proteins to repress *CRC* expression. Additionally, mutations in WIP1-TPL interacting domains lead to expression of CRC and femaleness. These results suggest that WIP1-TPL complex promotes male flower development by impairing CRC function in the carpel primordia of melon.

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Conflict of interest

The author declares that there is no conflict of interest.

Fig. 1 Melon female flower. (Photo by Bin Liu)

Dates

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