

GEPHE SUMMARY

	Gephebase Gene		GepheID
Lethal Hybrid rescue (https://www.gephebase.org/search-criteria?/and+Gene Gephebase= [^] Lethal Hybrid rescue [^] #gephebase-summary-title)		GP00000540	
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category= [^] Physiology [^] #gephebase-summary-title)			
	Trait		
Hybrid incompatibility (F1 male lethality) (<a href="https://www.gephebase.org/search-criteria?/and+Trait=<sup>^</sup>Hybrid incompatibility (F1 male lethality)<sup>^</sup>#gephebase-summary-title">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	Taxon B	
	Latin Name		Latin Name
Drosophila melanogaster (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Drosophila melanogaster<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Drosophila melanogaster[^]#gephebase-summary-title)		Drosophila simulans (<a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=<sup>^</sup>Drosophila simulans<sup>^</sup>#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=[^]Drosophila simulans[^]#gephebase-summary-title)	
	Common Name		Common Name
fruit fly		-	
	Synonyms		Synonyms
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster		-	
	Rank		Rank
species		species	
	Lineage		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; Acalypratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup		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; Acalypratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	
	Parent		Parent
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)		melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227)		7240 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7240)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Drosophila melanogaster
Lhr		Q95RV3 (http://www.uniprot.org/uniprot/Q95RV3)	
	Synonyms		GenebankID or UniProtKB
CG18468; Dmel\CG18468; HP3; LHR; LHR[[mel]]; mel-Lhr; DmeL_CG18468		XP_002081899 (https://www.ncbi.nlm.nih.gov/nuccore/XP_002081899)	
	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)			

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](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](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](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](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](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](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