

GEPHE SUMMARY

	Gephebase Gene	GephelD
ORGANIC CATION TRANSPORTER 1 (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=^ORGANIC CATION TRANSPORTER 1^#gephebase-summary-title)	GP00001279	Main curator
	Entry Status	
Published		

PHENOTYPIC CHANGE

	Trait Category	
Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category=^Physiology^#gephebase-summary-title)		Trait
Root growth (root length response to exogenous cadaverine) (https://www.gephebase.org/search-criteria/?and+Trait=^Root growth (root length response to exogenous cadaverine)^#gephebase-summary-title)		Trait State in Taxon A
Arabidopsis thaliana- Ler0		Trait State in Taxon B
Arabidopsis thaliana- Cvi		Ancestral State
Unknown		Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria/?and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)		
Taxon A		Taxon B
Arabidopsis thaliana (https://www.gephebase.org/search-criteria/?and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)	Latin Name	Latin Name
thale cress	Common Name	Common Name
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms	Synonyms
species	Rank	Rank
cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage	Lineage
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)	Parent	Parent
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)	NCBI Taxonomy ID	NCBI Taxonomy ID
Yes	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?
Arabidopsis thaliana- Ler0	Taxon A Description	Taxon B Description
	Arabidopsis thaliana- Cvi	

GENOTYPIC CHANGE

OCT1	Generic Gene Name	UniProtKB Arabidopsis thaliana
AtOCT1; organic cation/carnitine transporter1; T18K17.11; T18K17_11; 1-Oct; At1g73220	Synonyms	GenebankID or UniProtKB
3702.AT1G73220.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT1G73220.1)	String	843656 (https://www.ncbi.nlm.nih.gov/nuccore/843656)
Belongs to the major facilitator (TC 2.A.1) superfamily. Organic cation transporter (TC 2.A.1.19) family.	Sequence Similarities	
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)	GO - Molecular Function	

GO:0015226 : carnitine transmembrane transporter activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0015226>)

GO - Biological Process

GO:0010150 : leaf senescence (<https://www.ebi.ac.uk/QuickGO/term/GO:0010150>)

GO:0015839 : cadaverine transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0015839>)

GO - Cellular Component

GO:0016021 : integral component of membrane

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

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)

Presumptive Null

Unknown ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=%27Unknown%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive%20Null=%27Unknown%27#gephebase-summary-title))

Molecular Type

Cis-regulatory ([https://www.gephebase.org/search-criteria?/and+Molecular Type=%27Cis-regulatory%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular%20Type=%27Cis-regulatory%27#gephebase-summary-title))

Aberration Type

Unknown ([https://www.gephebase.org/search-criteria?/and+Aberration Type=%27Unknown%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration%20Type=%27Unknown%27#gephebase-summary-title))

Molecular Details of the Mutation

unknown

Experimental Evidence

Linkage Mapping ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%27Linkage Mapping%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental%20Evidence=%27Linkage%20Mapping%27#gephebase-summary-title))

Main Reference

Natural variation in the expression of ORGANIC CATION TRANSPORTER 1 affects root length responses to cadaverine in *Arabidopsis*. (2015) (<https://pubmed.ncbi.nlm.nih.gov/25403917>)

Authors

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Abstract

Polyamines, including cadaverine, are organic cations that affect numerous biological processes including transcription, translation, cell signalling, and ion channel activity. They often function in biotic and abiotic stress responses in plants. Because little is known about how plants respond to cadaverine, a quantitative natural variation approach was used to identify genetic factors that contribute to this response. Here it is shown that *Arabidopsis thaliana* accessions have varying root length responses to exogenous cadaverine: Cape Verde Islands (Cvi) was one of the most resistant accessions tested, whereas Landsberg erecta (Ler) was one of the most sensitive. Recombinant inbred lines, near isogenic lines, and a microarray were used to show that variation in ORGANIC CATION TRANSPORTER 1 (OCT1) is at least partially responsible for this difference. OCT1 expression was higher in Cvi than in Ler, and oct1 mutants were more sensitive to cadaverine than wild-type plants. In oct1 mutants transformed with an ectopic copy of OCT1 originating from either Cvi or Ler, the expression level of the transgene, not its accession, correlated with the cadaverine response. These results suggest that decreased OCT1 expression confers cadaverine sensitivity in some accessions.

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Additional References

RELATED GEPHE

Related Genes

4 (AZI1, Brevis radix (BRX), Phosphate transporter PHO1, Root System Architecture 1) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=%273702%27/and+Trait=Root growth/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon%20ID=%273702%27/and+Trait=Root%20growth/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

OCT1 was estimated to show a 73-fold increase in Cvi compared with Ler. Only one amino-acid change in CDS not responsible for the phenotype. The ability of OCT1 to affect the cadaverine response may depend on the genetic background ; non-null mutation