

## How does phytohormone abscisic acid regulates plant flowering time?

Optimum of flowering time is most important for modern agricultural production system, especially for crops yield and seeds quality. Furthermore, during the lifecycle of a plant, one of the most attractive biological processes in plant research field is the transition from the vegetative to the reproductive stage. Consequently, flowering time control is an important research field in plant biology. In *Arabidopsis*, flowering time is precisely controlled by extensive environmental and internal cues. Gibberellins (GA) promote flowering, while abscisic acid (ABA) is considered as a flowering suppressor. Currently, the mechanisms underlying the promotion effect of GA on flowering transition is studies extensively and intensively. However, the detailed mechanism through which ABA inhibits floral transition is poorly understood.

We recently found that ABA inhibits floral transition by activating *FLC* transcription through ABSCISIC ACID-INSENSITIVE 4 (*ABI4*) with solid evidences including genetics, molecular biology, plant physiology and biochemical data. Consequently, *ABI4* also is the second indentified gene regulating plant floral transition in ABA signaling pathway, after *ABI5*.

Firstly, the authors demonstrated that the *abi4* mutant showed the early flowering phenotype whereas the over-expression *ABI4* (*OE-ABI4*) plant delayed floral transition. Consistently, qRT-PCR assay revealed that the *FLC* transcription level was downregulated in *abi4*, but upregulated in *OE-ABI4*. The change of *FT* level was consistent with the pattern of *FLC* expression. Following Chromatin immunoprecipitation qPCR (ChIP-qPCR), Electrophoretic Mobility Shift Assays (EMSA) and tobacco transient expression analysis showed that *ABI4* promotes *FLC* expression by directly binding to its promoter. Further, genetic analysis demonstrated that *OE-ABI4::flc-3* could not alter the *flc-3* phenotype. *OE-FLC::abi4* showed a markedly delayed-flowering phenotype, which mimicked *OE-FLC::WT*, and suggested that *ABI4* acts upstream on *FLC* in the same genetic pathway. In a word, these available evidences suggest that ABA inhibits floral transition by activating *FLC* transcription through *ABI4*.

### Publication

[ABSCISIC ACID-INSENSITIVE 4 negatively regulates flowering through directly promoting Arabidopsis FLOWERING LOCUS C transcription.](#)

Shu K, Chen Q, Wu Y, Liu R, Zhang H, Wang S, Tang S, Yang W, Xie Q  
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