GEPHE SUMMARY

Gephebase Gene
GLABROUS1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^GLABROUS1^#gephebase-summary-title)

GepheID
GP00001242

Entry Status
Published

Main curator
Courtier

PHENOTYPIC CHANGE

Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait
Trichome density (leaf) (https://www.gephebase.org/search-criteria?/and+Trait=^Trichome density (leaf)^#gephebase-summary-title)

Trait State in Taxon A
Arabidopsis thaliana haplotype A (28 accessions)

Trait State in Taxon B
Arabidopsis thaliana haplotype B (66 accessions) - Glabrous

Ancestral State
Data not curated

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
GL1

Synonyms
ATGL1; ATMYB0; GL1; GLABRA 1; myb domain protein 0; TRICHOME DIFFERENTIATION PROTEIN GL1; MYB0; At3g27920; K16N12.17

String
3702.AT3G27920.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT3G27920.1)

Sequence Similarities
-

GO - Molecular Function
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)
GO:0044212 : transcription regulatory region DNA binding

UniProtKB Arabidopsis thaliana
P27900 (http://www.uniprot.org/uniprot/P27900)

GenebankID or UniProtKB
ABD65321 (https://www.ncbi.nlm.nih.gov/nuccore/ABD65321)

(https://www.ebi.ac.uk/QuickGO/term/GO:0044212)
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)

GO - Biological Process

GO:0030154 : cell differentiation (https://www.ebi.ac.uk/QuickGO/term/GO:0030154)
GO:0009740 : gibberellic acid mediated signaling pathway
(https://www.ebi.ac.uk/QuickGO/term/GO:0009740)
GO:0001708 : cell fate specification (https://www.ebi.ac.uk/QuickGO/term/GO:0001708)
GO:0009867 : jasmonic acid mediated signaling pathway
(https://www.ebi.ac.uk/QuickGO/term/GO:0009867)
GO:0010026 : trichome differentiation
(https://www.ebi.ac.uk/QuickGO/term/GO:0010026)
GO:0032880 : regulation of protein localization
(https://www.ebi.ac.uk/QuickGO/term/GO:0032880)
GO:2000039 : regulation of trichome morphogenesis
(https://www.ebi.ac.uk/QuickGO/term/GO:2000039)
GO:0048629 : trichome patterning (https://www.ebi.ac.uk/QuickGO/term/GO:0048629)

GO - Cellular Component

GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#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

high frequency pattern of polymorphism identified in the third exon and 3′ flank

Experimental Evidence

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

Main Reference

Trichome distribution in Arabidopsis thaliana and its close relative Arabidopsis lyrata: molecular analysis of the candidate gene GLABROUS1. (2001)
(https://pubmed.ncbi.nlm.nih.gov/11504855)

Authors

Hauser MT; Harr B; SchlÃ¶tterer C

Abstract

GLABROUS1 (GL1) belongs to the large family of MYB transcription factors and is known to play a central role in trichome initiation. We studied trichome distribution and the molecular variation of GL1 in 28 A. thaliana accessions. Trichome density on rosette leaves was highly variable among those accessions. On the molecular level, we detected substantial sequence variation in a 3-kb fragment which included the complete coding region of the GL1 locus (pi = 0.01). Phylogenetic analysis of GL1 indicates the presence of two diverged clades among 28 accessions. Using ANOVA, we show that the phenotypic variation in trichome density cannot be explained by the sequence divergence between the two phylogenetic lineages. Sequence analysis of wild-type Arabidopsis thaliana and Arabidopsis lyrata accessions indicates that all amino acid substitutions are located outside of the conserved helix-turn-helix DNA-binding domains R2 and R3. Using plants of A. thaliana and A. lyrata with either naturally occurring or ethyl methane sulfonate--induced glabrous phenotypes, we demonstrate that the last 14 C-terminal amino acids of the GL1 gene have no major impact on the initiation of trichomes.

Additional References

Trichome distribution in Arabidopsis thaliana and its close relative Arabidopsis lyrata: molecular analysis of the candidate gene GLABROUS1. (2001)
(https://pubmed.ncbi.nlm.nih.gov/11504855)

RELATED GEPHE

Related Genes

2 (AtMYC1, ETC2) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Trichome density/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

4 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^GLABROUS1^/and+Taxon ID=^3702^/or+Gene Gephebase=^GLABROUS1^/and+Taxon ID=^3702^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS

Based on previous mappings showing the involvement of GL1 locus on trichome density. Mean trichome densities were 10.82 and 13.13 for haplogroups A and B; respectively; yielding a 17.6% difference between groups and accounting for 11% of the trichome density variation observed in the set of 94 lines