

GEPHE SUMMARY

para (kdr) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~para (kdr)^#gephebase-summary-title)	Gephebase Gene	GepheID
	GP00000842	
	Entry Status	Martin
Published		Main curator

PHENOTYPIC CHANGE

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

GENOTYPIC CHANGE

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		NP_001273814 (https://www.ncbi.nlm.nih.gov/nuccore/NP_001273814)
	String	
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)	Presumptive Null
Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title)	Molecular Type
SNP (https://www.gephebase.org/search-criteria?/and+Aberration Type=~SNP~#gephebase-summary-title)	Aberration Type
Nonsynonymous	SNP Coding Change
L1014F	Molecular Details of the Mutation
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping~#gephebase-summary-title)	Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Cloning and sequencing of the para-type sodium channel gene from susceptible and kdr-resistant German cockroaches (*Blattella germanica*) and house fly (*Musca domestica*). (1996)
(<https://pubmed.ncbi.nlm.nih.gov/8804404>)

Miyazaki M; Ohyama K; Dunlap DY; Matsumura F

Using reverse transcription polymerase chain reactions (RT-PCR), the DNA sequence for the main membrane-spanning region (IS3 through IVS6) of the gene encoding the alpha-subunit of the para sodium channel of the German cockroach, *Blattella germanica*, has been determined. The overall structure of the open reading frame region of this *B. germanica* gene is very similar to that of the para gene of *Drosophila melanogaster*, and that of the partially sequenced para gene of *Musca domestica*. On the other hand, it is distinctly different from that of the DSC gene (*Drosophila* sodium channel). As a result of a side-by-side comparison of the para gene sequences of the susceptible CSMA strain and the kdr resistant VT strain of *B. germanica*, one mutation (TTG to TTC) at the approximate center of the IIS6 membrane-spanning segment was found to result in an amino acid change from L to F. While the functional meaning of this mutation for the operation of the para sodium channel remains to be studied, this region is very highly conserved among all sodium channels identified so far, and is one of the most hydrophobic areas of the entire alpha-subunit. For comparison, we have studied the same region of the para sodium channel of both kdr and susceptible SBO strain of the housefly, *Musca domestica*. We found the homologous type of mutation, CTT to TTT, resulting in the same amino acid alteration (L to F) at this site. However, in the case of houseflies both kdr and susceptible strains contained both L and F versions of the protein. The ratio of TTT to CTT was significantly higher in the kdr strain of *M. domestica* than in the three susceptible strains examined.

Mutations in DIIS5 and the DIIS4-S5 linker of *Drosophila melanogaster* sodium channel define binding domains for pyrethroids and DDT. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17991435>)
The L1014F point mutation in the house fly *Vssc1* sodium channel confers knockdown resistance to pyrethroids. (1997) (<https://pubmed.ncbi.nlm.nih.gov/9474777>)

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)	Related Genes
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)	Related Haplotypes

EXTERNAL LINKS

