

GEPHE SUMMARY

Gephebase Gene
alcohol dehydrogenase (Adh)

Entry Status
Published

GepheID
GP00001990

Main curator
Courtier

PHENOTYPIC CHANGE

Trait Category
Physiology

Trait
Xenobiotic resistance (alcohol)

Trait State in Taxon A
Drosophila melanogaster - low enzyme activity

Trait State in Taxon B
Drosophila melanogaster - AdhnAC14 allele - no enzyme activity

Ancestral State
Taxon A

Taxonomic Status
Intraspecific

Taxon A

Latin Name
Drosophila melanogaster

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; Acalyptera; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup

Parent
melanogaster subgroup () - (Rank: species subgroup)

NCBI Taxonomy ID
7227

is Taxon A an Intraspecies?
No

Taxon B

Latin Name
Drosophila melanogaster

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; Acalyptera; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup

Parent
melanogaster subgroup () - (Rank: species subgroup)

NCBI Taxonomy ID
7227

is Taxon B an Intraspecies?
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

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

GO - Molecular Function
GO:0042803 : protein homodimerization activity
GO:0008774 : acetaldehyde dehydrogenase (acetylating) activity
GO:0004022 : alcohol dehydrogenase (NAD) activity
GO:0016491 : oxidoreductase activity

GO - Biological Process
GO:0006117 : acetaldehyde metabolic process

UniProtKB Drosophila melanogaster
P00334

GenebankID or UniProtKB
M22210

GO:0046164 : alcohol catabolic process
GO:0006066 : alcohol metabolic process
GO:0048149 : behavioral response to ethanol
GO:0006067 : ethanol metabolic process
GO:0006069 : ethanol oxidation
GO:0055114 : oxidation-reduction process

GO - Cellular Component

GO:0005829 : cytosol
GO:0032991 : protein-containing complex

Presumptive Null

Yes

Molecular Type

Coding

Aberration Type

Insertion

Insertion Size

1-9 bp

Molecular Details of the Mutation

eight extra nucleotides (in two groups of four) in the second intron commencing six bases 3' from the 5' splice site. A stop codon was also found in exon 2. S1 nuclease protection experiments have shown that the insertions in intron 2 disrupt the correct splicing of intron 2. The null allele produces a transcript approximately 100 bases longer than the normal mature adult transcript, and the amount of the null allele transcript is only about 10% of the normal level.

Experimental Evidence

Candidate Gene

Main Reference

Aberant splicing of a naturally occurring alcohol dehydrogenase null activity allele in *Drosophila melanogaster*. (1990)

Authors

Freeth AL; Gibson JB; Wilks AV

Abstract

The DNA sequence of a naturally occurring alcohol dehydrogenase null activity allele, Adh^{AC14}, has eight extra nucleotides (in two groups of four) in the second intron, commencing six bases 3' from the 5' splice site. A stop codon was also found in exon 2. S1 nuclease protection experiments have shown that the insertions in intron 2 disrupt the correct splicing of intron 2. The null allele produces a transcript approximately 100 bases longer than the normal mature adult transcript, and the amount of the null allele transcript is only about 10% of the normal level.

Additional References

Molecular relationships between alcohol dehydrogenase null-activity alleles from natural populations of *Drosophila melanogaster*. (1992)

RELATED GEPHE

Related Genes

17 (Acetylcholinesterase (Ace-2), Aldehyde dehydrogenase (Aldh), CG11699, Cyp12d1, Cyp28d1, Cyp28d1-Cyp28d2, cyp6d2, cyp6g1, GSS (glutathione synthetase), GSTE1-E10 cluster, kin of irre (kire), PHGPx, resistance to dieldrin, RnrS, SOD1, Ugt86Dd, CHKov1)

Related Haplotypes

4

EXTERNAL LINKS

COMMENTS

@Splicing - <http://flybase.org/reports/FBal0000377> <http://flybase.org/reports/FBal0000385>