

GEPHE SUMMARY

HAC1 (=ATQ1) (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^HAC1(=ATQ1)^#gephebase-summary-title)	Gephebase Gene	GP00000434	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=^Physiology^#gephebase-summary-title)	Trait Category		
Xenobiotic resistance (soil contamination; arsenate) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance (soil contamination; arsenate)^#gephebase-summary-title)	Trait		
Arabidopsis thaliana - Col0	Trait State in Taxon A		
Arabidopsis thaliana - Kashmir	Trait State in Taxon B		
Data not curated	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Intraspecific^#gephebase-summary-title)	Taxonomic Status		
	Taxon A	Taxon B	
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)	Latin Name	Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)	Latin Name
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; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; 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 Intraspecies?	Yes	is Taxon B an Intraspecies?
Arabidopsis thaliana - Col0	Taxon A Description	Arabidopsis thaliana - Kashmir	Taxon B Description

GENOTYPIC CHANGE

HAC1	Generic Gene Name	Q9C5X9 (http://www.uniprot.org/uniprot/Q9C5X9)	UniProtKB Arabidopsis thaliana
ARABIDOPSIS HISTONE ACETYLTRANSFERASE OF THE CBP FAMILY 1; ARABIDOPSIS THALIANA P300/CBP ACETYLTRANSFERASE-RELATED PROTEIN 2; ATHAC1; ATHPCAT2; histone acetyltransferase of the CBP family 1; P300/CBP ACETYLTRANSFERASE-RELATED PROTEIN 2; PCAT2; YUP8H12R.38; YUP8H12R_38; At1g79000; YUP8H12R_22	Synonyms	()	GenebankID or UniProtKB
3702.AT1G79000.2 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT1G79000.2)	String		
-	Sequence Similarities		

GO - Molecular Function

GO:0008270 : zinc ion binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0008270>)

GO:0003712 : transcription coregulator activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0003712>)

GO:0004402 : histone acetyltransferase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0004402>)

GO - Biological Process

GO:0006355 : regulation of transcription, DNA-templated
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006355>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

No ([https://www.gephebase.org/search-criteria?/and+Presumptive+Null="+No+"#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=))

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

Coding variation and differential gene expression in roots

Experimental Evidence

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

Main Reference

Natural variation in arsenate tolerance identifies an arsenate reductase in *Arabidopsis thaliana*. (2014) (<https://pubmed.ncbi.nlm.nih.gov/25099865>)

Authors

SÁnchez-Bermejo E; Castrillo G; del Llano B; Navarro C; Zarco-FernÁndez S; Martínez-Herrera DJ; Leo-del Puerto Y; Muñoz R; CÃmara C; Paz-Ares J; Alonso-Blanco C; Leyva A

Abstract

The enormous amount of environmental arsenic was a major factor in determining the biochemistry of incipient life forms early in the Earth's history. The most abundant chemical form in the reducing atmosphere was arsenite, which forced organisms to evolve strategies to manage this chemical species. Following the great oxygenation event, arsenite oxidized to arsenate and the action of arsenate reductases became a central survival requirement. The identity of a biologically relevant arsenate reductase in plants nonetheless continues to be debated. Here we identify a quantitative trait locus that encodes a novel arsenate reductase critical for arsenic tolerance in plants. Functional analyses indicate that several non-additive polymorphisms affect protein structure and account for the natural variation in arsenate reductase activity in *Arabidopsis thaliana* accessions. This study shows that arsenate reductases are an essential component for natural plant variation in As(V) tolerance.

Additional References

Genome-wide association mapping identifies a new arsenate reductase enzyme critical for limiting arsenic accumulation in plants. (2014) (<https://pubmed.ncbi.nlm.nih.gov/25464340>)

RELATED GEPHE

Related Genes

1 (CLH1) ([https://www.gephebase.org/search-criteria?/or+Taxon+ID="+3702+"/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=))

Related Haplotypes

1 ([https://www.gephebase.org/search-criteria?/or+Gene+Gephebase="+HAC1\(=ATQ1\)^/and+Taxon+ID="+3702^/or+Gene+Gephebase="+HAC1\(=ATQ1\)^/and+Taxon+ID="+3702^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=))

EXTERNAL LINKS

COMMENTS

Mapped independently in two studies