

GEPHE SUMMARY

<p>hsp70Ba (https://www.gephebase.org/search-criteria?/and+GeneGephebase=hsp70Ba#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00002004</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
---	---	-----------------------------------	------------------------------------

PHENOTYPIC CHANGE

<p>Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=Physiology#gephebase-summary-title)</p> <p>Temperature tolerance (https://www.gephebase.org/search-criteria?/and+Trait=Temperature tolerance#gephebase-summary-title)</p> <p>Drosophila melanogaster - wild-type tolerance</p> <p>Drosophila melanogaster - lower tolerance</p> <p>Taxon A</p> <p>Intraspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=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; Acalyptratae; 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; Acalyptratae; 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>Yes</p> <p>Taxon B Description</p> <p>T32 population - collected in Chad; Africa in 1977</p>
--	---	--	--

GENOTYPIC CHANGE

<p>Hsp70Ba</p> <p>CG31449; dhsp70; dHsp70; Dm-hsp70; Dmel\CG31449; Hsp 70; hsp-70; Hsp-70; hsp70; Hsp70; HSP70; hsp70 87C; hsp70 Ba; Hsp70(87C); hsp70b; hsp70B; Hsp70B; hsp70ba; hsp70Ba</p> <p>7227.FBpp0082107 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0082107)</p> <p>Belongs to the heat shock protein 70 family.</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>Q8IN18 (http://www.uniprot.org/uniprot/Q8IN18)</p> <p>()</p> <p>UniProtKB Drosophila melanogaster</p> <p>GenebankID or UniProtKB</p>
---	--	---

GO:0005524 : ATP binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0005524>)
GO:0031072 : heat shock protein binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0031072>)
GO:0051082 : unfolded protein binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0051082>)
GO:0016887 : ATPase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0016887>)
GO:0042623 : ATPase activity, coupled (<https://www.ebi.ac.uk/QuickGO/term/GO:0042623>)
GO:0051787 : misfolded protein binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0051787>)
GO:0044183 : protein folding chaperone (<https://www.ebi.ac.uk/QuickGO/term/GO:0044183>)

GO - Biological Process

GO:0001666 : response to hypoxia (<https://www.ebi.ac.uk/QuickGO/term/GO:0001666>)
GO:0034605 : cellular response to heat (<https://www.ebi.ac.uk/QuickGO/term/GO:0034605>)
GO:0009408 : response to heat (<https://www.ebi.ac.uk/QuickGO/term/GO:0009408>)
GO:0034620 : cellular response to unfolded protein (<https://www.ebi.ac.uk/QuickGO/term/GO:0034620>)
GO:0051085 : chaperone cofactor-dependent protein refolding (<https://www.ebi.ac.uk/QuickGO/term/GO:0051085>)
GO:0035080 : heat shock-mediated polytene chromosome puffing (<https://www.ebi.ac.uk/QuickGO/term/GO:0035080>)
GO:0042026 : protein refolding (<https://www.ebi.ac.uk/QuickGO/term/GO:0042026>)
GO:0006986 : response to unfolded protein (<https://www.ebi.ac.uk/QuickGO/term/GO:0006986>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)

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

A 1447 bp fragment corresponding to the 39 end of a jockey element is inserted 107 bps upstream of the hsp70Ba transcription start site in the T strain. The insertion intervenes between HSEs 2 and 3; displacing HSEs 3 and 4 as well as three GAGA elements.

Experimental Evidence

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

Main Reference

Modification of heat-shock gene expression in *Drosophila melanogaster* populations via transposable elements. (2003) (<https://pubmed.ncbi.nlm.nih.gov/12519916>)

Authors

Lerman DN; Michalak P; Helin AB; Bettencourt BR; Feder ME

Abstract

We report multiple cases in which disruption of hsp70 regulatory regions by transposable element (TE) insertions underlies natural variation in expression of the stress-inducible molecular chaperone Hsp70 in *Drosophila melanogaster*. Three *D. melanogaster* populations from different continents are polymorphic for jockey or P element insertions in the promoter of the hsp70Ba gene. All three TE insertions are within the same 87-bp region of hsp70Ba promoter, and we suggest that the distinctive promoter architecture of hsp genes may make them vulnerable to TE insertions. Each of the TE insertions reduces Hsp70 levels, and RNase protection assays demonstrate that such insertions can reduce transcription of the hsp70Ba gene. In addition, the TEs alter two measures of organismal fitness, inducible thermotolerance and female reproductive success. Thus, transposition can create quantitative genetic variation in gene expression within populations, on which natural selection can act.

Additional References

RELATED GEPHE

Related Genes

1 (lncRNA:Hsr omega) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=~7227~/and+Trait=Temperature+tolerance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

2 (<https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~hsp70Ba~/and+Taxon+ID=~7227~/or+Gene+Gephebase=~hsp70Ba~/and+Taxon+ID=~7227~#gephebase-summary-title>)

EXTERNAL LINKS

COMMENTS

@TE - <http://flybase.org/reports/FBa0147840.html>

