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On the Cover: The cover photo, taken by Drs. Yong-Ling Ruan and Eric Hines, shows rapidly elongating cotton (*Gossypium hirsutum*) fiber cells from the outer seed coat epidermis using a confocal microscope for preloaded fluorescent dye, carboxyfluorescein. Each cotton fiber is a single cell that undergoes rapid and synchronized unidirectional expansion to several centimeters long by approximately 18 d after anthesis before it switches to cell wall cellulose synthesis. Thus, cotton fiber represents an excellent cell model to study regulation of cell expansion. In this issue, Wang et al. (pp. 744–756) explore the roles and mechanisms of vacuolar invertase (VIN) in controlling plant cell expansion. They discovered that VIN regulates cotton fiber and *Arabidopsis* (*Arabidopsis thaliana*) root elongation in osmotic-dependent and -independent pathways, respectively. The study provides an example that a given protein (e.g. VIN) could control similar developmental processes such as cell expansion through different mechanisms in different cell types.

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