

## GEPHE SUMMARY

<p>hsp70Ba (<a +hsp70ba+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+hsp70Ba+"#gephebase-summary-title</a>)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00002005</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
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## PHENOTYPIC CHANGE

<p>Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title</a>)</p> <p>Temperature tolerance (<a +temperature+tolerance+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Temperature+tolerance+"#gephebase-summary-title</a>)</p> <p>Drosophila melanogaster - wild-type tolerance</p> <p>Drosophila melanogaster - lower tolerance - Evolution Canyon allele</p> <p>Taxon A</p> <p>Intraspecific (<a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific+"#gephebase-summary-title</a>)</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>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">Taxon A</td> <td style="width: 50%; text-align: center;">Taxon B</td> </tr> <tr> <td style="vertical-align: top;"> <p>Drosophila melanogaster (<a +drosophila+melanogaster+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Drosophila+melanogaster+"#gephebase-summary-title</a>)</p> <p>fruit fly</p> <p>Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster</p> <p>species</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>melanogaster subgroup () - (Rank: species subgroup) (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351</a>)</p> <p>7227 (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227</a>)</p> <p>No is Taxon A an Intraspecies?</p> </td> <td style="vertical-align: top;"> <p>Drosophila melanogaster (<a +drosophila+melanogaster+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Drosophila+melanogaster+"#gephebase-summary-title</a>)</p> <p>fruit fly</p> <p>Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster</p> <p>species</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>melanogaster subgroup () - (Rank: species subgroup) (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351</a>)</p> <p>7227 (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227</a>)</p> <p>Yes is Taxon B an Intraspecies?</p> <p>Taxon B Description</p> <p>flies were collected from the north-facing slope (NFS) of Evolution Canyon (Lower Nahal Oren; Mt. 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Lineage	Lineage																					
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## 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 (<a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0082107">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0082107</a>)</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>Q8INI8 (<a href="http://www.uniprot.org/uniprot/Q8INI8">http://www.uniprot.org/uniprot/Q8INI8</a>)</p> <p>()</p>	<p>UniProtKB Drosophila melanogaster</p> <p>GenebankID or UniProtKB</p>
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GO - Molecular Function

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>)

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

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

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

1-10 kb Insertion Size

Insertion of a 1222bp non-autonomous P-element at position -184 relative to the Hsp70Ba transcription start site. The P-element intervenes between the second and third heat shock response elements (HSEs). Molecular Details of the Mutation

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

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

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

**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

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 Genes

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>) Related Haplotypes

EXTERNAL LINKS

COMMENTS

