

Interaction between BZR1 and histone deacetylase SRT1 promotes lateral bud growth in *Solanum lycopersicum*

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Abstract

Bud dormancy is regulated by internal hormones, metabolism and clock, and external environment. Various genetic and epigenetic mechanisms underly the molecular regulation of bud dormancy. However, the role of histone modification in the regulation of bud growth in tomato (*Solanum lycopersicum*) is unclear. *BRANCHED1 (BRC1)* is a key gene that integrates multiple pathways to inhibit lateral bud growth. We previously showed that brassinosteroid (BR) promotes tomato lateral bud growth through inhibiting *BRC1* expression via BZR1, a key transcription factor in BR signalling. Here, we found that BZR1 interacts with a histone deacetylase SRT1. CRISPR knockout mutant *srt1* and plants overexpressing *SRT1* show reduced and increased lateral bud growth, respectively. By constructing OE-*BZR1/srt1* and *bzr1/OE-SRT1* double mutants, it was found that BZR1 and SRT1 are interdependent in regulating *BRC1* expression and lateral bud growth. Dual luciferase assay confirms that SRT1 enhances the transcriptional suppression of *BRC1* by BZR1. ChIP-qPCR shows that BZR1 and SRT1 cooperate to remove the H3K9 histone acetylation near the *BRC1* promoter. These results indicate that BZR1 and SRT1 interact to promote lateral bud growth through regulating the histone acetylation and transcription of *BRC1* gene in tomato.