

GEPHE SUMMARY

<p>Cpm1 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=Cpm1#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00002102</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
--	---	-----------------------------------	------------------------------------

PHENOTYPIC CHANGE

<p>Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=Physiology#gephebase-summary-title)</p> <p>Xenobiotic resistance (insecticide; toxin produced by <i>Bacillus sphaericus</i>) (https://www.gephebase.org/search-criteria?/and+Trait=Xenobiotic+resistance+(insecticide;+toxin+produced+by+Bacillus+sphaericus)#gephebase-summary-title)</p> <p>Culex pipiens - sensitive</p> <p>Culex pipiens fasciatus - resistant - allele cpm1BP</p> <p>Taxon A</p> <p>Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Intraspecific#gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Culex pipiens</p> <p>Culex pipiens</p> <p>northern house mosquito</p> <p>Culex agilis; Culex autogenicus; Culex azoriensis; Culex bicolor; Culex bifurcatus; Culex calcitrans; Culex calloti; Culex comitatus; Culex consobrinus; Culex dipseticus; Culex disjunctus; Culex doliorum; Culex domesticus; Culex erectus; Culex fasciatus; Culex haematophagus; Culex longefurcatus; Culex luteus; Culex marginalis; Culex melanorhinus; Culex meridionalis; Culex osakaensis; Culex pallipes; Culex phytophagus; Culex quasimodestus; Culex rufinus; Culex rufus; Culex sternopunctatus; Culex thoracicus; Culex torridus; Culex trifurcatus; Culex unistriatus; Culex varioannulatus; northern house mosquito; Culex pipiens Linnaeus, 1758</p> <p>species</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Culicini; Culex; Culex; Culex pipiens complex</p> <p>Culex pipiens complex () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=518105)</p> <p>7175 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7175)</p> <p>is Taxon A an Intraspecies?</p> <p>No</p>	<p>Taxon B</p> <p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Lineage</p> <p>Parent</p>	<p>Culex pipiens</p> <p>Culex pipiens</p> <p>northern house mosquito</p> <p>Culex agilis; Culex autogenicus; Culex azoriensis; Culex bicolor; Culex bifurcatus; Culex calcitrans; Culex calloti; Culex comitatus; Culex consobrinus; Culex dipseticus; Culex disjunctus; Culex doliorum; Culex domesticus; Culex erectus; Culex fasciatus; Culex haematophagus; Culex longefurcatus; Culex luteus; Culex marginalis; Culex melanorhinus; Culex meridionalis; Culex osakaensis; Culex pallipes; Culex phytophagus; Culex quasimodestus; Culex rufinus; Culex rufus; Culex sternopunctatus; Culex thoracicus; Culex torridus; Culex trifurcatus; Culex unistriatus; Culex varioannulatus; northern house mosquito; Culex pipiens Linnaeus, 1758</p> <p>species</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Culicini; Culex; Culex; Culex pipiens complex</p> <p>Culex pipiens complex () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=518105)</p> <p>7175 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7175)</p> <p>is Taxon B an Intraspecies?</p> <p>No</p>
--	---	---	--	---

GENOTYPIC CHANGE

<p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>Q95WY5 (http://www.uniprot.org/uniprot/Q95WY5)</p> <p>Q95WY5 (https://www.ncbi.nlm.nih.gov/nuccore/Q95WY5)</p>	<p>UniProtKB</p> <p>GenebankID or UniProtKB</p>
---	--	---	---

GO - Biological Process

GO - Cellular Component

Presumptive Null

Yes ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=~Yes^#gephebase-summary-title))

Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding^#gephebase-summary-title](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](https://www.gephebase.org/search-criteria?/and+Aberration+Type=~SNP^#gephebase-summary-title))

SNP Coding Change

Nonsense

Molecular Details of the Mutation

Gln396Stop - nonsense mutation which causes the loss of the C-terminal domain required for a proper anchoring of the receptor to the cell surface and thus disrupts a crucial step in the toxic properties of *B. sphaericus* toxin.

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Gln	STP	396

Main Reference

Transposon-mediated resistance to *Bacillus sphaericus* in a field-evolved population of *Culex pipiens* (Diptera: Culicidae). (2007) (<https://pubmed.ncbi.nlm.nih.gov/17394558>)

Authors

Darboux I; Charles JF; Pauchet Y; Warot S; Pauron D

Abstract

The binary toxin is the major active component of *Bacillus sphaericus*, a microbial larvicide used for controlling some vector mosquito-borne diseases. *B. sphaericus* resistance has been reported in many part of the world, leading to a growing concern for the usefulness of this environmental friendly insecticide. Here we characterize a novel mechanism of resistance to the binary toxin in a natural population of the West Nile virus vector, *Culex pipiens*. We show that the insertion of a transposable element-like DNA into the coding sequence of the midgut toxin receptor induces a new mRNA splicing event, unmasking cryptic donor and acceptor sites located in the host gene. The creation of the new intron causes the expression of an altered membrane protein, which is incapable of interacting with the toxin, thus providing the host mosquito with an advantageous phenotype. As a large portion of insect genomes is composed of transposable elements or transposable elements-related sequences, this new mechanism may be of general importance to appreciate their significance as potent agents for insect resistance to the microbial insecticides.

Additional References

RELATED GEPHE

Related Genes

2 (Acetylcholinesterase (Ace-1), para (kdr)) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=~7175^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=~7175^/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

1 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~Cpm1^/and+Taxon ID=~7175^/or+Gene Gephebase=~Cpm1^/and+Taxon ID=~7175^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~Cpm1^/and+Taxon+ID=~7175^/or+Gene+Gephebase=~Cpm1^/and+Taxon+ID=~7175^#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS