

## GEPHE SUMMARY

**Gephebase Gene**  
Acetylcholinesterase (Ace)

**Entry Status**  
Published

**GepheID**  
GP00002013

**Main curator**  
Courtier

## PHENOTYPIC CHANGE

**Trait Category**  
Physiology

**Trait**  
Xenobiotic resistance (insecticide)

**Trait State in Taxon A**  
Tetranychus urticae - sensitive

**Trait State in Taxon B**  
Tetranychus urticae - resistant

**Ancestral State**  
Taxon A

**Taxonomic Status**  
Intraspecific

### Taxon A

**Latin Name**  
*Tetranychus urticae*

**Common Name**  
two-spotted spider mite

**Synonyms**  
two-spotted spider mite; red spider mite; twospotted mite; Tetranychus urticae Koch, 1836

**Rank**  
species

**Lineage**  
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidae; Tetranychidae; Tetranychus

**Parent**  
Tetranychus () - (Rank: genus)

**NCBI Taxonomy ID**  
32264

**is Taxon A an Intraspecies?**  
No

### Taxon B

**Latin Name**  
*Tetranychus urticae*

**Common Name**  
two-spotted spider mite

**Synonyms**  
two-spotted spider mite; red spider mite; twospotted mite; Tetranychus urticae Koch, 1836

**Rank**  
species

**Lineage**  
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidae; Tetranychidae; Tetranychus

**Parent**  
Tetranychus () - (Rank: genus)

**NCBI Taxonomy ID**  
32264

**is Taxon B an Intraspecies?**  
No

## GENOTYPIC CHANGE

**Generic Gene Name**  
Ace

**Synonyms**  
AcChE; ace; ACE; ace-2; ache; AchE; AChE; CG17907; CHE; dAChE; dmAChE; DmAChE; Dmel\CG17907; Dm\_ace; FBgn0000024; l(3)26; l(3)87Ed

**String**  
7227.FBpp0289713

**Sequence Similarities**  
Belongs to the type-B carboxylesterase/lipase family.

**GO - Molecular Function**  
GO:0042803 : protein homodimerization activity  
GO:0003990 : acetylcholinesterase activity  
GO:0004104 : cholinesterase activity  
GO:0043199 : sulfate binding

**GO - Biological Process**  
GO:0006581 : acetylcholine catabolic process  
GO:0001507 : acetylcholine catabolic process in synaptic cleft  
GO:0007268 : chemical synaptic transmission  
GO:0042426 : choline catabolic process

**UniProtKB Drosophila melanogaster**  
P07140

**GenebankID or UniProtKB**

GO:0042331 : phototaxis

GO - Cellular Component

GO:0005886 : plasma membrane

GO:0005737 : cytoplasm

GO:0031225 : anchored component of membrane

GO:0030054 : cell junction

GO:0043083 : synaptic cleft

Presumptive Null

No

Molecular Type

Coding

Aberration Type

SNP

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

several non-synonymous SNP - exact causing amino acid change(s) unknown

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)

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

## RELATED GEPHE

Related Genes

1 (Chitin synthase 1 (CHS1))

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS