GEPHE SUMMARY

Gephebase Gene

ODORANT1 [pseudo-replication between 2 ODO1 entries due to possible homology between alleles] (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^ODORANT1 [pseudo-replication between 2 ODO1 entries due to possible homology between alleles]^#gephebase-summary-title)

Entry Status

Published

GepheID

GP00000751

Main curator

Martin

PHENOTYPIC CHANGE

Trait Category

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

Trait

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

Trait State in Taxon A

Petunia hybrida - R27 (scentless)

Trait State in Taxon B

Petunia hybrida - Mitchell (odorant)

Ancestral State

Data not curated

Taxonomic Status

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

Taxon A

Latin Name

Petunia x hybrida (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Petunia x hybrida^#gephebase-summary-title)

Common Name

-

Synonyms

Petunia axillaris X Petunia integrifolia; Petunia hybrida; garden petunia; Petunia x hybrida hort. ex E.Vilm., 1863

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Petunioideae; Petunia

Parent

Petunia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4101)

NCBI Taxonomy ID

4102 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4102)

is Taxon A an Infraspecies?

Yes

Taxon A Description

Petunia hybrida - R27 (scentless)

Taxon B

Latin Name

Petunia x hybrida (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Petunia x hybrida^#gephebase-summary-title)

Common Name

-

Synonyms

Petunia axillaris X Petunia integrifolia; Petunia hybrida; garden petunia; Petunia x hybrida hort. ex E.Vilm., 1863

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Petunioideae; Petunia

Parent

Petunia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4101)

NCBI Taxonomy ID

4102 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4102)

is Taxon B an Infraspecies?

Yes

Taxon B Description

Petunia hybrida - Mitchell (odorant)

GENOTYPIC CHANGE

Generic Gene Name

ODO1

Synonyms

-

String

-

Sequence Similarities

-

GO - Molecular Function

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

GO - Biological Process

-

GO - Cellular Component

UniProtKB Petunia hybrida

Q50EX6 (http://www.uniprot.org/uniprot/Q50EX6)

GenebankID or UniProtKB

AY705977 (https://www.ncbi.nlm.nih.gov/nuccore/AY705977)

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

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

Aberration Type

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

Molecular Details of the Mutation

C/T substitution in enhancer region MYB-TF binding site

Experimental Evidence

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

Main Reference

The transcription factor EMISSION OF BENZENOIDS II activates the MYB ODORANT1 promoter at a MYB binding site specific for fragrant petunias. (2011) (https://pubmed.ncbi.nlm.nih.gov/21585571)

Authors

Van Moerkercke A; Haring MA; Schuurink RC

Abstract

Fragrance production in petunia flowers is highly regulated. Two transcription factors, ODORANT1 (ODO1) and EMISSION OF BENZENOIDS II (EOBII) have recently been identified as regulators of the volatile benzenoid/phenylpropanoid pathway in petals. Unlike the non-fragrant Petunia hybrida cultivar R27, the fragrant cultivar Mitchell highly expresses ODO1. Using stable reporter lines, we identified the 1.2-kbp ODO1 promoter from Mitchell that is sufficient for tissue-specific, developmental and rhythmic expression. This promoter fragment can be activated in non-fragrant R27 petals, indicating that the set of trans-acting factors driving ODO1 expression is conserved in these two petunias. Conversely, the 1.2-kbp ODO1 promoter of R27 is much less active in Mitchell petals. Transient transformation of 5′ deletion and chimeric Mitchell and R27 ODO1 promoter reporter constructs in petunia petals identified an enhancer region, which is specific for the fragrant Mitchell cultivar and contains a putative MYB binding site (MBS). Mutations in the MBS of the Mitchell promoter decreased overall promoter activity by 50%, highlighting the importance of the enhancer region. We show that EOBII binds and activates the ODO1 promoter via this MBS, establishing a molecular link between these two regulators of floral fragrance biosynthesis in petunia.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS