

## ***PhEXPA1* CONTROLS CELL SIZE AND THE TIMING OF AXILLARY MERISTEM DEVELOPMENT IN *PETUNIA HYBRIDA***

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Expansins are cell wall proteins required for cell enlargement and wall loosening in many developmental processes. It is thought that the role of expansins may be to dissociate the polysaccharide complex that links microfibrils together, but the mechanism is still poorly defined.

*PhEXPA1* is an expansin A gene from *Petunia hybrida*, preferentially expressed in petal limbs where it controls cell expansion and final organ size by preparing the cell wall for the deposition of crystalline cellulose during extension. We analyzed the expression and localization of PhEXPA1, confirming that the protein is localized in the cell wall of expanding tissues. *PhEXPA1* promoter activity was evaluated using a promoter-GUS assay and the protein's subcellular localization was established by expressing a PhEXPA1-GFP fusion protein. To create transgenic *PhEXPA1* overexpressing petunia plants, cauliflower mosaic virus (CaMV) 35S promoter was employed. The constitutive overexpression of *PhEXPA1* in petunia plants significantly affects organ size, and also changes the architecture of the plant by initiating premature axillary meristem outgrowth, indicating that expansin could have a crucial role in plant morphogenesis. Moreover, we evaluated that higher *PhEXPA1* mRNA levels correlated with an increase in expansin activity by extensometer measurements. Fourier transform infrared (FTIR) and chemical analysis were used for the quantitative analysis of cell wall polymers. The alteration of polymer composition in transgenic plants provides a new insight into the role of *PhEXPA1* in cell wall metabolism.

These results support a role for expansins in the determination of organ shape, in lateral branching, and in the variation of cell wall polymer composition, probably reflecting a complex role in cell wall metabolism.