

PER36 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~PER36^#gephebase-summary-title)	Gephebase Gene	GP00001273	GepheID
Published	Entry Status	Arnoult	Main curator

Physiology (#gephebase-summary-title)		Trait Category
Mucilage (seeds) (#gephebase-summary-title)		Trait
Arabidopsis thaliana- Col-0		Trait State in Taxon A
Arabidopsis thaliana Sk-1-1		Trait State in Taxon B
Data not curated		Ancestral State
Intraspecific (#gephebase-summary-title)		Taxonomic Status
Taxon A	Taxon B	
Arabidopsis thaliana (#gephebase-summary-title)	Arabidopsis thaliana (#gephebase-summary-title)	Latin Name
thale cress	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	thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms
species	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	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) (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)	Parent
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)	NCBI Taxonomy ID
Yes	Yes	is Taxon A an Intraspecies?
Arabidopsis thaliana- Col-0	Arabidopsis thaliana Sk-1-1	Taxon A Description

PER36	Generic Gene Name	UniProtKB Arabidopsis thaliana
	Synonyms	Q9SD46 (http://www.uniprot.org/uniprot/Q9SD46)
PER36; peroxidase 36; P36; At3g50990; F24M12.30	String	GenebankID or UniProtKB
3702.AT3G50990.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier= 3702.AT3G50990.1)	Sequence Similarities	
Belongs to the peroxidase family. Classical plant (class III) peroxidase subfamily.		
GO - Molecular Function		
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)		
GO:0020037 : heme binding (https://www.ebi.ac.uk/QuickGO/term/GO:0020037)		
GO:0004601 : peroxidase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004601)		
GO - Biological Process		

GO:0006979 : response to oxidative stress
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006979>)
GO:0042744 : hydrogen peroxide catabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042744>)
GO:0044347 : cell wall polysaccharide catabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0044347>)
GO:0080001 : mucilage extrusion from seed coat
(<https://www.ebi.ac.uk/QuickGO/term/GO:0080001>)

GO - Cellular Component

GO:0005576 : extracellular region (<https://www.ebi.ac.uk/QuickGO/term/GO:0005576>)
GO:0009505 : plant-type cell wall (<https://www.ebi.ac.uk/QuickGO/term/GO:0009505>)

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

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

SNP Coding Change

Nonsense

Molecular Details of the Mutation

Tyrosine @position 262bp to a stop codon

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

A naturally occurring mutation in an Arabidopsis accession affects a beta-D-galactosidase that increases the hydrophilic potential of rhamnogalacturonan I in seed mucilage. (2007)
(<https://pubmed.ncbi.nlm.nih.gov/18165330>)

Authors

Macquet A; Ralet MC; Loudet O; Kronenberger J; Mouille G; Marion-Poll A; North HM

Abstract

The Arabidopsis thaliana accession Shahdara was identified as a rare naturally occurring mutant that does not liberate seed mucilage on imbibition. The defective locus was found to be allelic to the mum2-1 and mum2-2 mutants. Map-based cloning showed that MUCILAGE-MODIFIED2 (MUM2) encodes the putative beta-D-galactosidase BGAL6. Activity assays demonstrated that one of four major beta-D-galactosidase activities present in developing siliques is absent in mum2 mutants. No difference was observed in seed coat epidermal cell structure between wild-type and mutant seed; however, weakening of the outer tangential cell wall by chemical treatment resulted in the release of mucilage from mum2 seed coat epidermal cells, and the mum2 mucilage only increased slightly in volume, relative to the wild type. Consistent with the absence of beta-D-galactosidase activity in the mutant, the inner layer of mucilage contained more Gal. The allocation of polysaccharides between the inner and outer mucilage layers was also modified in mum2. Mass spectrometry showed that rhamnogalacturonan I in mutant mucilage had more branching between rhamnose and hexose residues relative to the wild type. We conclude that the MUM2/BGAL6 beta-D-galactosidase is required for maturation of rhamnogalacturonan I in seed mucilage by the removal of galactose/galactan branches, resulting in increased swelling and extrusion of the mucilage on seed hydration.

Additional References

Spatiotemporal secretion of PEROXIDASE36 is required for seed coat mucilage extrusion in Arabidopsis. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23572548>)

RELATED GEPHE

Related Genes

2 (mucilage-modified 2 (mum2), PME16) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~3702~/and+Trait=Mucilage/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Null mutation

