

The functional role of *EARLY FLOWERING 4* in coordination of flower opening in *Petunia*

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Genes and environmental features interact to modulate responses via the circadian clock allowing plants to adapt to periodic changes, such as daily or seasonal alterations (1). One of the genes involved is *EARLY FLOWERING 4 (ELF4)* which was firstly described as a flowering time mutant in *Arabidopsis* (2). Later work concluded that this gene takes part in the evening complex of the *Arabidopsis* circadian clock (3, 4). We analyse the phenotypes of downregulation of *PhELF4*, in *Petunia x hybrida*. This study was carried out using artificial vision in order to have a better understanding of flower opening behaviour. An unknown mechanism was identified in flowers of wild-type *Petunia*, called flowering in chain, in which only one flower is completely opened per day. This process was deregulated for *RNAi:PhELF4* flowers. Moreover, flower opening is stopped during the night for those wild-type flowers which did not complete their opening, restarting just in the moment in which plants are exposed to light again. A decrease in *PhELF4* expression causes an immediate floral opening, resulting in several flowers opening at once during a short period of four hours in the subjective afternoon. Our results indicate that *PhELF4* is involved in controlling the distribution of flower opening throughout the day.

1. McClung (2006). *Plant Cell* 18, 792-803.
2. Doyle et al. (2002). *Nature* 419, 74-77.
3. McWatters et al. (2007). *Plant Physiology* 144, 391-401.
4. Nusinow et al. (2011). *Nature* 475, 398-402.

This work was supported by MICINN-BFU2017-88300-C2-1-R.