GEPHE SUMMARY

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

GepheID
GP00000219

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Drosophila (Sophophora) spp.

Trait State in Taxon B
Drosophila melanogaster

Ancestral State
Data not curated

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

Taxon A

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

Common Name
-

Synonyms
Drosophila (Drosophila); Drosophila (Drosophila) Fallen, 1823

Rank
subgenus

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila

Parent
Drosophila (fruit flies) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7215)

NCBI Taxonomy ID
32281 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32281)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
fruit fly

Synonyms
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup

Parent
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)

NCBI Taxonomy ID
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
desatF

Synonyms
-

String
-

Sequence Similarities
Belongs to the fatty acid desaturase type 1 family.

GO - Molecular Function
GO:0016717 : oxidoreductase activity, acting on paired donors, with oxidation of a pair of donors resulting in the reduction of molecular oxygen to two molecules of water (https://www.ebi.ac.uk/QuickGO/term/GO:0016717)

GO - Biological Process
GO:0006633 : fatty acid biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0006633)

UniProtKB Drosophila melanogaster
A7DZ97 (http://www.uniprot.org/uniprot/A7DZ97)

GenebankID or UniProtKB
AM773627 (https://www.ncbi.nlm.nih.gov/nuccore/AM773627)

GO - Cellular Component

GO:0016021 : integral component of membrane
(https://www.ebi.ac.uk/QuickGO/term/GO:0016021)

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

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

Molecular Details of the Mutation

Enrichment/gain of DSX binding sites

Experimental Evidence

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

Main Reference

Evolution of a desaturase involved in female pheromonal cuticular hydrocarbon biosynthesis and courtship behavior in Drosophila. (2008) (https://pubmed.ncbi.nlm.nih.gov/18207084)

Authors

Legendre A; Miao XX; Da Lage JL; Wicker-Thomas C

Abstract

Drosophila species exhibit polymorphism in female pheromonal cuticular hydrocarbons, with 7-monoenes produced in Drosophila simulans and 7,11-dienes in most populations of Drosophila melanogaster (5,9-dienes in several African populations). A female-biased desaturase, desatF, expressed only in D. melanogaster is involved in the synthesis of 7,11-dienes. We investigated the role of desatF in 5,9-diene flies. We constructed a 5,9-diene strain knock-down for desatF and showed that desatF is involved in 5,9-diene formation. We also studied D. melanogaster/D. simulans hybrids. These hybrid females produced dienes and received normal courtship from D. melanogaster males, but copulation success was reduced. With D. simulans males, courtship was decreased and no copulation occurred. Hybrids with a chromosomal deletion of the D. melanogaster desatF gene had no dienes and received normal courtship from D. simulans males; depending on the D. simulans parental strain, 7-19% of them succeeded in mating. D. simulans desatF promoter region shows 21-23% gaps and 86-89% identity with D. melanogaster promoter region, the coding region 93-94% identity, depending on the strain. These differences could explain the functional polymorphism of desatF observed between both species, contributing to different cuticular hydrocarbon profiles, that constitute an effective barrier between species.

Additional References

Rapid evolution of sex pheromone-producing enzyme expression in Drosophila. (2009) (https://pubmed.ncbi.nlm.nih.gov/19652700)

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^desatF^/and+Taxon ID=^32281^/or+Gene Gephebase=^desatF^/and+Taxon ID=^7227^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS