

GEPHE SUMMARY

<p>glycerol-3-phosphate dehydrogenase (Gpdh) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=glycerol-3-phosphate+dehydrogenase+(Gpdh)^#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>GP00001998</p> <p>Courtier</p> <p>Entry Status</p>	<p>GepheID</p> <p>Main curator</p>
---	---	------------------------------------

PHENOTYPIC CHANGE

<p>Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=Physiology^#gephebase-summary-title)</p> <p>Enzymatic activity (https://www.gephebase.org/search-criteria?/and+Trait=Enzymatic+activity^#gephebase-summary-title)</p> <p>Drosophila melanogaster - wild-type activity</p> <p>Drosophila melanogaster - reduced activity</p> <p>Taxon A</p> <p>Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Intraspecific^#gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon A</p> <p>Latin Name</p> <p>Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Drosophila+melanogaster^#gephebase-summary-title)</p> <p>Common Name</p> <p>fruit fly</p> <p>Synonyms</p> <p>Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>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</p> <p>Parent</p> <p>melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)</p> <p>NCBI Taxonomy ID</p> <p>7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)</p> <p>is Taxon A an Intraspecies?</p> <p>No</p>	<p>Taxon B</p> <p>Latin Name</p> <p>Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Drosophila+melanogaster^#gephebase-summary-title)</p> <p>Common Name</p> <p>fruit fly</p> <p>Synonyms</p> <p>Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>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</p> <p>Parent</p> <p>melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)</p> <p>NCBI Taxonomy ID</p> <p>7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)</p> <p>is Taxon B an Intraspecies?</p> <p>No</p>
---	---	---	---

GENOTYPIC CHANGE

<p>Gpdh</p> <p>GPD; alpha-GPD; alpha-Gpdh; alpha-GPDH; alpha-GPDH-1; alphaGpd; alphaGpdh; alphaGPDH; alphaGpdh-1; CG9042; dGpdh; Dmel\CG9042; DmG3PDH; DROGPDHA; G3pdh; G3PDH; GAPDH; Gdh; Gpd; GPDA; gpdh; Gpdh; GPDH; gpdh-1; GPDH-1; sn-Gpdh</p> <p>String</p> <p>7227.FBpp0305431 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0305431)</p> <p>Sequence Similarities</p> <p>Belongs to the NAD-dependent glycerol-3-phosphate dehydrogenase family.</p> <p>GO - Molecular Function</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>UniProtKB Drosophila melanogaster</p> <p>P13706 (http://www.uniprot.org/uniprot/P13706)</p> <p>GenebankID or UniProtKB</p>
--	--	---

GO:0042803 : protein homodimerization activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042803>)
GO:0051287 : NAD binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0051287>)
GO:0004367 : glycerol-3-phosphate dehydrogenase [NAD+] activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0004367>)

GO - Biological Process

GO:0005975 : carbohydrate metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005975>)
GO:0006067 : ethanol metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006067>)
GO:0055114 : oxidation-reduction process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0055114>)
GO:0006641 : triglyceride metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006641>)
GO:0055093 : response to hyperoxia (<https://www.ebi.ac.uk/QuickGO/term/GO:0055093>)
GO:0007629 : flight behavior (<https://www.ebi.ac.uk/QuickGO/term/GO:0007629>)
GO:0046168 : glycerol-3-phosphate catabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0046168>)
GO:0006072 : glycerol-3-phosphate metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006072>)
GO:0006650 : glycerophospholipid metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006650>)
GO:0006116 : NADH oxidation (<https://www.ebi.ac.uk/QuickGO/term/GO:0006116>)

GO - Cellular Component

GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)
GO:0030018 : Z disc (<https://www.ebi.ac.uk/QuickGO/term/GO:0030018>)
GO:0009331 : glycerol-3-phosphate dehydrogenase complex
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009331>)
GO:0031430 : M band (<https://www.ebi.ac.uk/QuickGO/term/GO:0031430>)

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 8kb blood retrotransposon in the 3' region of the Gpdh gene 66bp downstream of the stop codon. This mutation induces a GPDH isozyme-GPDH-4-and alters the pattern of expression of the three normal isozymes-GPDH-1 to GPDH-3.

Experimental Evidence

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

Main Reference

Retrotransposon insertion induces an isozyme of sn-glycerol-3-phosphate dehydrogenase in Drosophila melanogaster. (1995) (<https://pubmed.ncbi.nlm.nih.gov/8618845>)

Authors

Wilanowski TM; Gibson JB; Symonds JE

Abstract

The insertion of the blood retrotransposon into the untranslated region of exon 7 of the sn-glycerol-3-phosphate dehydrogenase-encoding gene (Gpdh) in Drosophila melanogaster induces a GPDH isozyme-GPDH-4-and alters the pattern of expression of the three normal isozymes-GPDH-1 to GPDH-3. The process of transcript terminus formation inside the retrotransposon insertion reduces the level of the Gpdh transcript that contains exon 8 and increases the level of the transcript that contains exons 1-7. The induced GPDH-4 isozyme is a translation product of the three transcripts that contain fragments of the blood retrotransposon. The mechanism of mutagenesis by the blood insertion is postulated to involve the pause or termination of transcription within the blood sequence, which in turn is caused by the interference of a DNA-binding protein with the RNA polymerase. Thus, we show the formation of a new functional GPDH protein by the insertion of a transposable element and discuss the evolutionary significance of this phenomenon.

Additional References

RELATED GEPHE

Related Genes

3 (Dopa oxidase-3 (Dox-3), prophenoloxidase 1 (PPO1), tryptophan phenylalanine hydroxylase) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=~7227~/and+Trait=Enzymatic+activity/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

1 ([https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~glycerol-3-phosphate+dehydrogenase+\(Gpdh\)~/and+Taxon+ID=~7227~/or+Gene+Gephebase=~glycerol-3-phosphate+dehydrogenase+\(Gpdh\)~/and+Taxon+ID=~7227~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~glycerol-3-phosphate+dehydrogenase+(Gpdh)~/and+Taxon+ID=~7227~/or+Gene+Gephebase=~glycerol-3-phosphate+dehydrogenase+(Gpdh)~/and+Taxon+ID=~7227~#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

@TE - <http://flybase.org/reports/FBal0048805>

