Title:	Understanding the role of HY5 in maintaing iron homeostasis in Arabidopsis thalania
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Abstract:	iron is the fourth most abundant element in the Earth's crust and is crucial for plants because of its diverse roles; however, its availability to plants is minimal. Almost 1/3 rd of the world's cultivated lands are calcareous, where iron exists in the form of insol- uble ferric ions, making the soil iron deficient. To cope with this deficiency, plants have evolved two strategies which are Strategy 1: Reduction-based and Strategy II: Chelation- based. However, as plants are the only source of dietary iron at higher trophic levels. improving iron uptake in plants is currently the major area of focus. Arabidopsis thaliana follows a reduction-based strategy for iron uptake from the soil and has quite an elaborate iron signaling pathway which the bHLH family of transcription factors majorly governs. Many of these have already been elucidated; however, there is still much to discover. HY5 encodes for a bZIP transcription factor that is known to be involved in photomorphogenesis and seedling development. It inhibits hypocotyl elongation and lateral root development. It is already known that HYS has a role in sulphur, nitrate and copper signaling pathways. Upon checking the phenotype, we found that HYS has a role in the primary root growth and development of the Arabidopsis thaliana under iron-limiting conditions as the hy5 mutant exhibits shortened primary root length, less chlorophyll content and low iron levels in iron- limiting conditions. This phenotype was rescued fully upon the use of the overexpression line of HY5 constructed in the hy5 mutant background (35S:HA:HY5/hy5). This confirmed the role of HY5 in primary root growth and development under iron-limiting conditions. In a recent study, it was shown that the induction of HY5 for iron uptake was dependent on PHYB in the case of tomato. Upon analysing the phenotype of p / t * yB - 9 mutants, we concluded that under iron-limiting conditions, HYS regulates the primary root length inde- pendent of PHYB in Arabidopsis thaliana.
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