

14-3-3 Proteins Act as Intracellular Receptors for Rice Hd3a Florigen

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Abstract

'Florigen' was proposed 75 years ago to be synthesized in the leaf and transported to the shoot apex, where it induces flowering. Only recently have genetic and biochemical studies established that florigen is encoded by *FLOWERING LOCUS T (FT)*, a gene that is universally conserved in higher plants. Nonetheless, the exact function of florigen during floral induction remains poorly understood and receptors for florigen have not been identified. We show here that the rice FT homologue Hd3a interacts with 14-3-3 proteins in shoot apical cells, yielding a complex that translocates to the nucleus and binds to OsFD1, a rice homologue of *Arabidopsis* FD. The resultant ternary 'florigen activation complex' (FAC) induces transcription of *OsMADS15*, a homologue of *Arabidopsis* *APETALA1 (AP1)*, which leads to flowering. We determined the 2.4-Å crystal structure of a rice FAC. The modelled FAC structure provides a mechanistic basis for florigen function in flowering. Our results suggest that 14-3-3 proteins act as intracellular receptors for florigen in shoot apical cells and offer new approaches to manipulate flowering in various crops and trees.

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