Title:	The repressor and co-activator HsfB1 regulates the major heat stress transcription factors in tomato
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Abstract:	Plants code for a multitude of heat stress transcription factors (Hsfs). Three of them act as central regulators of heat stress (HS) response in tomato (Solanum lycopersicum). HsfA1a regulates the initial response, and HsfA2 controls acquired thermotolerance. HsfB1 is a transcriptional repressor but can also act as co-activator of HsfA1a. Currently, the mode of action and the relevance of the dual function of HsfB1 remain elusive. We examined this in HsfB1 overexpression or suppression transgenic tomato lines. Proteome analysis revealed that HsfB1 overexpression stimulates the co-activator function of HsfB1 and consequently the accumulation of HS-related proteins under non-stress conditions. Plants with enhanced levels of HsfB1 show aberrant growth and development but enhanced thermotolerance. HsfB1 suppression has no significant effect prior to stress. Upon HS, HsfB1 suppression strongly enhances the induction of heat shock proteins due to the higher activity of other HS-induced Hsfs, resulting in increased thermotolerance compared with wild-type. Thereby, HsfB1 acts as co-activator of HsfA1a for several Hsps, but as a transcriptional repressor on other Hsfs, including HsfA1b and HsfA2. The dual function explains the activation of chaperones to enhance protection and regulate the balance between growth and stress response upon deviations from the homeostatic levels of HsfB1.
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