

## GEPHE SUMMARY

	Gephebase Gene	GephelD
PPAR-gamma ( <a href="https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^PPAR-gamma">#gephebase-summary-title)</a>	GP00002664	Main curator
	Entry Status	Courtier
Published		

## PHENOTYPIC CHANGE

	Trait Category		
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology">#gephebase-summary-title)</a>	Trait		
Fertility ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Fertility">#gephebase-summary-title)</a>	Trait State in Taxon A		
-	Trait State in Taxon B		
-	Ancestral State		
Unknown	Taxonomic Status		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific">#gephebase-summary-title)</a>			
Taxon A	Latin Name	Taxon B	Latin Name
Drosophila melanogaster ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila melanogaster">#gephebase-summary-title)</a> )		Drosophila melanogaster ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila melanogaster">#gephebase-summary-title)</a> )	
fruit fly	Common Name	fruit fly	Common Name
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	Synonyms	Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	Synonyms
species	Rank	species	Rank
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; Ephydriodea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	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; Ephydriodea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	Lineage
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> )	Parent	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> )	Parent
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> )	NCBI Taxonomy ID	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> )	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?		is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Drosophila melanogaster
Eip75B	Synonyms	
57B; 75B; anon-WO0172774.31; anon-WO0172774.32; BcDNA:GM02640; CG8127; dE75; DmE75; DmE75A; DmE75B; Dmel\CG8127; E75; E75-C; E75A; E75B; E75C; Eip75; Eip75; Eip75 A; eip75a; Eip75A; eip75B; EP1121b; I(3)07041; I(3)j11A6; I(3)j12E8; I(3)j3A6; I(3)j5E1; I(3)neo25; Mgn00274; NR1D3; Rev-Erb; REV-ERB&agr	P17672 ( <a href="http://www.uniprot.org/uniprot/P17672">http://www.uniprot.org/uniprot/P17672</a> )	
	String	GenebankID or UniProtKB
-	Sequence Similarities	0
Belongs to the nuclear hormone receptor family. NR1 subfamily.	GO - Molecular Function	
GO:0008270 : zinc ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0008270">https://www.ebi.ac.uk/QuickGO/term/GO:0008270</a> )		
GO:0003677 : DNA binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003677">https://www.ebi.ac.uk/QuickGO/term/GO:0003677</a> )		
GO:0004879 : nuclear receptor activity		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0004879>)  
GO:0000978 : RNA polymerase II proximal promoter sequence-specific DNA binding  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000978>)  
GO:0020037 : heme binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0020037>)  
GO - Biological Process  
GO:0045944 : positive regulation of transcription by RNA polymerase II  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045944>)  
GO:0030154 : cell differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0030154>)  
GO:0009755 : hormone-mediated signaling pathway  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009755>)  
GO:0000122 : negative regulation of transcription by RNA polymerase II  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000122>)  
GO:0010468 : regulation of gene expression  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010468>)  
GO:0048477 : oogenesis (<https://www.ebi.ac.uk/QuickGO/term/GO:0048477>)  
GO:0018990 : ecdysis, chitin-based cuticle  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0018990>)  
GO:0007591 : molting cycle, chitin-based cuticle  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007591>)  
GO:0007553 : regulation of ecdysteroid metabolic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007553>)  
GO:0035075 : response to ecdysones (<https://www.ebi.ac.uk/QuickGO/term/GO:0035075>)  
GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

This SNP is biallelic with the T variant being more common in the late-reproducing long-lived populations (average frequency: 0.84 / 0.16) as compared to the early-reproducing populations (average frequency: 0.52 / 0.48).

Experimental Evidence

Association Mapping (<https://www.gepheebase.org/search-criteria?/and+Experimental+Evidence=^Association+Mapping^#gepheebase-summary-title>)

Main Reference

A Single Nucleotide Variant in the PPAR $\gamma$ -homolog Eip75B Affects Fecundity in Drosophila. (2023) (<https://pubmed.ncbi.nlm.nih.gov/36703226>)

Authors

Hoedjes KM; Kostic H; Flatt T; Keller L

Abstract

Single nucleotide polymorphisms are the most common type of genetic variation, but how these variants contribute to the adaptation of complex phenotypes is largely unknown. Experimental evolution and genome-wide association studies have demonstrated that variation in the PPAR $\gamma$ -homolog Eip75B has associated with longevity and life-history differences in the fruit fly *Drosophila melanogaster*. Using RNAi knockdown, we first demonstrate that reduced expression of Eip75B in adult flies affects lifespan, egg-laying rate, and egg volume. We then tested the effects of a naturally occurring SNP within a cis-regulatory domain of Eip75B by applying two complementary approaches: a Mendelian randomization approach using lines of the *Drosophila* Genetic Reference Panel, and allelic replacement using precise CRISPR/Cas9-induced genome editing. Our experiments reveal that this natural polymorphism has a significant pleiotropic effect on fecundity and egg-to-adult viability, but not on longevity or other life-history traits. Our results provide a rare functional validation at the nucleotide level and identify a natural allelic variant affecting fitness and life-history adaptation.

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Additional References

## RELATED GEPHE

6 (bab2, Drip, Sdic gene cluster, InR, PHGPx, RnrS) (<https://www.gepheebase.org/search-criteria?/or+Taxon+ID=^7227^/and+Trait=Fertility/and+groupHaplotypes=true#gepheebase-summary-title>)

Related Genes

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

Validated by @CRISPR. Eip75B has been identified previously as an aging candidate gene by two previous genome-wide association studies.

