

GEPHE SUMMARY

	Gephebase Gene	GephelD
Acetylcholinesterase (Ace-2) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Acetylcholinesterase (Ace-2)^#gephebase-summary-title)	GP00002583	Main curator
Published	Entry Status	Courtier

PHENOTYPIC CHANGE

Trait Category		Trait	
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)			
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)			
Taxon A	Latin Name	Taxon B	Latin Name
Cochliomyia hominivorax (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Cochliomyia+hominivorax^#gephebase-summary-title)		Cochliomyia hominivorax (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Cochliomyia+hominivorax^#gephebase-summary-title)	
primary screw-worm	Common Name	primary screw-worm	Common Name
primary screw-worm; Cochliomyia hominivorax (Coquerel, 1858)	Synonyms	primary screw-worm; Cochliomyia hominivorax (Coquerel, 1858)	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Calyptratae; Oestroidea; Calliphoridae; Chrysomyinae; Chrysomyini; Cochliomyia	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Calyptratae; Oestroidea; Calliphoridae; Chrysomyinae; Chrysomyini; Cochliomyia	Lineage
Cochliomyia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 66360)	Parent	Cochliomyia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 66360)	Parent
115425 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 115425)	NCBI Taxonomy ID	115425 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 115425)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

Ace	Generic Gene Name	UniProtKB Drosophila melanogaster
	Synonyms	GenebankID or UniProtKB
AcChE; ace; ACE; ace-2;ache; AchE; AChE; CG17907; CHE; dAChE; dmAChE; DmAChE; Dmel\CG17907; Dm_ace; FBgn0000024; l(3)26; (3)87Ed	0	
7227.FBpp0289713 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0289713)	String	
Belongs to the type-B carboxylesterase/lipase family.	Sequence Similarities	
GO:0042803 : protein homodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0042803)	GO - Molecular Function	
GO:0003990 : acetylcholinesterase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003990)		
GO:0004104 : cholinesterase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004104)		

GO:0043199 : sulfate binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0043199>)
GO - Biological Process

GO:0006581 : acetylcholine catabolic process

(<https://www.ebi.ac.uk/QuickGO/term/GO:0006581>)

GO:0001507 : acetylcholine catabolic process in synaptic cleft

(<https://www.ebi.ac.uk/QuickGO/term/GO:0001507>)

GO:0007268 : chemical synaptic transmission

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007268>)

GO:0042426 : choline catabolic process

(<https://www.ebi.ac.uk/QuickGO/term/GO:0042426>)

GO:0042331 : phototaxis (<https://www.ebi.ac.uk/QuickGO/term/GO:0042331>)

GO - Cellular Component

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)

GO:0031225 : anchored component of membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0031225>)

GO:0030054 : cell junction (<https://www.ebi.ac.uk/QuickGO/term/GO:0030054>)

GO:0043083 : synaptic cleft (<https://www.ebi.ac.uk/QuickGO/term/GO:0043083>)

Presumptive Null

No (<https://www.gephebase.org/search-criteria?/and+Presumptive+Null=%22No%22#gephebase-summary-title>)

Molecular Type

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular+Type=%22Coding%22#gephebase-summary-title>)

Aberration Type

SNP (<https://www.gephebase.org/search-criteria?/and+Aberration+Type=%22SNP%22#gephebase-summary-title>)

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

F466Y

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%22Candidate+Gene%22#gephebase-summary-title>)

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Phe	Tyr	466

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

da Silva NM; de Carvalho RA; de Azeredo-Espin AM

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.

Copyright © 2010 Elsevier B.V. All rights reserved.

Additional References

RELATED GEPHE

Related Genes

1 (esterase isozyme E3) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=%22115425%22/and+Trait=%22Xenobiotic+resistance%22/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

