

GEPHE SUMMARY

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

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=Physiology#gephebase-summary-title)		Trait Category	
Glucosinolate content (https://www.gephebase.org/search-criteria?/and+Trait=Glucosinolate content#gephebase-summary-title)		Trait	
Arabidopsis thaliana- Col0		Trait State in Taxon A	
Arabidopsis thaliana- Ler0		Trait State in Taxon B	
Taxon A		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)		Arabidopsis thaliana (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; Pentapetales; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; 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- Col0		Arabidopsis thaliana- Ler0	

GENOTYPIC CHANGE

AOP2		Generic Gene Name		UniProtKB Arabidopsis thaliana	
-		Synonyms		Q945B5 (http://www.uniprot.org/uniprot/Q945B5)	
-		String		GenebankID or UniProtKB	
-		Sequence Similarities		AF417858 (https://www.ncbi.nlm.nih.gov/nucore/AF417858)	
Belongs to the iron/ascorbate-dependent oxidoreductase family.		GO - Molecular Function			
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:0019761 : glucosinolate biosynthetic process		GO - Biological Process			

(https://www.ebi.ac.uk/QuickGO/term/GO:0019761)	GO - Cellular Component	
-		Presumptive Null
Yes (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes^#gephebase-summary-title)		Molecular Type
Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding^#gephebase-summary-title)		Aberration Type
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Deletion^#gephebase-summary-title)		Deletion Size
1-9 bp		Molecular Details of the Mutation
5bp deletion resulting in frameshift		Experimental Evidence
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping^#gephebase-summary-title)		Main Reference
Gene duplication in the diversification of secondary metabolism: tandem 2-oxoglutarate-dependent dioxygenases control glucosinolate biosynthesis in Arabidopsis. (2001) (https://pubmed.ncbi.nlm.nih.gov/11251105)		Authors
Kliebenstein DJ; Lambrix VM; Reichelt M; Gershenzon J; Mitchell-Olds T		Abstract
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 Arabidopsis to investigate the evolution of enzymes involved in secondary metabolism. Arabidopsis contains natural variations in the presence of methylsulfinylalkyl, alkenyl, and hydroxyalkyl 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 hydroxyalkyl form. By heterologous expression in Escherichia 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 hydroxyalkyl 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.		
Understanding the evolution of defense metabolites in Arabidopsis thaliana using genome-wide association mapping. (2010) (https://pubmed.ncbi.nlm.nih.gov/19737743) Combining genome-wide association mapping and transcriptional networks to identify novel genes controlling glucosinolates in Arabidopsis thaliana. (2011) (https://pubmed.ncbi.nlm.nih.gov/21857804)		
		Additional References

RELATED GEPHE

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

EXTERNAL LINKS

COMMENTS