

GEPHE SUMMARY

<p>Ge-1 (<a +ge-1+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+Ge-1+"#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00001993</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)</p> <p>Pathogen resistance (sigma virus) (<a +pathogen+resistance+(sigma+virus)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Pathogen+resistance+(sigma+virus)+"#gephebase-summary-title)</p> <p>susceptible</p> <p>resistant</p> <p>Taxon A</p> <p>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)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon A</p> <p>Latin Name</p> <p><i>Drosophila melanogaster</i> (<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)</p> <p>Common Name</p> <p>fruit fly</p> <p>Synonyms</p> <p><i>Sophophora melanogaster</i>; fruit fly; <i>Drosophila melanogaster</i> Meigen, 1830; <i>Sophophora melanogaster</i> (Meigen, 1830); <i>Drosophila melangaster</i></p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>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</p> <p>Parent</p> <p>melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)</p> <p>NCBI Taxonomy ID</p> <p>7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)</p> <p>is Taxon A an Intraspecies?</p> <p>No</p>	<p>Taxon B</p> <p>Latin Name</p> <p><i>Drosophila melanogaster</i> (<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)</p> <p>Common Name</p> <p>fruit fly</p> <p>Synonyms</p> <p><i>Sophophora melanogaster</i>; fruit fly; <i>Drosophila melanogaster</i> Meigen, 1830; <i>Sophophora melanogaster</i> (Meigen, 1830); <i>Drosophila melangaster</i></p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>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</p> <p>Parent</p> <p>melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)</p> <p>NCBI Taxonomy ID</p> <p>7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)</p> <p>is Taxon B an Intraspecies?</p> <p>No</p>
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GENOTYPIC CHANGE

<p>Ge-1</p> <p>CG6181; dGe-1; Dmel\CG6181; EDC4; GE-1; ref(2)M; Ref(2)Me</p> <p>7227.FBpp0079818 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0079818)</p> <p>Belongs to the WD repeat EDC4 family.</p> <p>-</p> <p>GO:0050832 : defense response to fungus (https://www.ebi.ac.uk/QuickGO/term/GO:0050832)</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p> <p>GO - Biological Process</p>	<p>UniProtKB <i>Drosophila melanogaster</i> Q9VKK1 (http://www.uniprot.org/uniprot/Q9VKK1)</p> <p>GenebankID or UniProtKB</p> <p>()</p>
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GO:0033962 : cytoplasmic mRNA processing body assembly
(<https://www.ebi.ac.uk/QuickGO/term/GO:0033962>)
GO:0035195 : gene silencing by miRNA
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035195>)
GO:0006402 : mRNA catabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006402>)
GO:0045451 : pole plasm oskar mRNA localization
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045451>)

GO - Cellular Component

GO:0000932 : P-body (<https://www.ebi.ac.uk/QuickGO/term/GO:0000932>)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Deletion Size

10-99 bp

Molecular Details of the Mutation

78bp deletion (2L:11097925 ..11098002 in both Release 5 and Release 6 coordinates) in the fifth exon of Ge-1 which reduces the length of the serine-rich linker region by 26 amino acid residues

Experimental Evidence

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

Main Reference

A Polymorphism in the Processing Body Component Ge-1 Controls Resistance to a Naturally Occurring Rhabdovirus in *Drosophila*. (2016) (<https://pubmed.ncbi.nlm.nih.gov/26799957>)

Authors

Cao C; Magwire MM; Bayer F; Jiggins FM

Abstract

Hosts encounter an ever-changing array of pathogens, so there is continual selection for novel ways to resist infection. A powerful way to understand how hosts evolve resistance is to identify the genes that cause variation in susceptibility to infection. Using high-resolution genetic mapping we have identified a naturally occurring polymorphism in a gene called Ge-1 that makes *Drosophila melanogaster* highly resistant to its natural pathogen *Drosophila melanogaster* sigma virus (DMelSV). By modifying the sequence of the gene in transgenic flies, we identified a 26 amino acid deletion in the serine-rich linker region of Ge-1 that is causing the resistance. Knocking down the expression of the susceptible allele leads to a decrease in viral titre in infected flies, indicating that Ge-1 is an existing restriction factor whose antiviral effects have been increased by the deletion. Ge-1 plays a central role in RNA degradation and the formation of processing bodies (P bodies). A key effector in antiviral immunity, the RNAi induced silencing complex (RISC), localises to P bodies, but we found that Ge-1-based resistance is not dependent on the small interfering RNA (siRNA) pathway. However, we found that Decapping protein 1 (DCP1) protects flies against sigma virus. This protein interacts with Ge-1 and commits mRNA for degradation by removing the 5' cap, suggesting that resistance may rely on this RNA degradation pathway. The serine-rich linker domain of Ge-1 has experienced strong selection during the evolution of *Drosophila*, suggesting that this gene may be under long-term selection by viruses. These findings demonstrate that studying naturally occurring polymorphisms that increase resistance to infections enables us to identify novel forms of antiviral defence, and support a pattern of major effect polymorphisms controlling resistance to viruses in *Drosophila*.

Additional References

RELATED GEPHE

Related Genes

15 (18-wheeler, CG8492, Dipteracin, Drosomycin-like 5, GNBP1, GNBP2, Immune deficiency, Lectin-24A, pastrel, 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](https://www.gephebase.org/search-criteria?/or+Taxon+ID=))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

<http://flybase.org/reports/FBal0014522>