

	Gephebase Gene	GepheID
esterase isozyme E3 (https://www.gephebase.org/search-criteria?/and+Gene)	GP00002584	
Gephebase="esterase isozyme E3"#gephebase-summary-title)		Main curator
	Entry Status	Courtier
Published		

	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
Cochliomyia hominivorax - sensitive	
	Trait State in Taxon B
Cochliomyia hominivorax - resistant	
	Ancestral State
Taxon A	
	Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title)	

GENOTYPIC CHANGE		
alphaE7	Generic Gene Name	UniProtKB <i>Cochliomyia hominivorax</i>
	Synonyms	A0A0G3Z837 (http://www.uniprot.org/uniprot/A0A0G3Z837) GenebankID or UniProtKB <i>Cochliomyia hominivorax</i>
-	String	A0A0G3Z837 (https://www.ncbi.nlm.nih.gov/nuccore/A0A0G3Z837)
-	Sequence Similarities	
-	GO - Molecular Function	
-	GO - Biological Process	
-	GO - Cellular Component	
-		
No (https://www.gephebase.org/search-criteria?/and+Presumptive+Null=~No~#gephebase-summary-title)		Presumptive Null
		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

G137D

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	GGG	GAC	-
Amino-acid	Gly	Asp	137

Main Reference

Acetylcholinesterase cDNA sequencing and identification of mutations associated with organophosphate resistance in *Cochliomyia hominivorax* (Diptera: Calliphoridae). (2011) (<https://pubmed.ncbi.nlm.nih.gov/21159442>)

Authors

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Abstract

Altered acetylcholinesterase (AChE) has been identified in numerous arthropod species resistant to organophosphate (OP) and carbamate insecticides. The New World screwworm (NWS) *Cochliomyia hominivorax* (Coquerel), one of the most important myiasis-causing flies in the Neotropics, has been controlled mainly by the application of OP insecticides in its current geographical distribution. However, few studies have investigated insecticide resistance in this species. Based on previous studies about mutations conferring OP resistance in related dipteran species, AChE cDNA was sequenced allowing a survey for mutations (I298V, G401A, F466Y) in NWS populations. In addition, the G137D mutation in the carboxylesterase E3 gene, also associated with OP resistance, was analyzed in the same NWS populations. Only 2/135 individuals presented an altered AChE gene (F466Y). In contrast, a high frequency of the G137D mutation in the E3 gene was found in some localities of Brazil and Uruguay, while the mutant allele was not found in Cuba, Venezuela or Colombia. These findings suggest that the alteration in the carboxylesterase E3 gene may be one of the main resistance mechanisms selected in this ectoparasite. The knowledge of the frequency of these resistance-associated mutations in the NWS natural populations may contribute to the selection of appropriate chemicals for control as part of pest management strategies.

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Additional References

Genotype to phenotype, the molecular and physiological dimensions of resistance in arthropods. (2015) (<https://pubmed.ncbi.nlm.nih.gov/26047113>)
A survey of mutations in the *Cochliomyia hominivorax* (Diptera: Calliphoridae) esterase E3 gene associated with organophosphate resistance and the molecular identification of mutant alleles. (2006) (<https://pubmed.ncbi.nlm.nih.gov/16701956>)

RELATED GEPHE

Related Genes

1 (Acetylcholinesterase (Ace-2)) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=~115425^/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Parallelism