GEPHE SUMMARY

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

Entry Status
Published

GepheID
GP00000540

Main curator
Martin

PHENOTYPIC CHANGE

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

Trait
Hybrid incompatibility (F1 male lethality) (https://www.gephebase.org/search-criteria?/and+Trait=^Hybrid incompatibility (F1 male lethality)^#gephebase-summary-title)

Trait State in Taxon A
Drosophila melanogaster

Trait State in Taxon B
Drosophila simulans

Ancestral State
Taxon A

Taxonomic Status
Interspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Interspecific^#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 simulans (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila simulans^#gephebase-summary-title)

Common Name
-

Synonyms
-

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
7240 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7240)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
Lhr

Synonyms
CG18468; Dmel\CG18468; HP3; LHR; LHR[[mel]]; mel-Lhr; Dmel_CG18468

String
7227.FBpp0086073 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0086073)

Sequence Similarities
-

GO - Molecular Function
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)

GO - Biological Process
GO:0000070 : mitotic sister chromatid segregation (https://www.ebi.ac.uk/QuickGO/term/GO:0000070)

UniProtKB Drosophila melanogaster
Q95RV3 (http://www.uniprot.org/uniprot/Q95RV3)

GenebankID or UniProtKB
XP_002081899 (https://www.ncbi.nlm.nih.gov/nuccore/XP_002081899)

GO:0010529 : negative regulation of transposition
(https://www.ebi.ac.uk/QuickGO/term/GO:0010529)
GO:0010528 : regulation of transposition
(https://www.ebi.ac.uk/QuickGO/term/GO:0010528)
GO:0000723 : telomere maintenance
(https://www.ebi.ac.uk/QuickGO/term/GO:0000723)
GO:0070868 : heterochromatin organization involved in chromatin silencing
(https://www.ebi.ac.uk/QuickGO/term/GO:0070868)

GO - Cellular Component

GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)
GO:0000775 : chromosome, centromeric region
(https://www.ebi.ac.uk/QuickGO/term/GO:0000775)
GO:0000792 : heterochromatin (https://www.ebi.ac.uk/QuickGO/term/GO:0000792)
GO:0035012 : polytene chromosome, telomeric region
(https://www.ebi.ac.uk/QuickGO/term/GO:0035012)
GO:0010369 : chromocenter (https://www.ebi.ac.uk/QuickGO/term/GO:0010369)

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

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

Insertion Size

10-99 bp

Molecular Details of the Mutation

16a.a. insertion with effect in sensitive background only (Maheshwari and Barbash 2012)

Experimental Evidence

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

Main Reference

Two Dobzhansky-Muller genes interact to cause hybrid lethality in Drosophila. (2006) (https://pubmed.ncbi.nlm.nih.gov/17124320)

Authors

Brideau NJ; Flores HA; Wang J; Maheshwari S; Wang X; Barbash DA

Abstract

The Dobzhansky-Muller model proposes that hybrid incompatibilities are caused by the interaction between genes that have functionally diverged in the respective hybridizing species. Here, we show that Lethal hybrid rescue (Lhr) has functionally diverged in Drosophila simulans and interacts with Hybrid male rescue (Hmr), which has functionally diverged in D. melanogaster, to cause lethality in F1 hybrid males. LHR localizes to heterochromatic regions of the genome and has diverged extensively in sequence between these species in a manner consistent with positive selection. Rapidly evolving heterochromatic DNA sequences may be driving the evolution of this incompatibility gene.

Additional References

The impact of shared ancestral variation on hybrid male lethality--a 16 codon indel in the Drosophila simulans Lhr gene. (2008) (https://pubmed.ncbi.nlm.nih.gov/18194231)
An indel polymorphism in the hybrid incompatibility gene lethal hybrid rescue of Drosophila is functionally relevant. (2012) (https://pubmed.ncbi.nlm.nih.gov/22865735)

RELATED GEPHE

Related Genes

6 (gfzf, Hybrid male rescue, JYalpha, Nup160, Nup96, tyrosyl-tRNA synthetase (mt-TyrRS)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7227^/and+Trait=Hybrid incompatibility/or+Taxon ID=^7240^/and+Trait=Hybrid incompatibility/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^Lethal Hybrid rescue^/and+Taxon ID=^7227^/or+Gene Gephebase=^Lethal Hybrid rescue^/and+Taxon ID=^7240^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS