

# GEPHE SUMMARY

UDP-glycosyltransferase 89A2 ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> Gephebase=^UDP-glycosyltransferase 89A2^#gephebase-summary-title)	Gephebase Gene	GP00001278	Gepheid
Published	Entry Status	Arnoult	Main curator

## PHENOTYPIC CHANGE

Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> Category=^Physiology^#gephebase-summary-title)	Trait Category
Plant secondary metabolites (xylosides vs. glucosides ratio) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Plant+secondary+metabolites">https://www.gephebase.org/search-criteria?/and+Trait=^Plant secondary metabolites</a> (xylosides vs. glucosides ratio)^#gephebase-summary-title)	Trait
Arabidopsis thaliana- Col-0	Trait State in Taxon A
Arabidopsis thaliana- C24	Trait State in Taxon B
Unknown	Ancestral State
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> Status=^Intraspecific^#gephebase-summary-title)	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> )	
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; Camelinae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; 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 Infraspecies?	Yes	is Taxon B an Infraspecies?
Arabidopsis thaliana- Col-0	Taxon A Description	Arabidopsis thaliana- C24	Taxon B Description

## GENOTYPIC CHANGE

UGT89A2	Generic Gene Name	UniProtKB Arabidopsis thaliana
F12E4.260; F12E4_260; At5g03490	Synonyms	GenebankID or UniProtKB
3702.AT5G03490.1 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT5G03490.1">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT5G03490.1</a> )	String	831823 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/831823">https://www.ncbi.nlm.nih.gov/nuccore/831823</a> )
Belongs to the UDP-glycosyltransferase family.	Sequence Similarities	
GO:0080043 : quercetin 3-O-glucosyltransferase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0080043">https://www.ebi.ac.uk/QuickGO/term/GO:0080043</a> ) GO:0080044 : quercetin 7-O-glucosyltransferase activity	GO - Molecular Function	

(<https://www.ebi.ac.uk/QuickGO/term/GO:0080044>)  
GO:0035251 : UDP-glucosyltransferase activity  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035251>)  
GO:0008194 : UDP-glycosyltransferase activity  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008194>)

GO - Biological Process

- GO - Cellular Component

GO:0043231 : intracellular membrane-bounded organelle  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0043231>)

Presumptive Null

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

Molecular Type

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

Exploiting natural variation of secondary metabolism identifies a gene controlling the glycosylation diversity of dihydroxybenzoic acids in *Arabidopsis thaliana*. (2014)  
(<https://pubmed.ncbi.nlm.nih.gov/25173843>)

Authors

Li X; Svedin E; Mo H; Atwell S; Dilkes BP; Chapple C

Abstract

Plant secondary metabolism is an active research area because of the unique and important roles the specialized metabolites have in the interaction of plants with their biotic and abiotic environment, the diversity and complexity of the compounds and their importance to human medicine. Thousands of natural accessions of *Arabidopsis thaliana* characterized with increasing genomic precision are available, providing new opportunities to explore the biochemical and genetic mechanisms affecting variation in secondary metabolism within this model species. In this study, we focused on four aromatic metabolites that were differentially accumulated among 96 *Arabidopsis* natural accessions as revealed by leaf metabolic profiling. Using UV, mass spectrometry, and NMR data, we identified these four compounds as different dihydroxybenzoic acid (DHBA) glycosides, namely 2,5-dihydroxybenzoic acid (gentisic acid) 5-O- $\beta$ -D-glucoside, 2,3-dihydroxybenzoic acid 3-O- $\beta$ -D-glucoside, 2,5-dihydroxybenzoic acid 5-O- $\beta$ -D-xyloside, and 2,3-dihydroxybenzoic acid 3-O- $\beta$ -D-xyloside. Quantitative trait locus (QTL) mapping using recombinant inbred lines generated from C24 and Col-0 revealed a major-effect QTL controlling the relative proportion of xylosides vs. glucosides. Association mapping identified markers linked to a gene encoding a UDP glycosyltransferase gene. Analysis of Transfer DNA (T-DNA) knockout lines verified that this gene is required for DHBA xylosylation in planta and recombinant protein was able to xylosylate DHBA in vitro. This study demonstrates that exploiting natural variation of secondary metabolism is a powerful approach for gene function discovery.

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Additional References

## RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

## EXTERNAL LINKS

## COMMENTS

putative null mutation