

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)	Gephebase Gene	GepheID
	GP00000824	Main curator
Published	Entry Status	Martin

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
Blatella germanica	Trait State in Taxon A
Blatella germanica - resistant - alleles 1 and 2	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

GENOTYPIC CHANGE

(<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>)

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

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

L993F (=L1014F)

Experimental Evidence

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

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

Main Reference

The L1014F point mutation in the house fly Vssc1 sodium channel confers knockdown resistance to pyrethroids. (1997) (<https://pubmed.ncbi.nlm.nih.gov/9474777>)

Authors

Smith TJ; Lee SH; Ingles PJ; Knipple DC; Soderlund DM

Abstract

Voltage-sensitive sodium channels encoded by a full-length cDNA corresponding to the Vssc1 gene of the house fly (*Musca domestica*) were expressed in *Xenopus laevis* oocytes either alone or in combination with the tipE gene product of *Drosophila melanogaster* and were characterized by two-electrode voltage clamp. Vssc1 cRNA alone produced very small (50-150 nA) sodium currents, whereas the combination of Vssc1 and tipE cRNAs produced robust (0.5-3 microA), rapidly inactivating sodium currents. The pyrethroid insecticide cismethrin prolonged the sodium current carried by Vssc1/tipE sodium channels during a depolarizing pulse and induced a tail current after repolarization. The Vssc1 cDNA was specifically mutated to substitute phenylalanine for leucine at position 1014 of the inferred amino acid sequence (L1014F), a polymorphism shown previously to be associated with the kdr (knockdown resistance) trait of the house fly. The L1014F substitution reduced the sensitivity of expressed house fly sodium channels to cismethrin at least 10-fold and increased the rate of decay of pyrethroid-induced sodium tail currents. These results demonstrate that the resistance-associated L1014F mutation confers a reduction in the sensitivity of house fly sodium channels to pyrethroids that is sufficient to account for the kdr resistance trait.

Additional References

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>)

A single amino acid change in the para sodium channel protein is associated with knockdown-resistance (kdr) to pyrethroid insecticides in German cockroach. (1997)

(<https://pubmed.ncbi.nlm.nih.gov/9066120>)

RELATED GEPHE

Related Genes

1 (resistance to dieldrin) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~6973~/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

3 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~para \(kdr\)~/and+Taxon ID=~6973~/or+Gene Gephebase=~para \(kdr\)~/and+Taxon ID=~6973~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~para (kdr)~/and+Taxon ID=~6973~/or+Gene Gephebase=~para (kdr)~/and+Taxon ID=~6973~#gephebase-summary-title))

EXTERNAL LINKS

