GEPHE SUMMARY

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

GepheID
GP00001989

Entry Status
Published

Main curator
Courtier

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Drosophila melanogaster - low enzyme activity

Trait State in Taxon B
Drosophila melanogaster - RI-42 allele - extremely low enzyme activity

Ancestral State
Taxon A

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

Taxon A

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 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
Adh

Synonyms
adh; ADH; Adh3; BG:DS01486.8; CG32954; CG3481; dADH; DM-ADH; DmADH; Dmel\CG3481; Dreg-1; Reg-1; T16

String
7227.FBpp0100048 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0100048)

Sequence Similarities
Belongs to the short-chain dehydrogenases/reductases (SDR) family.

GO - Molecular Function
GO:0042803 : protein homodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0042803)
GO:0008774 : acetaldehyde dehydrogenase (acetylating) activity

UniProtKB Drosophila melanogaster
P00334 (http://www.uniprot.org/uniprot/P00334)

GenebankID or UniProtKB
M22210 (https://www.ncbi.nlm.nih.gov/nuccore/M22210)

(https://www.ebi.ac.uk/QuickGO/term/GO:0008774)
GO:0004022 : alcohol dehydrogenase (NAD) activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0004022)
GO:0016491 : oxidoreductase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016491)

GO - Biological Process

GO:0006117 : acetaldehyde metabolic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0006117)
GO:0046164 : alcohol catabolic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0046164)
GO:0006066 : alcohol metabolic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0006066)
GO:0048149 : behavioral response to ethanol
(https://www.ebi.ac.uk/QuickGO/term/GO:0048149)
GO:0006067 : ethanol metabolic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0006067)
GO:0006069 : ethanol oxidation (https://www.ebi.ac.uk/QuickGO/term/GO:0006069)
GO:0055114 : oxidation-reduction process
(https://www.ebi.ac.uk/QuickGO/term/GO:0055114)

GO - Cellular Component

GO:0005829 : cytosol (https://www.ebi.ac.uk/QuickGO/term/GO:0005829)
GO:0032991 : protein-containing complex
(https://www.ebi.ac.uk/QuickGO/term/GO:0032991)

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

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

insertion of a complete 5.2kb copia retroviral-like transposable element 240 bp upstream from the distal (adult) adh transcriptional start site

Experimental Evidence

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

Main Reference

Insertion of a copia element 5′ to the Drosophila melanogaster alcohol dehydrogenase gene (adh) is associated with altered developmental and tissue-specific patterns of expression. (1989) (https://pubmed.ncbi.nlm.nih.gov/2470641)

Authors

Strand DJ; McDonald JF

Abstract

The Drosophila melanogaster alcohol dehydrogenase gene (adh) is under the control of two separate promoters (proximal and distal) which are preferentially utilized at the larval and adult life stages, respectively. A variant alcohol dehydrogenase allele (RI-42) isolated from a natural population contains a copia retroviral-like transposable element inserted 240 bp upstream from the distal (adult) adh transcriptional start site. Levels of adh transcripts in the RI-42 variant are reduced in tissues and at life stages where copia is actively expressed and are affected in trans- by mutant alleles at the suppressor-of-white-apricot (su(wa] and suppressor-of-forked (su(f] loci. These suppressor genes have no effect on adh expression in wild-type Drosophila.

Additional References

RELATED GEPHE

Related Genes

19 (Acetylcholinesterase (Ace-2), Aldehyde dehydrogenase (Aldh), CG11699, Cyp12d1, Cyp28d1, Cyp28d1-Cyp28d2, cyp6d2, cyp6g1, glutamate-gated chloride channel (GluCl), GSS (glutathione synthetase), GSTE1-E10 cluster, kin of irre (kire), para (kdr), PHGPx, resistance to dieldrin, RnrS, SOD1, Ugt86Dd, CHKov1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7227^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

4 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^alcohol dehydrogenase (Adh)^/and+Taxon ID=^7227^/or+Gene Gephebase=^alcohol dehydrogenase (Adh)^/and+Taxon ID=^7227^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS

http://flybase.org/reports/FBal0000376