

GEPHE SUMMARY

Gephebase Gene		GepheID
timeless (tim) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^timeless+(tim)^#gephebase-summary-title)	GP00001129	
Entry Status		Main curator
Published		Martin

PHENOTYPIC CHANGE

Trait #1	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title)	Trait
Diapause (https://www.gephebase.org/search-criteria?/and+Trait=^Diapause^#gephebase-summary-title)	Trait State in Taxon A
Drosophila melanogaster - allele s-tim	Trait State in Taxon B
Drosophila melanogaster - allele ls-tim	

Trait #2	Trait Category
Behavior, Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Behavior^/and+Trait+Category=^Physiology^#gephebase-summary-title)	Trait
Locomotor activity (https://www.gephebase.org/search-criteria?/and+Trait=^Locomotor+activity^#gephebase-summary-title)	Trait State in Taxon A
Drosophila melanogaster - allele s-tim	Trait State in Taxon B
Drosophila melanogaster - allele ls-tim - timls flies kept in constant light conditions show locomotor arrhythmicity as do wild-type flies. tims flies show a larger phase response to light pulses than timls flies.	

Ancestral State			
Taxon A	Taxonomic Status	Taxon B	
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+melanogaster^#gephebase-summary-title)		Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+melanogaster^#gephebase-summary-title)	
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; Ephydroidea; 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; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	Lineage
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	Parent	melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	Parent
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)	NCBI Taxonomy ID	7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)	NCBI Taxonomy ID
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
No		No	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Homo sapiens
TIMELESS	Q9UNS1 (http://www.uniprot.org/uniprot/Q9UNS1)	
	Synonyms	GenebankID or UniProtKB
TIM; TIM1; hTIM; TIMELESS1	CAM59650 (https://www.ncbi.nlm.nih.gov/nuccore/CAM59650)	
	String	
9606.ENSPO0000450607 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000450607)		
	Sequence Similarities	
Belongs to the timeless family.		
	GO - Molecular Function	
GO:0042803 : protein homodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0042803)		
GO:0046982 : protein heterodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0046982)		
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)		
	GO - Biological Process	
GO:0000122 : negative regulation of transcription by RNA polymerase II (https://www.ebi.ac.uk/QuickGO/term/GO:0000122)		
GO:0045892 : negative regulation of transcription, DNA-templated (https://www.ebi.ac.uk/QuickGO/term/GO:0045892)		
GO:0051301 : cell division (https://www.ebi.ac.uk/QuickGO/term/GO:0051301)		
GO:0007623 : circadian rhythm (https://www.ebi.ac.uk/QuickGO/term/GO:0007623)		
GO:0042752 : regulation of circadian rhythm (https://www.ebi.ac.uk/QuickGO/term/GO:0042752)		
GO:0030324 : lung development (https://www.ebi.ac.uk/QuickGO/term/GO:0030324)		
GO:0002009 : morphogenesis of an epithelium (https://www.ebi.ac.uk/QuickGO/term/GO:0002009)		
GO:0048754 : branching morphogenesis of an epithelial tube (https://www.ebi.ac.uk/QuickGO/term/GO:0048754)		
GO:0006974 : cellular response to DNA damage stimulus (https://www.ebi.ac.uk/QuickGO/term/GO:0006974)		
GO:0006281 : DNA repair (https://www.ebi.ac.uk/QuickGO/term/GO:0006281)		
GO:0044770 : cell cycle phase transition (https://www.ebi.ac.uk/QuickGO/term/GO:0044770)		
GO:1904976 : cellular response to bleomycin (https://www.ebi.ac.uk/QuickGO/term/GO:1904976)		
GO:0072719 : cellular response to cisplatin (https://www.ebi.ac.uk/QuickGO/term/GO:0072719)		
GO:0072711 : cellular response to hydroxyurea (https://www.ebi.ac.uk/QuickGO/term/GO:0072711)		
GO:0009582 : detection of abiotic stimulus (https://www.ebi.ac.uk/QuickGO/term/GO:0009582)		
GO:0000076 : DNA replication checkpoint (https://www.ebi.ac.uk/QuickGO/term/GO:0000076)		
GO:2000781 : positive regulation of double-strand break repair (https://www.ebi.ac.uk/QuickGO/term/GO:2000781)		
GO:0043111 : replication fork arrest (https://www.ebi.ac.uk/QuickGO/term/GO:0043111)		
GO:0048478 : replication fork protection (https://www.ebi.ac.uk/QuickGO/term/GO:0048478)		
	GO - Cellular Component	
GO:0005654 : nucleoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005654)		
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)		
GO:0000790 : nuclear chromatin (https://www.ebi.ac.uk/QuickGO/term/GO:0000790)		
GO:0000228 : nuclear chromosome (https://www.ebi.ac.uk/QuickGO/term/GO:0000228)		
GO:0031298 : replication fork protection complex (https://www.ebi.ac.uk/QuickGO/term/GO:0031298)		
		Presumptive Null
Yes (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes~#gephebase-summary-title)		
		Molecular Type
Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title)		
		Aberration Type
Insertion (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Insertion~#gephebase-summary-title)		
		Insertion Size
1-9 bp		
		Molecular Details of the Mutation
1bp insertion; allows production of longer protein from upstream start codon		
		Experimental Evidence
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene~#gephebase-summary-title)		
		Main Reference
Natural selection favors a newly derived timeless allele in Drosophila melanogaster. (2007) (https://pubmed.ncbi.nlm.nih.gov/17600215)		
		Authors
Tauber E; Zordan M; Sandrelli F; Pegoraro M; Osterwalder N; Breda C; Daga A; Selmin A; Monger K; Benna C; Rosato E; Kyriacou CP; Costa R		
		Abstract

Circadian and other natural clock-like endogenous rhythms may have evolved to anticipate regular temporal changes in the environment. We report that a mutation in the circadian clock gene timeless in *Drosophila melanogaster* has arisen and spread by natural selection relatively recently in Europe. We found that, when introduced into different genetic backgrounds, natural and artificial alleles of the timeless gene affect the incidence of diapause in response to changes in light and temperature. The natural mutant allele alters an important life history trait that may enhance the fly's adaptation to seasonal conditions.

Additional References

A molecular basis for natural selection at the timeless locus in *Drosophila melanogaster*. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17600216>)

RELATED GEPHE

Related Genes

3 (Catecholamines up, Couch potato, Period (per)) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^7227^/and+Trait=Diapause/or+Taxon ID=^7227^/and+Trait=Locomotor activity/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

<http://flybase.org/reports/FBal0211083> - <http://flybase.org/reports/FBal0211084>