

GEPHE SUMMARY

	Gephebase Gene		GepheID
GLC-1 (<a +glc-1"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+GLC-1"#gephebase-summary-title)		GP00000400	
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

	Trait Category		
Physiology (<a +physiology"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology"#gephebase-summary-title)			
	Trait		
Xenobiotic resistance (antihelmintics) (<a +xenobiotic+resistance+(antihelmintics)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Xenobiotic+resistance+(antihelmintics)+"#gephebase-summary-title)			
	Trait State in Taxon A		
C. elegans			
	Trait State in Taxon B		
C. elegans			
	Ancestral State		
Taxon A			
	Taxonomic Status		
Intraspecific (<a +intraspecific"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific"#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Caenorhabditis elegans (<a +caenorhabditis+elegans"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Caenorhabditis+elegans"#gephebase-summary-title)		Caenorhabditis elegans (<a +caenorhabditis+elegans"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Caenorhabditis+elegans"#gephebase-summary-title)	
	Common Name		Common Name
-		-	
	Synonyms		Synonyms
roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900		roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis	
	Parent		Parent
Caenorhabditis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6237)		Caenorhabditis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6237)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
6239 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6239)		6239 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6239)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Caenorhabditis elegans
glc-1		G5EBR3 (http://www.uniprot.org/uniprot/G5EBR3)	
	Synonyms		GenebankID or UniProtKB
F11A5.10		U14524 (https://www.ncbi.nlm.nih.gov/nuccore/U14524)	
	String		
6239.F11A5.10 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=6239.F11A5.10)			
	Sequence Similarities		
Belongs to the ligand-gated ion channel (TC 1.A.9) family. Glutamate-gated chloride channel (TC 1.A.9.4) subfamily.			
	GO - Molecular Function		
GO:0004888 : transmembrane signaling receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004888)			
GO:0042802 : identical protein binding (https://www.ebi.ac.uk/QuickGO/term/GO:0042802)			
GO:0005254 : chloride channel activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005254)			
GO:0008068 : extracellularly glutamate-gated chloride channel activity			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0008068>)
 GO:0016595 : glutamate binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0016595>)
 GO - Biological Process
 GO:0007165 : signal transduction (<https://www.ebi.ac.uk/QuickGO/term/GO:0007165>)
 GO:0007268 : chemical synaptic transmission
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0007268>)
 GO:0051259 : protein complex oligomerization
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0051259>)
 GO:0034220 : ion transmembrane transport
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0034220>)
 GO:0050877 : nervous system process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0050877>)
 GO:0042391 : regulation of membrane potential
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0042391>)
 GO:1902476 : chloride transmembrane transport
 (<https://www.ebi.ac.uk/QuickGO/term/GO:1902476>)
 GO:0031987 : locomotion involved in locomotory behavior
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0031987>)

GO - Cellular Component

GO:0005887 : integral component of plasma membrane
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)
 GO:0030054 : cell junction (<https://www.ebi.ac.uk/QuickGO/term/GO:0030054>)
 GO:0043005 : neuron projection (<https://www.ebi.ac.uk/QuickGO/term/GO:0043005>)
 GO:0045211 : postsynaptic membrane
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0045211>)
 GO:0045202 : synapse (<https://www.ebi.ac.uk/QuickGO/term/GO:0045202>)

Yes ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=~Yes^#gephebase-summary-title))

Presumptive Null

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

Molecular Type

Deletion ([https://www.gephebase.org/search-criteria?/and+Aberration Type=~Deletion^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=~Deletion^#gephebase-summary-title))

Aberration Type

10-99 bp

Deletion Size

4aa deletion

Molecular Details of the Mutation

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

Experimental Evidence

Natural variation in a chloride channel subunit confers avermectin resistance in *C. elegans*. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22301316>)

Main Reference

Ghosh R; Andersen EC; Shapiro JA; Gerke JP; Kruglyak L

Authors

Resistance of nematodes to anthelmintics such as avermectins has emerged as a major global health and agricultural problem, but genes conferring natural resistance to avermectins are unknown. We show that a naturally occurring four-amino-acid deletion in the ligand-binding domain of GLC-1, the alpha-subunit of a glutamate-gated chloride channel, confers resistance to avermectins in the model nematode *Caenorhabditis elegans*. We also find that the same variant confers resistance to the avermectin-producing bacterium *Streptomyces avermitilis*. Population-genetic analyses identified two highly divergent haplotypes at the *glc-1* locus that have been maintained at intermediate frequencies by long-term balancing selection. These results implicate variation in glutamate-gated chloride channels in avermectin resistance and provide a mechanism by which such resistance can be maintained.

Abstract

Additional References

RELATED GEPHE

2 (beta-tubulin (ben-1), str-217) ([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))

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

@BalancingSelection

