GEPHE SUMMARY

Gephebase Gene
para (kdr) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^para (kdr)^#gephebase-summary-title)

GepheID
GP00002447

Entry Status
Published

Main curator
Courtier

PHENOTYPIC CHANGE

Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait
Xenobiotic resistance (insecticide) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance (insecticide)^#gephebase-summary-title)

Trait State in Taxon A
Aedes albopictus

Trait State in Taxon B
Aedes albopictus - resistant from Singapore

Ancestral State
Taxon A

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Aedes albopictus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Aedes albopictus^#gephebase-summary-title)

Common Name
Asian tiger mosquito

Synonyms
Stegomyia albopicta; Asian tiger mosquito; forest day mosquito; Aedes albopictus (Skuse, 1894)

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Aedini; Aedes; Stegomyia

Parent
Stegomyia () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 53541)

NCBI Taxonomy ID
7160 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7160)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Aedes albopictus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Aedes albopictus^#gephebase-summary-title)

Common Name
Asian tiger mosquito

Synonyms
Stegomyia albopicta; Asian tiger mosquito; forest day mosquito; Aedes albopictus (Skuse, 1894)

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Aedini; Aedes; Stegomyia

Parent
Stegomyia () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 53541)

NCBI Taxonomy ID
7160 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7160)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
para

Synonyms
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

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)

UniProtKB Drosophila melanogaster
P35500 (http://www.uniprot.org/uniprot/P35500)

GenebankID or UniProtKB
()

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)

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

F1534C

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	Phe	Cys	1534

Main Reference

First detection of a putative knockdown resistance gene in major mosquito vector, Aedes albopictus. (2011) (https://pubmed.ncbi.nlm.nih.gov/21617306)

Authors

Kasai S; Ng LC; Lam-Phua SG; Tang CS; Itokawa K; Komagata O; Kobayashi M; Tomita T

Abstract

The Asian tiger mosquito, Aedes albopictus (Skuse), is the major vector of Chikungunya fever and the secondary vector of dengue fever. We collected Ae. albopictus from Singapore and performed genotyping assay to detect mutations of the voltage-gated sodium channel, which is the target site of pyrethroid insecticides. We detected an amino acid substitution, F1534C, which is suspected to confer knockdown resistance (kdr) to pyrethroid insecticides. Of the collected mosquitoes, 53.8% were homozygous for this mutation, and the allele frequency of this mutation was estimated to be 73.1%. No kdr mutation was detected in the 5 other loci of domains II and IV. This is the first evidence for the presence of the kdr gene in Ae. albopictus, and our findings highlight the need for studying the global distribution of this allele in this important vector insect.

Additional References

Pyrethroid resistance in Aedes aegypti and Aedes albopictus: Important mosquito vectors of human diseases. (2016) (https://pubmed.ncbi.nlm.nih.gov/27742355)

RELATED GEPHE

Related Genes

1 (resistance to dieldrin) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7160^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

2 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^para (kdr)^/and+Taxon ID=^7160^/or+Gene Gephebase=^para (kdr)^/and+Taxon ID=^7160^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS