

	Gephebase Gene	GepheID
para (kdr) (<a +para+(kdr)^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+para+(kdr)^#gephebase-summary-title)	GP00002645	
	Entry Status	Courtier
Published		Main curator

Trait Category		Trait	
Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology^#gephebase-summary-title)			
Xenobiotic resistance (insecticide) (https://www.gephebase.org/search-criteria?/and+Trait=~Xenobiotic resistance (insecticide)^#gephebase-summary-title)			
Musca domestica	Trait State in Taxon A		
Musca domestica - resistant - kdr+T929I	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Intraspecific^#gephebase-summary-title)	Taxonomic Status		
Taxon A	Latin Name	Taxon B	Latin Name
Musca domestica (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Musca domestica^#gephebase-summary-title)		Musca domestica (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Musca domestica^#gephebase-summary-title)	
Common Name		Common Name	
house fly		house fly	
Synonyms		Synonyms	
house fly; Musca domestica Linnaeus, 1758		house fly; Musca domestica Linnaeus, 1758	
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; Calyptratae; Muscoidea; Muscidae; Muscinae; Muscini; Musca; Musca		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; Calyptratae; Muscoidea; Muscidae; Muscinae; Muscini; Musca; Musca	
Parent		Parent	
Musca () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 44052)		Musca () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 44052)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
7370 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7370)		7370 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7370)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
No		No	

para	Generic Gene Name	UniProtKB Drosophila melanogaster
	Synonyms	GenebankID or UniProtKB
bas; bss; CG9907; Dmel\CG9907; DmNav; DmNav1; DmNa[[v]]: DmNa[[V]]: DmNa[[v]]1; l(1)14Da; l(1)ESHS48; lincRNA.S9469; Nav1; Ocd; olfD; par; sbl; sbl-1; Shu; Shudderer		P35500 (http://www.uniprot.org/uniprot/P35500)
	String	NP_001273814 (https://www.ncbi.nlm.nih.gov/nuccore/NP_001273814)
7227.FBpp0303597 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier= 7227.FBpp0303597)		
	Sequence Similarities	
Belongs to the sodium channel (TC 1.A.1.10) family. Para subfamily.		
	GO - Molecular Function	
GO:0005509 : calcium ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005509)		
GO:0005244 : voltage-gated ion channel activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005244)		
GO:0005248 : voltage-gated sodium channel activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005248)		

GO:0005272 : sodium channel activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005272>)

GO - Biological Process

GO:0045433 : male courtship behavior, veined wing generated song production
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045433>)
GO:0001666 : response to hypoxia (<https://www.ebi.ac.uk/QuickGO/term/GO:0001666>)
GO:0009612 : response to mechanical stimulus
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009612>)
GO:0034765 : regulation of ion transmembrane transport
(<https://www.ebi.ac.uk/QuickGO/term/GO:0034765>)
GO:0035725 : sodium ion transmembrane transport
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035725>)
GO:0007638 : mechanosensory behavior
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007638>)
GO:0060078 : regulation of postsynaptic membrane potential
(<https://www.ebi.ac.uk/QuickGO/term/GO:0060078>)

GO - Cellular Component

GO:0005887 : integral component of plasma membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)
GO:0001518 : voltage-gated sodium channel complex
(<https://www.ebi.ac.uk/QuickGO/term/GO:0001518>)

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title>)

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title>)

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

Nonsynonymous

kdr+T929I - addition of T929I to the kdr mutation (L1014F) increased resistance to all pyrethroids (except etofenprox) and enhanced resistance by ~1000-fold to acrinathrin and flumethrin.

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene~#gephebase-summary-title>)

Presumptive Null

Molecular Type

Aberration Type

SNP Coding Change

Molecular Details of the Mutation

Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Thr	Ile	929

Two novel house fly Vssc mutations, D600N and T929I, give rise to new insecticide resistance alleles. (2017) (<https://pubmed.ncbi.nlm.nih.gov/29183579>)

Sun H; Kasai S; Scott JG

The house fly, Musca domestica, is a serious pest because it transmits a large diversity of human and veterinary diseases. Insecticides, particularly pyrethroids, are commonly used to control house flies. However, the evolution of pyrethroid resistance has reduced the effectiveness of these insecticides. A major mechanism of resistance to pyrethroids is target site insensitivity caused by the mutations in the voltage-sensitive sodium channel (Vssc) gene (e.g. kdr [L1014F] and super-kdr [M918T+L1014F]). Recently, two novel Vssc alleles, super-kdr+D600N and kdr+T929I were detected in a field collected resistant house fly population in Kansas, USA in 2013. To determine the levels of resistance that these new alleles confer to pyrethroids, we isolated strains having the unique Vssc alleles, but being otherwise congenic to the susceptible strain, aabys. We compared levels of resistance conferred to 14 pyrethroids and determined the inheritance of resistance to 8 pyrethroids. Our results revealed that super-kdr+D600N conferred higher levels of resistance to seven pyrethroids relative to super-kdr, and kdr+T929I showed super-kdr-like levels of resistance in house flies. Our results are compared with previous studies and reveal that addition of T929I to the kdr mutation (L1014F) increased resistance to all pyrethroids (except etofenprox), and enhanced resistance by ~1000-fold to acrinathrin and flumethrin. The implications of these results on the evolution of resistance are discussed.

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Main Reference

Authors

Abstract

Additional References

RELATED GEPHE

5 (Acetylcholinesterase (Ace-2), Acetylcholinesterase (Ace), CYP6D1, esterase isozyme E7 = E3, resistance to dieldrin) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~7370~/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title>)

3 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~para \(kdr\)~/and+Taxon ID=~7370~/or+Gene Gephebase=~para \(kdr\)~/and+Taxon ID=~7370~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~para (kdr)~/and+Taxon ID=~7370~/or+Gene Gephebase=~para (kdr)~/and+Taxon ID=~7370~#gephebase-summary-title))

Related Genes

Related Haplotypes

EXTERNAL LINKS

