

# GEPHE SUMMARY

	Gephebase Gene	GephelD
acetyl-CoA carboxylase (ACC) ( <a href="https://www.gephebase.org/search-criteria/?and+Gene">https://www.gephebase.org/search-criteria/?and+Gene</a> ) Gephebase=^acetyl-CoA carboxylase (ACC)^#gephebase-summary-title)	GP00002618	Main curator
	Entry Status	Courtier
Published		

## 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=^Physiology^#gephebase-summary-title)	Trait
Xenobiotic resistance (insecticide; spirotetramat) ( <a href="https://www.gephebase.org/search-criteria/?and+Trait=^Xenobiotic+resistance+(insecticide;+spirotetramat)^#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Trait=^Xenobiotic+resistance+(insecticide;+spirotetramat)^#gephebase-summary-title</a> )	Trait State in Taxon A
Caenorhabditis elegans - sensitive	Trait State in Taxon B
Caenorhabditis elegans - resistant line after mutagenesis and selection	Ancestral State
Taxon A	Taxonomic Status
Experimental Evolution ( <a href="https://www.gephebase.org/search-criteria/?and+Taxonomic">https://www.gephebase.org/search-criteria/?and+Taxonomic</a> Status=^Experimental Evolution^#gephebase-summary-title)	

Taxon A		Taxon B	
Latin Name		Latin Name	
Caenorhabditis elegans ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Caenorhabditis+elegans^#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Caenorhabditis+elegans^#gephebase-summary-title</a> )		Caenorhabditis elegans ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Caenorhabditis+elegans^#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Caenorhabditis+elegans^#gephebase-summary-title</a> )	
-		-	
Common Name		Common Name	
roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900	Synonyms	roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis	Lineage
Caenorhabditis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6237">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6237</a> )	Parent	Caenorhabditis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6237">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6237</a> )	Parent
6239 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6239">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6239</a> )	NCBI Taxonomy ID	6239 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6239">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6239</a> )	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

ACC	Generic Gene Name	UniProtKB Drosophila melanogaster
A1Z784_DROME; acc; Acc; ACoT; CG11198; CG8723; dACC; DmACC; Dmel\CG11198; FBgn0043811; Dmel_CG11198	Synonyms	GenebankID or UniProtKB
-	String	0
	Sequence Similarities	
	GO - Molecular Function	
GO:0005524 : ATP binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005524">https://www.ebi.ac.uk/QuickGO/term/GO:0005524</a> ) GO:0046872 : metal ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0046872">https://www.ebi.ac.uk/QuickGO/term/GO:0046872</a> ) GO:0003989 : acetyl-CoA carboxylase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003989">https://www.ebi.ac.uk/QuickGO/term/GO:0003989</a> )		
	GO - Biological Process	
GO:0006633 : fatty acid biosynthetic process ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0006633">https://www.ebi.ac.uk/QuickGO/term/GO:0006633</a> )		

GO:0019432 : triglyceride biosynthetic process  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0019432>)  
 GO:0009744 : response to sucrose (<https://www.ebi.ac.uk/QuickGO/term/GO:0009744>)  
 GO:0000902 : cell morphogenesis (<https://www.ebi.ac.uk/QuickGO/term/GO:0000902>)  
 GO:0005977 : glycogen metabolic process  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0005977>)  
 GO:0071329 : cellular response to sucrose stimulus  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0071329>)  
 GO:2001295 : malonyl-CoA biosynthetic process  
 (<https://www.ebi.ac.uk/QuickGO/term/GO:2001295>)

#### GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)  
 GO:0005739 : mitochondrion (<https://www.ebi.ac.uk/QuickGO/term/GO:0005739>)

Presumptive Null

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

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

A1847V

Experimental Evidence

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

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

#### Main Reference

Studies of an insecticidal inhibitor of acetyl-CoA carboxylase in the nematode *C. elegans*. (2020) (<https://pubmed.ncbi.nlm.nih.gov/32828380>)

Authors

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Abstract

We have studied the mode of action of the insecticide spirotetramat in the nematode *Caenorhabditis elegans*. A combination of symptomology, forward genetics and genome editing show that spirotetramat acts on acetyl-CoA carboxylase (ACC) in *C. elegans*, as it does in insects. We found *C. elegans* embryos exposed to spirotetramat show a cell division defect which closely resembles the phenotype of loss-of-function mutations in the gene *pod-2*, which encodes ACC. We then identified two mutations in the carboxyl transferase domain of *pod-2* (ACC) which confer resistance and were confirmed using CRISPR/Cas9. One of these mutations substitutes an invertebrate-specific amino acid with one ubiquitous in other taxa; this residue may, therefore, be a determinant of the selectivity of spirotetramat for invertebrates. Such a mutation may also be the target of selection for resistance in the field. Our study is a further demonstration of the utility of *C. elegans* in studying bioactive chemicals.

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Additional References

## RELATED GEPHE

	Related Genes
3 (beta-tubulin (ben-1), GLC-1, str-217) ( <a href="https://www.gephebase.org/search-criteria?/or+Taxon ID=^6239^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title">https://www.gephebase.org/search-criteria?/or+Taxon ID=^6239^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title</a> )	Related Haplotypes
1 ( <a href="https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^acetyl-CoA carboxylase (ACC)^/and+Taxon ID=^6239^/or+Gene Gephebase=^acetyl-CoA carboxylase (ACC)^/and+Taxon ID=^6239^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^acetyl-CoA carboxylase (ACC)^/and+Taxon ID=^6239^/or+Gene Gephebase=^acetyl-CoA carboxylase (ACC)^/and+Taxon ID=^6239^#gephebase-summary-title</a> )	

## EXTERNAL LINKS

## COMMENTS

A1559V apeared independently in two lines. A1847V also apeared independently in two lines.

