

GEPHE SUMMARY

	Gephebase Gene		GepheID
Acetylcholinesterase (Ace-1) (https://www.gephebase.org/search-criteria?/and+Gene)		GP00002592	
Gephebase= [^] Acetylcholinesterase (Ace-1) [^] #gephebase-summary-title			Main curator
	Entry Status	Courtier	
Published			

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)	
criteria= [^] Xenobiotic resistance (insecticide) [^] #gephebase-summary-title	Trait State in Taxon A
Tetranychus urticae - sensitive	
	Trait State in Taxon B
Tetranychus urticae - 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
Tetranychus urticae		Tetranychus urticae	
(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms= [^] Tetranychus urticae [^] #gephebase-summary-title)		(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms= [^] Tetranychus urticae [^] #gephebase-summary-title)	
	Common Name		Common Name
two-spotted spider mite		two-spotted spider mite	
	Synonyms		Synonyms
two-spotted spider mite; red spider mite; twospotted mite; Tetranychus urticae Koch, 1836		two-spotted spider mite; red spider mite; twospotted mite; Tetranychus urticae Koch, 1836	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidae; Tetranychidae; Tetranychus		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidae; Tetranychidae; Tetranychus	
	Parent		Parent
Tetranychus () - (Rank: genus)		Tetranychus () - (Rank: genus)	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32263)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32263)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
32264		32264	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32264)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32264)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Drosophila melanogaster
Ace		P07140 (http://www.uniprot.org/uniprot/P07140)
	Synonyms	GenebankID or UniProtKB
AcChE; ace; ACE; ace-2; ache; AchE; AchE; CG17907; CHE; dAcChE; dmAcChE; DmAcChE; Dmel\CG17907; Dm_ace; FBgn0000024; l(3)26; l(3)87Ed		()
	String	
7227.FBpp0289713		
(http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0289713)		
	Sequence Similarities	
Belongs to the type-B carboxylesterase/lipase family.		
	GO - Molecular Function	
GO:0042803 : protein homodimerization activity		
(https://www.ebi.ac.uk/QuickGO/term/GO:0042803)		
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 ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null+No))

Molecular Type

Coding ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type+Coding))

Aberration Type

SNP ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type+SNP))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

F331C

Experimental Evidence

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

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

Main Reference

Sequence of a cDNA encoding acetylcholinesterase from susceptible and resistant two-spotted spider mite, *Tetranychus urticae*. (2003) (<https://pubmed.ncbi.nlm.nih.gov/12706630>)

Authors

Anazawa Y; Tomita T; Aiki Y; Kozaki T; Kono Y

Abstract

Acetylcholinesterase (AChE) from two-spotted spider mites, *Tetranychus urticae* was compared between an organophosphate susceptible (TKD) and a resistant (NCN) strain. The AChE of TKD had lower affinity to acetylthiocholine and propionylthiocholine than that of NCN, and the inhibition of AChE by DDVP, ambenonium, eserine and n-methyl-eserine showed that NCN was more insensitive than TKD. AChE cDNA sequence was determined, and the 687 amino acids of primary structure were deduced. There were six replacements of amino acid residues in TKD and two in NCN. #F331(439)C was the only substitution unique to NCN, however, this mutation existed homozygously in only two out of nine mites. This residue is one of the gorge lining components, and #F331(439)C might act an important role in the sensitivity of AChE to the inhibitors.

Additional References

Genotype to phenotype, the molecular and physiological dimensions of resistance in arthropods. (2015) (<https://pubmed.ncbi.nlm.nih.gov/26047113>)

RELATED GEPHE

Related Genes

8 (Chitin synthase 1 (CHS1), CPR, CYP392A16, CYP392E8, cytochrome b, glutamate-gated chloride channel (GluCl), para (kdr), PSST) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID+32264#/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gpepbase-summary-title>)

Related Haplotypes

5 ([https://www.gephebase.org/search-criteria?/or+Gene+Gephebase+Acetylcholinesterase+\(Ace-1\)/and+Taxon+ID+32264#/or+Gene+Gephebase+Acetylcholinesterase+\(Ace-1\)/and+Taxon+ID+32264#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase+Acetylcholinesterase+(Ace-1)/and+Taxon+ID+32264#/or+Gene+Gephebase+Acetylcholinesterase+(Ace-1)/and+Taxon+ID+32264#gpepbase-summary-title))

EXTERNAL LINKS

COMMENTS

