

GEPHE SUMMARY

	Gephebase Gene	GephelD
FPN2 (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=^FPN2^#gephebase-summary-title)	GP00000354	
	Entry Status	Main curator
Published	Martin	

PHENOTYPIC CHANGE

Trait Category		Trait	
Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category=^Physiology^#gephebase-summary-title)			
Metal tolerance (https://www.gephebase.org/search-criteria/?and+Trait=^Metal tolerance^#gephebase-summary-title)		Trait State in Taxon A	
Arabidopsis thaliana- Colo		Trait State in Taxon B	
Arabidopsis thaliana- Ts-1		Ancestral State	
Taxon A		Taxonomic Status	
Intraspecific (https://www.gephebase.org/search-criteria/?and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title)		Arabidopsis thaliana (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title)	
thale cress	Common Name	thale cress	Common Name
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms	thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent	Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID	3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID
Yes	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
Arabidopsis thaliana- Colo	Taxon A Description	Arabidopsis thaliana- Ts-1	Taxon B Description

GENOTYPIC CHANGE

IREG2	Generic Gene Name	UniProtKB Arabidopsis thaliana
	Synonyms	
ARABIDOPSIS THALIANA IRON-REGULATED PROTEIN 2; ATIREG2; F12E4.370; F12E4_370; FERROPORTIN 2; FPN2; iron regulated 2; At5g03570		GenebankID or UniProtKB
3702.AT5G03570.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT5G03570.1)	String	CP002688 (https://www.ncbi.nlm.nih.gov/nuccore/CP002688)
Belongs to the ferroportin (FP) (TC 2.A.100) family. SLC40A subfamily.	Sequence Similarities	
GO:0015087 : cobalt ion transmembrane transporter activity (https://www.ebi.ac.uk/QuickGO/term/GO:0015087)	GO - Molecular Function	
GO:0005381 : iron ion transmembrane transporter activity		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005381>)

GO - Biological Process

GO:0010106 : cellular response to iron ion starvation

(<https://www.ebi.ac.uk/QuickGO/term/GO:0010106>)

GO:0055068 : cobalt ion homeostasis

(<https://www.ebi.ac.uk/QuickGO/term/GO:0055068>)

GO:0006824 : cobalt ion transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0006824>)

GO:0006826 : iron ion transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0006826>)

GO:0035444 : nickel cation transmembrane transport

(<https://www.ebi.ac.uk/QuickGO/term/GO:0035444>)

GO:0015675 : nickel cation transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0015675>)

GO:0000041 : transition metal ion transport

(<https://www.ebi.ac.uk/QuickGO/term/GO:0000041>)

GO - Cellular Component

GO:0016021 : integral component of membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

GO:0009705 : plant-type vacuole membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009705>)

Presumptive Null

Yes ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^Yes))

Molecular Type

Coding ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=^Coding))

Aberration Type

Insertion ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=^Insertion))

Insertion Size

1-9 bp

Molecular Details of the Mutation

1bp insertion resulting in frameshift

Experimental Evidence

Linkage Mapping ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=^Linkage+Mapping))

Main Reference

The ferroportin metal efflux proteins function in iron and cobalt homeostasis in Arabidopsis. (2009) (<https://pubmed.ncbi.nlm.nih.gov/19861554>)

Authors

Morrissey J; Baxter IR; Lee J; Li L; Lahner B; Grotz N; Kaplan J; Salt DE; Guerinot ML

Abstract

Relatively little is known about how metals such as iron are effluxed from cells, a necessary step for transport from the root to the shoot. Ferroportin (FPN) is the sole iron efflux transporter identified to date in animals, and there are two closely related orthologs in *Arabidopsis thaliana*, IRON REGULATED1 (IREG1/FPN1) and IREG2/FPN2. FPN1 localizes to the plasma membrane and is expressed in the stele, suggesting a role in vascular loading; FPN2 localizes to the vacuole and is expressed in the two outermost layers of the root in response to iron deficiency, suggesting a role in buffering metal influx. Consistent with these roles, fpn2 has a diminished iron deficiency response, whereas fpn1 fpn2 has an elevated iron deficiency response. Ferroportins also play a role in cobalt homeostasis; a survey of *Arabidopsis* accessions for ionomic phenotypes showed that truncation of FPN2 results in elevated shoot cobalt levels and leads to increased sensitivity to the metal. Conversely, loss of FPN1 abolishes shoot cobalt accumulation, even in the cobalt accumulating mutant frd3. Consequently, in the fpn1 fpn2 double mutant, cobalt cannot move to the shoot via FPN1 and is not sequestered in the root vacuoles via FPN2; instead, cobalt likely accumulates in the root cytoplasm causing fpn1 fpn2 to be even more sensitive to cobalt than fpn2 mutants.

Additional References

RELATED GEPHE

Related Genes

5 (FRD3 (FERRIC REDUCTASE DEFECTIVE3), heavy metal atpase3 (HMA3), heavy metal atpase5 (HMA5), Molybdenum transporter1 (MOT1), heavy metal atpase4 (HMA4))

([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=^3702/and+Trait=Metal+tolerance/and+groupHaplotypes=true))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS