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**Functional dissection of *DUF581* gene family by CRISPR/CAS9 in *Arabidopsis* in response to nutritional deficiency****Ping Lan and Mingke Yan**

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In *Arabidopsis* genome, there are 17 genes encoding proteins containing the Domain of *Unknown Function* (DUF) 581. Expression of some genes in this family was reported up-regulated upon various stresses including phosphate starvation. Biological functions of this gene family, however, remain largely unknown. To decipher the functions of this gene family, particularly under nutritional starvation, we created mutations on each of the gene by genome editing using CRISPR/CAS9 system, and also generated overexpression lines of these genes. Results showed that each gene of this family has been successfully edited either by insertion or by deletion in the code region, which will block the production of functional proteins. Of which, mutation of *DUF581-1* resulted in more sensitive to Fe deficiency. *DUF581-1* was mainly expressed in the vascular region in the leaf and its-encoded protein is localized in the nucleus. Overexpression of *DUF581-1* led to increased tolerance to Fe starvation, with the primary root being longer than that of wild type plants. ICP-MS analysis showed that overexpression of *DUF581-1* result in higher Fe content in the seeds, which could lead to these lines more tolerant to Fe starvation. Underlying mechanisms of *DUF581-1* associated with Fe response is under the way.

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