

GEPHE SUMMARY

Gephebase Gene		GepheID
Dca (=smp-30) (<a +dca+"(='smp-30)+"#gephebase-summary-title"' href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+Dca+"(=smp-30)+"#gephebase-summary-title)	GP00000214	
	Entry Status	Martin
Published		Main curator

PHENOTYPIC CHANGE

Trait Category			
Morphology (<a +morphology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Morphology+"#gephebase-summary-title)		Trait	
Wing size (<a +wing+size+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Wing+size+"#gephebase-summary-title)		Trait State in Taxon A	
Drosophila melanogaster		Trait State in Taxon B	
Drosophila melanogaster		Ancestral State	
Data not curated		Taxonomic Status	
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)			
Taxon A		Taxon B	
Drosophila melanogaster		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 +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)	
Common Name		Common Name	
fruit fly		fruit fly	
Synonyms		Synonyms	
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster		Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	
Rank		Rank	
species		species	
Lineage		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; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup		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	
Parent		Parent	
melanogaster subgroup () - (Rank: species subgroup)		melanogaster subgroup () - (Rank: species subgroup)	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
7227		7227	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
No		No	

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Drosophila melanogaster	
smp-30		Q9VFG5 (http://www.uniprot.org/uniprot/Q9VFG5)	
Synonyms		GenebankID or UniProtKB	
CG7390; CT22723; Dca; Dmel\CG7390; Smp-30; DmeL_CG7390		AE014298 (https://www.ncbi.nlm.nih.gov/nucleotide/14298)	
String			
-			
Sequence Similarities			
-			
GO - Molecular Function			
GO:0005509 : calcium ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005509)			
GO:0004341 : gluconolactonase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004341)			
GO - Biological Process			
GO:0009631 : cold acclimation (https://www.ebi.ac.uk/QuickGO/term/GO:0009631)			
GO:0044720 : negative regulation of imaginal disc-derived wing size			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0044720>)
GO:0090256 : regulation of cell proliferation involved in imaginal disc-derived wing morphogenesis (<https://www.ebi.ac.uk/QuickGO/term/GO:0090256>)
GO - Cellular Component
GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)

	Presumptive Null
Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)	
	Molecular Type
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title)	
	Aberration Type
Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Unknown^#gephebase-summary-title)	
	Molecular Details of the Mutation
Non-coding	
	Experimental Evidence
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title)	
	Main Reference
Molecular basis of adaptive shift in body size in Drosophila melanogaster: functional and sequence analyses of the Dca gene. (2011) (https://pubmed.ncbi.nlm.nih.gov/21393605)	
	Authors
Lee SF; Chen Y; Varan AK; Wee CW; Rako L; Axford JK; Good RT; Blacket MJ; Reuter C; Partridge L; Hoffmann AA	
	Abstract
Latitudinal body size clines in animals conforming to Bergmann’s rule occur on many continents but isolating their underlying genetic basis remains a challenge. In Drosophila melanogaster, the gene Dca accounts for approximately 5-10% of the natural wing size variation (McKechnie SW, Blacket MJ, Song SV, Rako L, Carroll X, Johnson TK, Jensen LT, Lee SF, Wee CW, Hoffmann AA. 2010. A clinally varying promoter polymorphism associated with adaptive variation in wing size in Drosophila. Mol Ecol. 19:775-784). We present here functional evidence that Dca is a negative regulator of wing size. A significant negative latitudinal cline of Dca gene expression was detected in synchronized third instar larvae. In addition, we clarified the evolutionary history of the three most common Dca promoter alleles (Dca237-1, Dca237-2, and Dca247) and showed that the insertion allele (Dca247), whose frequency increases with latitude, is associated with larger wing centroid size and higher average cell number in male flies. Finally, we showed that the overall linkage disequilibrium (LD) was low in the Dca promoter and that the insertion/deletion polymorphism that defines the Dca alleles was in strong LD with two other upstream sites. Our results provide strong support that Dca is a candidate for climatic adaptation in D. melanogaster.	
	Additional References
A clinally varying promoter polymorphism associated with adaptive variation in wing size in Drosophila. (2010) (https://pubmed.ncbi.nlm.nih.gov/20074315)	

RELATED GEPHE

	Related Genes
No matches found.	
	Related Haplotypes
No matches found.	

EXTERNAL LINKS

COMMENTS

<http://flybase.org/reports/FBaI0266080>