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| Title: | Understanding the role of HY5 in maintaining iron homeostatis in arabidopsis thaliana |
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| Abstract: | Iron is a vital element for life, and its absence or excess in lifeforms can result in major health concerns. It is the fourth most abundant metal on Earth. Plants are the major source of dietary iron, hence increasing crop iron content is a critical step towards improved public health. Iron is not accessible to plants in significant quantities. The major goal of research in this direction is to increase the Fe absorption in crop plants so that they can survive better in Fe-depleted soils. FIT (FER-LIKE IRON DEFICIENCY-INDUCED TRANSCRIPTION FACTOR) activates the transcription of iron uptake associated genes and plays a major role in iron uptake in Arabidopsis. Moreover, coumarin secretion is a significant route for iron absorption in non-grass species in alkaline soils when iron availability is low. Recent studies have identified the major coumarins involved in iron absorption in Arabidopsis thaliana, as well as the biochemical mechanisms and regulatory systems that regulate their production. Furthermore, In Arabidopsis, HY5 (ELONGATED HYPOCOTYL5 restricts hypocotyl growth and lateral root growth and stimulates pigment accumulation. A recent study identified that HY5 is at the core of a transcriptional network hub. HY5 modulates the transcription of a multiple genes by directly binding to cis- regulatory domains. In our lab, we have found that induction of coumarin biosynthesis genes (BGLU42, , CYP82C4, S8H, PDR9) and FIT was less in hy5 mutant background as compared to WT (Col-0) under iron-deficient conditions. To further understand the role of HY5 in iron homeostasis, I generated transcriptional reporter lines of coumarin biosynthesis genes and performed phenotyping of 35S:FIT/hy5 lines and hy5/hyh lines. Our results indicate that FIT overexpression in hy5 mutant partially rescues the hy5 phenotype and HY5 functions independent of HYH (HY5 homolog) in iron homeostasis. |
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