

GEPHE SUMMARY

AOP2 (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=AOP2">#gephebase-summary-title)	Gephebase Gene	GP00000095	GepheID
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

Trait Category			
Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category=Physiology">#gephebase-summary-title)	Trait		
Glucosinolate content (#gephebase-summary-title)	Trait State in Taxon A		
Arabidopsis thaliana- Col0	Trait State in Taxon B		
Arabidopsis thaliana- Ler0	Ancestral State		
Taxon A	Taxonomic Status		
Intraspecific (https://www.gephebase.org/search-criteria/?and+Taxonomic Status=Intraspecific">#gephebase-summary-title)			
Taxon A		Taxon B	
	Latin Name		Latin Name
Arabidopsis thaliana (#gephebase-summary-title)	Arabidopsis thaliana (#gephebase-summary-title)		
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	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
	Lineage		Lineage
cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis		cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	
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- Col0	Taxon A Description	Arabidopsis thaliana- Ler0	Taxon B Description

GENOTYPIC CHANGE

AOP2	Generic Gene Name	UniProtKB Arabidopsis thaliana
-	Synonyms	GenebankID or UniProtKB
-	String	
Belongs to the iron/ascorbate-dependent oxidoreductase family.	Sequence Similarities	
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872) GO:0016706 : oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen, 2-oxoglutarate as one donor, and incorporation of one atom each of oxygen into both donors (https://www.ebi.ac.uk/QuickGO/term/GO:0016706)	GO - Molecular Function	
	GO - Biological Process	
GO:0019761 : glucosinolate biosynthetic process		

Yes (https://www.gephebase.org/search-criteria?/and+Presumptive+Null=%Yes%#gephebase-summary-title)	Presumptive Null
Coding (https://www.gephebase.org/search-criteria?/and+Molecular+Type=%Coding%#gephebase-summary-title)	Molecular Type
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration+Type=%Deletion%#gephebase-summary-title)	Aberration Type
1-9 bp	Deletion Size
5bp deletion resulting in frameshift	Molecular Details of the Mutation
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%Linkage+Mapping%#gephebase-summary-title)	Experimental Evidence
Gene duplication in the diversification of secondary metabolism: tandem 2-oxoglutarate-dependent dioxygenases control glucosinolate biosynthesis in <i>Arabidopsis</i> . (2001) (https://pubmed.ncbi.nlm.nih.gov/11251105)	Main Reference
Kliebenstein DJ; Lambrix VM; Reichelt M; Gershenson J; Mitchell-Olds T	Authors
Secondary metabolites are a diverse set of plant compounds believed to have numerous functions in plant-environment interactions. The large chemical diversity of secondary metabolites undoubtedly arises from an equally diverse set of enzymes responsible for their biosynthesis. However, little is known about the evolution of enzymes involved in secondary metabolism. We are studying the biosynthesis of glucosinolates, a large group of secondary metabolites, in <i>Arabidopsis</i> to investigate the evolution of enzymes involved in secondary metabolism. <i>Arabidopsis</i> contains natural variations in the presence of methylsulfinylalkyl, alkenyl, and hydroxylalkyl glucosinolates. In this article, we report the identification of genes encoding two 2-oxoglutarate-dependent dioxygenases that are responsible for this variation. These genes, AOP2 and AOP3, which map to the same position on chromosome IV, result from an apparent gene duplication and control the conversion of methylsulfinylalkyl glucosinolate to either the alkenyl or the hydroxylalkyl form. By heterologous expression in <i>Escherichia coli</i> and the correlation of gene expression patterns to the glucosinolate phenotype, we show that AOP2 catalyzes the conversion of methylsulfinylalkyl glucosinolates to alkenyl glucosinolates. Conversely, AOP3 directs the formation of hydroxylalkyl glucosinolates from methylsulfinylalkyl glucosinolates. No ecotype coexpressed both genes. Furthermore, the absence of functional AOP2 and AOP3 leads to the accumulation of the precursor methylsulfinylalkyl glucosinolates. A third member of this gene family, AOP1, is present in at least two forms and found in all ecotypes examined. However, its catalytic role is still uncertain.	Abstract
Understanding the evolution of defense metabolites in <i>Arabidopsis thaliana</i> using genome-wide association mapping. (2010) (https://pubmed.ncbi.nlm.nih.gov/19737743)	Additional References
Combining genome-wide association mapping and transcriptional networks to identify novel genes controlling glucosinolates in <i>Arabidopsis thaliana</i> . (2011) (https://pubmed.ncbi.nlm.nih.gov/21857804)	

RELATED GEPHE

3 (AOP3, MAM1, CYP81F2) (https://www.gephebase.org/search-criteria?/or+Taxon+ID=%3702%/and+Trait=Glucosinolate+content/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS