GEPHE SUMMARY

Gephebase Gene

HAC1 (=ATQ1) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^HAC1 (=ATQ1)^#gephebase-summary-title)

GepheID

GP00000434

Entry Status

Published

Main curator

Martin

PHENOTYPIC CHANGE

Trait Category

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait

Xenobiotic resistance (soil contamination; arsenate) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance (soil contamination; arsenate)^#gephebase-summary-title)

Trait State in Taxon A

Arabidopsis thaliana- Col0

Trait State in Taxon B

Arabidopsis thaliana - Kashmir

Ancestral State

Data not curated

Taxonomic Status

Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name

Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name

thale cress

Synonyms

thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent

Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID

3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon A an Infraspecies?

Yes

Taxon A Description

Arabidopsis thaliana- Col0

Taxon B

Latin Name

Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name

thale cress

Synonyms

thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent

Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID

3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon B an Infraspecies?

Yes

Taxon B Description

Arabidopsis thaliana - Kashmir

GENOTYPIC CHANGE

Generic Gene Name

HAC1

Synonyms

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

String

3702.AT1G79000.2 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT1G79000.2)

Sequence Similarities

-

UniProtKB Arabidopsis thaliana

Q9C5X9 (http://www.uniprot.org/uniprot/Q9C5X9)

GenebankID or UniProtKB

()

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)

Molecular Type

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

Aberration Type

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

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)

Main Reference

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

Authors

SÃinchez-Bermejo E; Castrillo G; del Llano B; Navarro C; Zarco-FernÃindez S; Martinez-Herrera DJ; Leo-del Puerto Y; MuÃ±oz R; CÃimara 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)

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)

EXTERNAL LINKS

COMMENTS

Mapped independentyl in two studies