GEPHE SUMMARY

Gephebase Gene
Period (per) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Period (per)^#gephebase-summary-title)

GepheID
GP00002002

Entry Status
Published

Main curator
Courtier

PHENOTYPIC CHANGE

Trait Category
Behavior (https://www.gephebase.org/search-criteria?/and+Trait Category=^Behavior^#gephebase-summary-title)

Trait
Locomotor activity (temperature sensitivity) (https://www.gephebase.org/search-criteria?/and+Trait=^Locomotor activity (temperature sensitivity)^#gephebase-summary-title)

Trait State in Taxon A
Drosophila melanogaster - allele with repeat (Thr-Gly)17

Trait State in Taxon B
Drosophila melanogaster - allele with repeat (Thr-Gly)20

Ancestral State
Data not curated

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila melanogaster^#gephebase-summary-title)

Common Name
fruit fly

Synonyms
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster

Rank
species

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

Parent
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)

NCBI Taxonomy ID
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila melanogaster^#gephebase-summary-title)

Common Name
fruit fly

Synonyms
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster

Rank
species

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

Parent
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)

NCBI Taxonomy ID
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
per

Synonyms
CG2647; Clk; clk-6; Dmel\CG2647; dmper; dper; dPER; EG:155E2.4; mel_per; Per; PER; Per-2

String
7227.FBpp0070455 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0070455)

Sequence Similarities
-

GO - Molecular Function
GO:0042802 : identical protein binding (https://www.ebi.ac.uk/QuickGO/term/GO:0042802)

UniProtKB Drosophila melanogaster
P07663 (http://www.uniprot.org/uniprot/P07663)

GenebankID or UniProtKB
()

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:0008134 : transcription factor binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0008134)
GO:0003714 : transcription corepressor activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0003714)
GO:0003712 : transcription coregulator activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0003712)
GO:0000976 : transcription regulatory region sequence-specific DNA binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0000976)
GO:0001222 : transcription corepressor binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0001222)

GO - Biological Process

GO:0009416 : response to light stimulus
(https://www.ebi.ac.uk/QuickGO/term/GO:0009416)
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:0007616 : long-term memory (https://www.ebi.ac.uk/QuickGO/term/GO:0007616)
GO:0032922 : circadian regulation of gene expression
(https://www.ebi.ac.uk/QuickGO/term/GO:0032922)
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:0045187 : regulation of circadian sleep/wake cycle, sleep
(https://www.ebi.ac.uk/QuickGO/term/GO:0045187)
GO:0007619 : courtship behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0007619)
GO:0045433 : male courtship behavior, veined wing generated song production
(https://www.ebi.ac.uk/QuickGO/term/GO:0045433)
GO:0045475 : locomotor rhythm (https://www.ebi.ac.uk/QuickGO/term/GO:0045475)
GO:0008340 : determination of adult lifespan
(https://www.ebi.ac.uk/QuickGO/term/GO:0008340)
GO:0009266 : response to temperature stimulus
(https://www.ebi.ac.uk/QuickGO/term/GO:0009266)
GO:0006979 : response to oxidative stress
(https://www.ebi.ac.uk/QuickGO/term/GO:0006979)
GO:0001932 : regulation of protein phosphorylation
(https://www.ebi.ac.uk/QuickGO/term/GO:0001932)
GO:0001306 : age-dependent response to oxidative stress
(https://www.ebi.ac.uk/QuickGO/term/GO:0001306)
GO:0048148 : behavioral response to cocaine
(https://www.ebi.ac.uk/QuickGO/term/GO:0048148)
GO:0048512 : circadian behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0048512)
GO:0042745 : circadian sleep/wake cycle
(https://www.ebi.ac.uk/QuickGO/term/GO:0042745)
GO:0060086 : circadian temperature homeostasis
(https://www.ebi.ac.uk/QuickGO/term/GO:0060086)
GO:0007620 : copulation (https://www.ebi.ac.uk/QuickGO/term/GO:0007620)
GO:0008062 : eclosion rhythm (https://www.ebi.ac.uk/QuickGO/term/GO:0008062)
GO:0009649 : entrainment of circadian clock
(https://www.ebi.ac.uk/QuickGO/term/GO:0009649)
GO:0043153 : entrainment of circadian clock by photoperiod
(https://www.ebi.ac.uk/QuickGO/term/GO:0043153)
GO:0007617 : mating behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0007617)
GO:2000678 : negative regulation of transcription regulatory region DNA binding
(https://www.ebi.ac.uk/QuickGO/term/GO:2000678)
GO:1904059 : regulation of locomotor rhythm
(https://www.ebi.ac.uk/QuickGO/term/GO:1904059)
GO:0007622 : rhythmic behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0007622)

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)
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:0044297 : cell body (https://www.ebi.ac.uk/QuickGO/term/GO:0044297)
GO:0048471 : perinuclear region of cytoplasm
(https://www.ebi.ac.uk/QuickGO/term/GO:0048471)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Indel Size

10-99 bp

Molecular Details of the Mutation

repeat (Thr-Gly) either 17 times or 20 times within the protein coding sequence

Experimental Evidence

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

Main Reference

Natural variation in a Drosophila clock gene and temperature compensation. (1997) (https://pubmed.ncbi.nlm.nih.gov/9405346)

Authors

Sawyer LA; Hennessy JM; Peixoto AA; Rosato E; Parkinson H; Costa R; Kyriacou CP

Abstract

The threonine-glycine (Thr-Gly) encoding repeat within the clock gene period of Drosophila melanogaster is polymorphic in length. The two major variants (Thr-Gly)17 and (Thr-Gly)20 are distributed as a highly significant latitudinal cline in Europe and North Africa. Thr-Gly length variation from both wild-caught and transgenic individuals is related to the flies' ability to maintain a circadian period at different temperatures. This phenomenon provides a selective explanation for the geographical distribution of Thr-Gly lengths and gives a rare glimpse of the interplay between molecular polymorphism, behavior, population biology, and natural selection.

Additional References

RELATED GEPHE

Related Genes

2 (Catecholamines up, timeless (tim)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7227^/and+Trait=Locomotor activity/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^Period (per)^/and+Taxon ID=^7227^/or+Gene Gephebase=^Period (per)^/and+Taxon ID=^7227^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS

http://flybase.org/reports/FBal0082362 - http://flybase.org/reports/FBal0082363 - http://flybase.org/reports/FBal0082364 - http://flybase.org/reports/FBal0082365 - http://flybase.org/reports/FBal0082366