

T H E  
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**ON THE COVER**



Sieve tubes are the functional units for long-distance transport and signaling in the phloem. The tube architecture defines frictional interactions with the fluid, so sieve tube structure has a direct impact on translocation. There has been debate about the in vivo structure of sieve elements and the pressure flow hypothesis for many decades; in particular, the shape and location of P proteins remained unresolved. Froelich et al. (pages 4428–4445) present in vivo observations of transgenic *Arabidopsis thaliana* plants carrying P proteins from the Sieve-Element-Occlusion-Related (SEOR) family, tagged with yellow fluorescent protein. New protocols for transmission electron microscopy reveal the in vivo ultrastructure of sieve tubes. The authors show that massive protein agglomerations in the flow path are common but do not impede translocation, and implications for understanding phloem translocation are discussed. The cover shows an epifluorescence micrograph of an *Arabidopsis* flower. Yellow fluorescent protein-tagged SEOR proteins outline the phloem files in the petals (green/blue).

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- Kyoung Shin Yoo, Sung Han Ok, Byung-Cheon Jeong, Kwang Wook Jung, Mei Hua Cui, Sujin Hyoung, Myeong-Ryeol Lee, Hyun Kyu Song, and Jeong Sheop Shin (2011) Single Cystathionine β-Synthase Domain-Containing Proteins Modulate Development by Regulating the Thioredoxin System in *Arabidopsis*. *Plant Cell* 23: 3577–3594. 4527

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