

## GEPHE SUMMARY

	Gephebase Gene		GepheID
Acetylcholinesterase (Ace-2) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> )		GP00002575	
Gephebase= <sup>^</sup> Acetylcholinesterase (Ace-2) <sup>^</sup> #gephebase-summary-title			Main curator
Published	Entry Status	Courtier	

## PHENOTYPIC CHANGE

	Trait Category
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> )	
Category= <sup>^</sup> Physiology <sup>^</sup> #gephebase-summary-title	Trait
Xenobiotic resistance (insecticide) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> )	
criteria= <sup>^</sup> Xenobiotic resistance (insecticide) <sup>^</sup> #gephebase-summary-title	Trait State in Taxon A
Musca domestica - sensitive	
	Trait State in Taxon B
Drosophila melanogaster - resistant	
	Ancestral State
Taxon A	
	Taxonomic Status
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> )	
Status= <sup>^</sup> Intraspecific <sup>^</sup> #gephebase-summary-title	

Taxon A	Latin Name	Taxon B	Latin Name
Musca domestica		Musca domestica	
( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> )		( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> )	
domestica <sup>^</sup> #gephebase-summary-title	Common Name	domestica <sup>^</sup> #gephebase-summary-title	Common Name
house fly		house fly	
	Synonyms		Synonyms
house fly; Musca domestica Linnaeus, 1758		house fly; Musca domestica Linnaeus, 1758	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Calypratae; Muscoidea; Muscidae; Muscinae; Muscini; Musca; Musca		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Calypratae; Muscoidea; Muscidae; Muscinae; Muscini; Musca; Musca	
	Parent		Parent
Musca () - (Rank: subgenus)		Musca () - (Rank: subgenus)	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=44052">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=44052</a> )	NCBI Taxonomy ID	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=44052">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=44052</a> )	NCBI Taxonomy ID
7370		7370	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7370">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7370</a> )		( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7370">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7370</a> )	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

## GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Drosophila melanogaster
Ace		P07140 ( <a href="http://www.uniprot.org/uniprot/P07140">http://www.uniprot.org/uniprot/P07140</a> )
	Synonyms	GenebankID or UniProtKB
AcChE; ace; ACE; ace-2; ache; AchE; AChE; CG17907; CHE; dAChE; dmAChE; DmAChE; Dmel\CG17907; Dm_ace; FBgn0000024; I(3)26; I(3)87Ed		()
	String	
7227.FBpp0289713		
( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0289713">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0289713</a> )		
	Sequence Similarities	
Belongs to the type-B carboxylesterase/lipase family.		
	GO - Molecular Function	
GO:0042803 : protein homodimerization activity		
( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0042803">https://www.ebi.ac.uk/QuickGO/term/GO:0042803</a> )		
GO:0003990 : acetylcholinesterase activity		
( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003990">https://www.ebi.ac.uk/QuickGO/term/GO:0003990</a> )		
GO:0004104 : cholinesterase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004104">https://www.ebi.ac.uk/QuickGO/term/GO:0004104</a> )		

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>)

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

Presumptive Null

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

Molecular Type

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

Aberration Type

Nonsynonymous

SNP Coding Change

I129V

Molecular Details of the Mutation

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

Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Ile	Val	129

Fenitroxon insensitive acetylcholinesterases of the housefly, *Musca domestica* associated with point mutations. (2001) (<https://pubmed.ncbi.nlm.nih.gov/11483435>)

Main Reference

Kozaki T; Shono T; Tomita T; Kono Y

Authors

The cDNA of AChE in the housefly, *Musca domestica*, was sequenced and individual flies were genotyped by this gene in an inhibition assay of AChE activity with an organophosphate, fenitroxon. Mutations at Gly(342) and Tyr(407), which are reportedly conserved in resistant strains of *Drosophila*, were associated with the insensitivity to fenitroxon. Two other mutations, Ile(162) and Val(260), did not have an apparent effect on insensitivity. However, the four mutations are located in the active site of the enzyme, and therefore the non-neutral mutations in this gene are considered to cause the insensitivity of AChE in the development of insecticide resistance of the housefly.

Abstract

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

Additional References

## RELATED GEPHE

5 (Acetylcholinesterase (Ace), CYP6D1, esterase isozyme E7 = E3, para (kdr), resistance to dieldrin) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=~7370~/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Genes

4 ([https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~Acetylcholinesterase+\(Ace-2\)~/and+Taxon+ID=~7370~/or+Gene+Gephebase=~Acetylcholinesterase+\(Ace-2\)~/and+Taxon+ID=~7370~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~Acetylcholinesterase+(Ace-2)~/and+Taxon+ID=~7370~/or+Gene+Gephebase=~Acetylcholinesterase+(Ace-2)~/and+Taxon+ID=~7370~#gephebase-summary-title))

Related Haplotypes

## EXTERNAL LINKS

## COMMENTS

