

GEPHE SUMMARY

Gr5a (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+Gr5a+Gephebase-summary-title)	Gephebase Gene	GP00001997	GepheID
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category+Physiology+Gephebase-summary-title)	Trait Category		
Taste sensitivity (sugar; trehalose) (https://www.gephebase.org/search-criteria?/and+Trait+Taste+sensitivity+(sugar;+trehalose)+Gephebase-summary-title)	Trait		
Drosophila melanogaster - semidominant allele that confers low taste sensitivity to trehalose but does not affect taste sensitivity to glucose; fructose or sucrose.	Trait State in Taxon A		
Drosophila melanogaster - sensitive - derived allele	Trait State in Taxon B		
	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status+Intraspecific+Gephebase-summary-title)	Taxonomic Status		
	Taxon A		Taxon B
Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Drosophila+melanogaster+Gephebase-summary-title)	Latin Name	Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Drosophila+melanogaster+Gephebase-summary-title)	Latin Name
fruit fly	Common Name	fruit fly	Common Name
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	Synonyms	Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	Synonyms
species	Rank	species	Rank
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; Acalypratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	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; Acalypratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	Lineage
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	Parent	melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	Parent
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)	NCBI Taxonomy ID	7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

Gr5a	Generic Gene Name	Q9W497 (http://www.uniprot.org/uniprot/Q9W497)	UniProtKB Drosophila melanogaster
CG15779; Dmel5a; Dmel\CG15779; Gr5; GR5a; GR5A; Gr5A1; GRLU.7; GrLU7; han; LU.7; tre; Tre	Synonyms	()	GenebankID or UniProtKB
7227.FBpp0070768 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0070768)	String		
Belongs to the insect chemoreceptor superfamily. Gustatory receptor (GR) family. Gr5a subfamily.	Sequence Similarities		
GO:0008527 : taste receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008527)	GO - Molecular Function		

GO:0033041 : sweet taste receptor activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0033041>)

GO - Biological Process

GO:0007165 : signal transduction (<https://www.ebi.ac.uk/QuickGO/term/GO:0007165>)
GO:0001582 : detection of chemical stimulus involved in sensory perception of sweet taste
(<https://www.ebi.ac.uk/QuickGO/term/GO:0001582>)
GO:0050916 : sensory perception of sweet taste
(<https://www.ebi.ac.uk/QuickGO/term/GO:0050916>)
GO:0050912 : detection of chemical stimulus involved in sensory perception of taste
(<https://www.ebi.ac.uk/QuickGO/term/GO:0050912>)
GO:0007637 : proboscis extension reflex
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007637>)
GO:0010353 : response to trehalose (<https://www.ebi.ac.uk/QuickGO/term/GO:0010353>)
GO:0050909 : sensory perception of taste
(<https://www.ebi.ac.uk/QuickGO/term/GO:0050909>)

GO - Cellular Component

GO:0016021 : integral component of membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)
GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)

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

Presumptive Null

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

Molecular Type

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

Aberration Type

Nonsynonymous

SNP Coding Change

Nucleotide change: A5681571G - Amino acid change: T218A

Molecular Details of the Mutation

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

Experimental Evidence

	Taxon A	Taxon B	Position
Codon	ACN	GCN	5681571
Amino-acid	Thr	Ala	218

Trehalose sensitivity in *Drosophila* correlates with mutations in and expression of the gustatory receptor gene Gr5a. (2001) (<https://pubmed.ncbi.nlm.nih.gov/11566105>)

Main Reference

Ueno K; Ohta M; Morita H; Mikuni Y; Nakajima S; Yamamoto K; Isono K

Authors

Drosophila taste gene Tre is located on the distal X chromosome and controls gustatory sensitivity to a subset of sugars [1, 2]. Two adjacent, seven-transmembrane domain genes near the Tre locus are candidate genes for Tre. One (CG3171) encodes a rhodopsin family G protein receptor [3, 4], and the other (Gr5a) is a member of a chemosensory gene family encoding a putative gustatory receptor [5-7]. We carried out molecular analyses of mutations in Tre to elucidate their involvement in the gustatory phenotype. Here, we show that Tre mutations induced by P element-mediated genomic deletions disrupt Gr5a gene organization and the expression of Gr5a mRNA, while disruption of the CG3171 gene or its expression was not always associated with mutations in Tre. In flies with the spontaneous mutation Tre(01), both CG3171 and Gr5a mRNAs are transcribed. Coding sequences of these two candidate genes were compared among various strains. A total of three polymorphic sites leading to amino acid changes in CG3171 were not correlated with the gustatory phenotype. Among four nonsynonymous sites in Gr5a, a single nucleotide polymorphism leading to an Ala218Thr substitution in the predicted second intracellular loop cosegregated with Tre(01). Taken together, the mutation analyses support that Gr5a is allelic to Tre.

Abstract

Genetic dimorphism in the taste sensitivity to trehalose in *Drosophila melanogaster*. (1982) (<https://pubmed.ncbi.nlm.nih.gov/00000000.000018>)

Additional References

A single-amino-acid change of the gustatory receptor gene, Gr5a, has a major effect on trehalose sensitivity in a natural population of *Drosophila melanogaster*. (2004) (<https://pubmed.ncbi.nlm.nih.gov/15342513>)

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

