

## GEPHE SUMMARY

	Gephebase Gene	GephelD
Nup96 ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> Gephebase="Nup96">#gephebase-summary-title)	GP00000743	
	Entry Status	Main curator
Published	Martin	

## PHENOTYPIC CHANGE

	Trait Category
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> Category="Physiology">#gephebase-summary-title)	
Hybrid incompatibility (F1 male sterility) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Hybrid+incompatibility+(F1+male+sterility)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Hybrid+incompatibility+(F1+male+sterility)^#gephebase-summary-title</a> )	Trait
Drosophila melanogaster	Trait State in Taxon A
Drosophila simulans	Trait State in Taxon B
Data not curated	Ancestral State
Interspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> Status="Interspecific">#gephebase-summary-title)	Taxonomic Status

Taxon A		Taxon B	
	Latin Name		Latin Name
Drosophila melanogaster ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+melanogaster^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+melanogaster^#gephebase-summary-title</a> )		Drosophila simulans ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+simulans^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+simulans^#gephebase-summary-title</a> )	
fruit fly	Common Name	-	Common Name
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	Synonyms	-	Synonyms
species	Rank	species	Rank
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	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	Lineage
melanogaster subgroup () - (Rank: species subgroup) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351</a> )	Parent	melanogaster subgroup () - (Rank: species subgroup) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351</a> )	Parent
7227 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227</a> )	NCBI Taxonomy ID	7240 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7240">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7240</a> )	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
NUP96	Synonyms	Q8LLD0 ( <a href="http://www.uniprot.org/uniprot/Q8LLD0">http://www.uniprot.org/uniprot/Q8LLD0</a> )
3; F23A5.3; F23A5_3; MODIFIER OF SNC1; MOS3; NUP96; PRE; PRECOCIOUS; SUPPRESSOR OF AUXIN RESISTANCE 3; SAR3; At1g80680	String	GenebankID or UniProtKB
3702.AT1G80680.1 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT1G80680.1">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT1G80680.1</a> )	Sequence Similarities	KMZ05388 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/KMZ05388">https://www.ncbi.nlm.nih.gov/nuccore/KMZ05388</a> )
-	GO - Molecular Function	
GO:0003723 : RNA binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003723">https://www.ebi.ac.uk/QuickGO/term/GO:0003723</a> )		
GO:0017056 : structural constituent of nuclear pore ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0017056">https://www.ebi.ac.uk/QuickGO/term/GO:0017056</a> )		

GO:0008139 : nuclear localization sequence binding  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008139>)  
GO:0015288 : porin activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0015288>)  
GO - Biological Process  
GO:0006952 : defense response (<https://www.ebi.ac.uk/QuickGO/term/GO:0006952>)  
GO:0009733 : response to auxin (<https://www.ebi.ac.uk/QuickGO/term/GO:0009733>)  
GO:0006606 : protein import into nucleus  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006606>)  
GO:0009870 : defense response signaling pathway, resistance gene-dependent  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009870>)  
GO:0051028 : mRNA transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0051028>)  
GO:0000973 : posttranscriptional tethering of RNA polymerase II gene DNA at nuclear periphery (<https://www.ebi.ac.uk/QuickGO/term/GO:0000973>)  
GO:0006405 : RNA export from nucleus  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006405>)  
GO:0034398 : telomere tethering at nuclear periphery  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0034398>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)  
GO:0005635 : nuclear envelope (<https://www.ebi.ac.uk/QuickGO/term/GO:0005635>)  
GO:0031965 : nuclear membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0031965>)  
GO:0044614 : nuclear pore cytoplasmic filaments  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0044614>)

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

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

Molecular Details of the Mutation

Coding divergence

Experimental Evidence

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

Main Reference

Adaptive evolution drives divergence of a hybrid inviability gene between two species of Drosophila. (2003) (<https://pubmed.ncbi.nlm.nih.gov/12802326>)

Authors

Presgraves DC; Balagopalan L; Abmayr SM; Orr HA

Abstract

Speciation--the splitting of one species into two--occurs by the evolution of any of several forms of reproductive isolation between taxa, including the intrinsic sterility and inviability of hybrids. Abundant evidence shows that these hybrid fitness problems are caused by incompatible interactions between loci: new alleles that become established in one species are sometimes functionally incompatible with alleles at interacting loci from another species. However, almost nothing is known about the genes involved in such hybrid incompatibilities or the evolutionary forces that drive their divergence. Here we identify a gene that causes epistatic inviability in hybrids between two fruitfly species, *Drosophila melanogaster* and *D. simulans*. Our population genetic analysis reveals that this gene--which encodes a nuclear pore protein--evolved by positive natural selection in both species' lineages. These results show that a lethal hybrid incompatibility has evolved as a by-product of adaptive protein evolution.

Additional References

## RELATED GEPHE

### Related Genes

6 (gfz, Hybrid male rescue, JYalpha, Lethal Hybrid rescue, Nup160, 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

No matches found.

## EXTERNAL LINKS

## COMMENTS

@Epistasis

