

GEPHE SUMMARY

Gephebase Gene		GepheID
Epithiospecifier Modifier1 (ESM1) (<a +epithiospecifier+modifier1+(esm1)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+Epithiospecifier+Modifier1+(ESM1)+"#gephebase-summary-title)	GP00000277	
Entry Status	Martin	Main curator
Published		

PHENOTYPIC CHANGE

Trait Category			
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)		Trait	
Nitrile content (<a +nitrile+content+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Nitrile+content+"#gephebase-summary-title)		Trait State in Taxon A	
Arabidopsis thaliana- Col0		Trait State in Taxon B	
Arabidopsis thaliana- Ler0		Ancestral State	
Data not curated		Taxonomic Status	
Intraspecific (<a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific+"#gephebase-summary-title)			
Taxon A		Taxon B	
Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)		Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)	
Common Name		Common Name	
thale cress		thale cress	
Synonyms		Synonyms	
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	
Rank		Rank	
species		species	
Lineage		Lineage	
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	
Parent		Parent	
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)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
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)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
Yes		Yes	
Taxon A Description		Taxon B Description	
Arabidopsis thaliana- Col0		Arabidopsis thaliana- Ler0	

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Arabidopsis thaliana
ESM1		
Synonyms		GenebankID or UniProtKB
epithiospecifier modifier 1; At3g14210; MAG2.6		AK221834 (https://www.ncbi.nlm.nih.gov/nucore/AK221834)
String		
3702.AT3G14210.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT3G14210.1)		
Sequence Similarities		
Belongs to the 'GDSL' lipolytic enzyme family.		
GO - Molecular Function		
GO:0016788 : hydrolase activity, acting on ester bonds (https://www.ebi.ac.uk/QuickGO/term/GO:0016788)		
GO - Biological Process		
GO:0042742 : defense response to bacterium		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0042742>)
GO:0009409 : response to cold (<https://www.ebi.ac.uk/QuickGO/term/GO:0009409>)
GO:0019762 : glucosinolate catabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0019762>)
GO:0016042 : lipid catabolic process (<https://www.ebi.ac.uk/QuickGO/term/GO:0016042>)
GO:0009625 : response to insect (<https://www.ebi.ac.uk/QuickGO/term/GO:0009625>)
GO - Cellular Component
GO:0009506 : plasmodesma (<https://www.ebi.ac.uk/QuickGO/term/GO:0009506>)
GO:0016020 : membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0016020>)
GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)
GO:0009507 : chloroplast (<https://www.ebi.ac.uk/QuickGO/term/GO:0009507>)
GO:0005777 : peroxisome (<https://www.ebi.ac.uk/QuickGO/term/GO:0005777>)
GO:0005773 : vacuole (<https://www.ebi.ac.uk/QuickGO/term/GO:0005773>)
GO:0022626 : cytosolic ribosome (<https://www.ebi.ac.uk/QuickGO/term/GO:0022626>)
GO:0048046 : apoplast (<https://www.ebi.ac.uk/QuickGO/term/GO:0048046>)
GO:0009941 : chloroplast envelope (<https://www.ebi.ac.uk/QuickGO/term/GO:0009941>)

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)	Presumptive Null
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title)	Molecular Type
Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Unknown^#gephebase-summary-title)	Aberration Type
Not identified	Molecular Details of the Mutation
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#gephebase-summary-title)	Experimental Evidence
The gene controlling the quantitative trait locus EPITHIOSPECIFIER MODIFIER1 alters glucosinolate hydrolysis and insect resistance in Arabidopsis. (2006) (https://pubmed.ncbi.nlm.nih.gov/16679459)	Main Reference
Zhang Z; Ober JA; Kliebenstein DJ	Authors

Glucosinolates are sulfur-rich plant secondary metabolites whose breakdown products have a wide range of biological activities in plant-herbivore and plant-pathogen interactions and anticarcinogenic properties. In Arabidopsis thaliana, hydrolysis by the enzyme, myrosinase, produces bioactive nitriles, epithionitriles, or isothiocyanates depending upon the plant’s genotype and the glucosinolate’s structure. A major determinant of this structural specificity is the epithiospecifier locus (ESP), whose protein causes the formation of epithionitriles and nitriles. A quantitative trait locus (QTL) on chromosome 3 epistatically affects nitrile formation in combination with ESP; this QTL has been termed EPITHIOSPECIFIER MODIFIER1 (ESM1). We identified a myrosinase-associated protein as the ESM1 QTL in Arabidopsis using map-based cloning with recombinant inbred lines, natural variation transcriptomic analysis, and metabolic profiling. In planta and in vitro analyses with natural ESM1 alleles, ESM1 knockouts, and overexpression lines show that ESM1 represses nitrile formation and favors isothiocyanate production. The glucosinolate hydrolysis profile change influenced by ESM1 is associated with the ability to deter herbivory by Trichoplusia ni. This gene could provide unique approaches toward improving human nutrition.	Abstract
	Additional References

RELATED GEPHE

No matches found.	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS

@Epistasis