Title:	To investigate the molecular mechanism of HY5-BTS action under iron deficiency in arabidopsis thaliana
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Abstract:	Iron (Fe) is an important micronutrient for almost all living organisms because it is required for metabolic processes such as DNA synthesis, respiration, and photosynthesis. Hence a better understanding of the mechanisms involved in Fe uptake and trafficking and plant adaptation to Fe deficiency becomes crucial. Moreover, an excess of Fe is also toxic to plants due to its redox nature[19]. Therefore, plants tightly control the optimum level of Fe uptake, distribution, and allocation. In the iron uptake pathway of Arabidopsis thaliana, many genes and transcription factors are involved. The basic helix-loop-helix (bHLH) transcription factors are a subfamily of transcription factors that play a key role in plant transcriptional networks. Iron deficiency causes the expression of two genes: POPEYE (PYE), which encodes a bHLH protein, and BRUTUS (BTS), which is tightly co-regulated with PYE. PYE and BTS play important roles in regulating iron deficiency responses and interact with the same PYE homologs. The ubiquitin E3 ligase protein BRUTUS (BTS) is a potential Fe sensor that regulates Fe homeostasis negatively. It degrades both bHLH105 and bHLH115, which are known to positively regulate Fe homeostasis and hence down-regulate iron uptake. Under iron deficiency, PYE regulates growth and development in a positive way. PYE represses the expression of variously known iron homeostasis genes that are involved in iron storage (FER1, FER4), iron transport (NAS4), and iron assimilation (NEET) under iron deficiency. Here in this study, we focused on ELONGATED HYPOCOTYL5 (HY5), a member of the basic leucine zipper (bZIP) family of transcription factors that inhibits hypocotyl growth and lateral root development while promoting pigment accumulation in Arabidopsis thaliana in a light-dependent manner. We found that HY5 acts upstream of BTS. In addition to this, we found that HY5 interacts with PYE, and both of them play an additive role under iron deficiency.
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