

GEPHE SUMMARY

ORGANIC CATION TRANSPORTER 1 (<a +organic+cation+transporter+1+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+ORGANIC+CATION+TRANSPORTER+1+"#gephebase-summary-title)	Gephebase Gene	GP00001279	GepheID
	Entry Status		Main curator
	Published		

PHENOTYPIC CHANGE

Trait Category		Trait	
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)		Root growth (root length response to exogenous cadaverine) (<a +root+growth+(root+length+response+to+exogenous+cadaverine)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Root+growth+(root+length+response+to+exogenous+cadaverine)+"#gephebase-summary-title)	
Arabidopsis thaliana- Ler0		Arabidopsis thaliana- Cvi	
Unknown		Unknown	
Taxon A		Taxon B	
Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)		Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)	
thale cress		thale cress	
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress		thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	
species		species	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)		Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)		3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	
Yes		Yes	
Arabidopsis thaliana- Ler0		Arabidopsis thaliana- Cvi	

GENOTYPIC CHANGE

OCT1	Generic Gene Name	Q9CAT6 (http://www.uniprot.org/uniprot/Q9CAT6)	UniProtKB Arabidopsis thaliana
	Synonyms		GenebankID or UniProtKB
	AtOCT1; organic cation/carnitine transporter1; T18K17.11; T18K17_11; 1-Oct; At1g73220	843656 (https://www.ncbi.nlm.nih.gov/nuccore/843656)	
	String		
	3702.AT1G73220.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier= 3702.AT1G73220.1)		
	Sequence Similarities		
Belongs to the major facilitator (TC 2.A.1) superfamily. Organic cation transporter (TC 2.A.1.19) family.			
GO - Molecular Function			
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)			

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)		
Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Unknown^#gephebase-summary-title)		Presumptive Null
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Cis-regulatory^#gephebase-summary-title)		Molecular Type
Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Unknown^#gephebase-summary-title)		Aberration Type
unknown		Molecular Details of the Mutation
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping^#gephebase-summary-title)		Experimental Evidence
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)		Main Reference
Strohm AK; Vaughn LM; Masson PH		Authors

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

4 (AZI1, Brevis radix (BRX), Phosphate transporter PHO1, Root System Architecture 1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~3702^/and+Trait=Root growth/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

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