Chloroplast envelope membranes are known to be damaged by environmental stresses such as heat, drought, UV-B, and element toxicity. However, how envelope integrity is maintained is largely unknown. Zhang et al. (pages 3695–3707) report that Arabidopsis thaliana chloroplasts swell and form “balloon-like structures” when depleted in VESICLE-INDUCING PROTEIN IN PLASTIDS1 (VIPP1). VIPP1 forms a large complex at envelopes and appears to become highly mobile when chloroplasts receive osmotic stress, suggesting that VIPP1 is a multifunctional protein involved in maintenance of envelope integrity. The cover image shows an example of the balloon-like chloroplasts in a vipp1 knockdown mutant.

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