

## GEPHE SUMMARY

MAM1 ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=MAM1#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=MAM1#gephebase-summary-title</a> )	Gephebase Gene	GP00000562	GepheID
Published	Entry Status	Martin	Main curator

## PHENOTYPIC CHANGE

Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=Physiology#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=Physiology#gephebase-summary-title</a> )	Trait Category		
Glucosinolate content ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=Glucosinolate+content#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=Glucosinolate+content#gephebase-summary-title</a> )	Trait		
Arabidopsis thaliana- Col0	Trait State in Taxon A		
Arabidopsis thaliana- Ler0	Trait State in Taxon B		
Data not curated	Ancestral State		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Intraspecific#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Intraspecific#gephebase-summary-title</a> )	Taxonomic Status		

Taxon A		Taxon B	
	Latin Name		Latin Name
Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Arabidopsis+thaliana#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Arabidopsis+thaliana#gephebase-summary-title</a> )	Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Arabidopsis+thaliana#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Arabidopsis+thaliana#gephebase-summary-title</a> )	Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Arabidopsis+thaliana#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Arabidopsis+thaliana#gephebase-summary-title</a> )	Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Arabidopsis+thaliana#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Arabidopsis+thaliana#gephebase-summary-title</a> )
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) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701</a> )	Parent	Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701</a> )	Parent
3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702</a> )	NCBI Taxonomy ID	3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702</a> )	NCBI Taxonomy ID
Yes	is Taxon A an Intraspecies?	Yes	is Taxon B an Intraspecies?
Arabidopsis thaliana- Col0	Taxon A Description	Arabidopsis thaliana- Ler0	Taxon B Description

## GENOTYPIC CHANGE

MAM1	Generic Gene Name	Q9FG67 ( <a href="http://www.uniprot.org/uniprot/Q9FG67">http://www.uniprot.org/uniprot/Q9FG67</a> )	UniProtKB Arabidopsis thaliana
2-ISOPROPYLMALATE SYNTHASE; 2-ISOPROPYLMALATE SYNTHASE 3; IMS3; METHYLTHIOALKYLMALATE SYNTHASE; methylthioalkylmalate synthase 1; T2O7.3; T2O7_3; IPMS_AT2; MAM-L; MAML; At5g23010	Synonyms	AJ486888 ( <a href="https://www.ncbi.nlm.nih.gov/nucleotide/AJ486888">https://www.ncbi.nlm.nih.gov/nucleotide/AJ486888</a> )	GenebankID or UniProtKB
3702.AT5G23010.1 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT5G23010.1">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT5G23010.1</a> )	String		
Belongs to the alpha-IPM synthase/homocitrate synthase family.	Sequence Similarities		
GO:0010177 : 2-(2'-methylthio)ethylmalate synthase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0010177">https://www.ebi.ac.uk/QuickGO/term/GO:0010177</a> )	GO - Molecular Function		

GO:0003852 : 2-isopropylmalate synthase activity  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0003852>)

GO - Biological Process

GO:0019761 : glucosinolate biosynthetic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0019761>)

GO:0009414 : response to water deprivation  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009414>)

GO:0009625 : response to insect (<https://www.ebi.ac.uk/QuickGO/term/GO:0009625>)

GO:0009098 : leucine biosynthetic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009098>)

GO - Cellular Component

GO:0009507 : chloroplast (<https://www.ebi.ac.uk/QuickGO/term/GO:0009507>)

Presumptive Null

Unknown (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title>)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

unknown

Experimental Evidence

Linkage Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#gephebase-summary-title>)

Main Reference

A gene controlling variation in Arabidopsis glucosinolate composition is part of the methionine chain elongation pathway. (2001) (<https://pubmed.ncbi.nlm.nih.gov/11706188>)

Authors

Kroymann J; Textor S; Tokuhisa JG; Falk KL; Bartram S; Gershenzon J; Mitchell-Olds T

Abstract

Arabidopsis and other Brassicaceae produce an enormous diversity of aliphatic glucosinolates, a group of methionine (Met)-derived plant secondary compounds containing a beta-thio-glucose moiety, a sulfonated oxime, and a variable side chain. We fine-scale mapped GSL-ELONG, a locus controlling variation in the side-chain length of aliphatic glucosinolates. Within this locus, a polymorphic gene was identified that determines whether Met is extended predominantly by either one or by two methylene groups to produce aliphatic glucosinolates with either three- or four-carbon side chains. Two allelic mutants deficient in four-carbon side-chain glucosinolates were shown to contain independent missense mutations within this gene. In cell-free enzyme assays, a heterologously expressed cDNA from this locus was capable of condensing 2-oxo-4-methylthiobutanoic acid with acetyl-coenzyme A, the initial reaction in Met chain elongation. The gene methylthioalkylmalate synthase1 (MAM1) is a member of a gene family sharing approximately 60% amino acid sequence similarity with 2-isopropylmalate synthase, an enzyme of leucine biosynthesis that condenses 2-oxo-3-methylbutanoate with acetyl-coenzyme A.

Additional References

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>)

Natural enemies drive geographic variation in plant defenses. (2012) (<https://pubmed.ncbi.nlm.nih.gov/23042895>)

## RELATED GEPHE

Related Genes

3 (AOP2, AOP3, CYP81F2) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Glucosinolate content/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS