GEPHE SUMMARY

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

Entry Status
Published

GepheID
GP00000854

Main curator
Martin

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Drosophila melanogaster - DGRP lines

Trait State in Taxon B
Drosophila melanogaster - DGRP lines

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
pst

Synonyms
CG8588; Dm-65; Dmel\CG8588; Pst; Dmel_CG8588

String
-

Sequence Similarities
-

GO - Molecular Function
-

GO - Biological Process
GO:0007616 : long-term memory (https://www.ebi.ac.uk/QuickGO/term/GO:0007616)
GO:0009306 : protein secretion (https://www.ebi.ac.uk/QuickGO/term/GO:0009306)

GO - Cellular Component
GO:0005829 : cytosol (https://www.ebi.ac.uk/QuickGO/term/GO:0005829)

UniProtKB Drosophila melanogaster
Q8IQ82 (http://www.uniprot.org/uniprot/Q8IQ82)

GenebankID or UniProtKB
AE014296 (https://www.ncbi.nlm.nih.gov/nuccore/AE014296)

Presumptive Null

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

unknown

Experimental Evidence

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

Main Reference

Genome-wide association studies reveal a simple genetic basis of resistance to naturally coevolving viruses in Drosophila melanogaster. (2012) (https://pubmed.ncbi.nlm.nih.gov/23166512)

Authors

Magwire MM; Fabian DK; Schweyen H; Cao C; Longdon B; Bayer F; Jiggins FM

Abstract

Variation in susceptibility to infectious disease often has a substantial genetic component in animal and plant populations. We have used genome-wide association studies (GWAS) in Drosophila melanogaster to identify the genetic basis of variation in susceptibility to viral infection. We found that there is substantially more genetic variation in susceptibility to two viruses that naturally infect D. melanogaster (DCV and DMelSV) than to two viruses isolated from other insects (FHV and DAffSV). Furthermore, this increased variation is caused by a small number of common polymorphisms that have a major effect on resistance and can individually explain up to 47% of the heritability in disease susceptibility. For two of these polymorphisms, it has previously been shown that they have been driven to a high frequency by natural selection. An advantage of GWAS in Drosophila is that the results can be confirmed experimentally. We verified that a gene called pastrel--which was previously not known to have an antiviral function--is associated with DCV-resistance by knocking down its expression by RNAi. Our data suggest that selection for resistance to infectious disease can increase genetic variation by increasing the frequency of major-effect alleles, and this has resulted in a simple genetic basis to variation in virus resistance.

Additional References

RELATED GEPHE

Related Genes

15 (18-wheeler, CG8492, Diptericin, Drosomycin-like 5, Ge-1, GNBP1, GNBP2, Immune deficiency, Lectin-24A, PGRP-LC, ref(2)P, SR-CII, Tehao, Ubiquitin conjugating enzyme E2H (Ubc-E2H), CHKov1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7227^/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

RNAi functional evidence