

GEPHE SUMMARY

	Gephebase Gene		GephelD
glutamate-gated chloride channel (GluCl) (https://www.gephebase.org/search-criteria?/and+Gene=Gephebase+^glutamate-gated+chloride+channel+(GluCl)+^#gephebase-summary-title)		GP00002602	
	Entry Status	Courtier	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+Trait=Category+^Physiology+^#gephebase-summary-title)		Trait	
Xenobiotic resistance (insecticide; nodulisporic acid) (https://www.gephebase.org/search-criteria?/and+Trait+^Xenobiotic+resistance+(insecticide;+nodulisporic+acid)+^#gephebase-summary-title)			
	Trait State in Taxon A		
Drosophila melanogaster - sensitive		Trait State in Taxon B	
Drosophila melanogaster - resistant			
	Ancestral State		
Taxon A		Taxonomic Status	
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status+^Intraspecific+^#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+^Drosophila+melanogaster+^#gephebase-summary-title)		Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+^Drosophila+melanogaster+^#gephebase-summary-title)	
	Common Name		Common Name
fruit fly		fruit fly	
	Synonyms		Synonyms
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster		Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	
	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; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup		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; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	
	Parent		Parent
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)		melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)		7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)	
	is Taxon A an Infrasppecies?		is Taxon B an Infrasppecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Drosophila melanogaster
GluClalpha		Q94900 (http://www.uniprot.org/uniprot/Q94900)	
	Synonyms		GenebankID or UniProtKB Drosophila melanogaster
BcDNA:HL07853; CG7535; CT23049; dGluCl-alpha; Dm-GluCl; Dmel\CG7535; DmGlu; DmGluClalpha; DrosGlu-Cl-alpha; DrosGluCl; DrosGluCl-alpha; DrosGluCl-alpha1; glc; glu; GluCl; GLUCL; GluCla; gluClalpha; GluClalpha1		Q94900 (https://www.ncbi.nlm.nih.gov/nuccore/Q94900)	
	String		
7227.FBpp0099473 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0099473)			
	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:1904315 : transmitter-gated ion channel activity involved in regulation of postsynaptic membrane potential (<https://www.ebi.ac.uk/QuickGO/term/GO:1904315>)
GO:0005231 : excitatory extracellular ligand-gated ion channel activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005231>)
GO:0008068 : extracellularly glutamate-gated chloride channel activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008068>)
GO:0030594 : neurotransmitter receptor activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0030594>)

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: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:0006821 : chloride transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0006821>)

GO - Cellular Component

GO:0016021 : integral component of membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)
GO:0005887 : integral component of plasma membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)
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>)
GO:0034707 : chloride channel complex
(<https://www.ebi.ac.uk/QuickGO/term/GO:0034707>)
GO:0070161 : anchoring junction (<https://www.ebi.ac.uk/QuickGO/term/GO:0070161>)

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
P299S	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	Pro	Ser	299

Drug-resistant Drosophila indicate glutamate-gated chloride channels are targets for the antiparasitics nodulisporic acid and ivermectin. (2000) (https://pubmed.ncbi.nlm.nih.gov/11095718)	Main Reference
Kane NS; Hirschberg B; Qian S; Hunt D; Thomas B; Brochu R; Ludmerer SW; Zheng Y; Smith M; Arena JP; Cohen CJ; Schmatz D; Warmke J; Cully DF	Authors
The fruit fly Drosophila melanogaster was used to examine the mode of action of the novel insecticide and acaricide nodulisporic acid. Flies resistant to nodulisporic acid were selected by stepwise increasing the dose of drug in the culture media. The resistant strain, glc(1), is at least 20-fold resistant to nodulisporic acid and 3-fold cross-resistant to the parasiticide ivermectin, and exhibited decreased brood size, decreased locomotion, and bang sensitivity. Binding assays using glc(1) head membranes showed a marked decrease in the affinity for nodulisporic acid and ivermectin. A combination of genetics and sequencing identified a proline to serine mutation (P299S) in the gene coding for the glutamate-gated chloride channel subunit DmGluClalpha. To examine the effect of this mutation on the biophysical properties of DmGluClalpha channels, it was introduced into a recombinant DmGluClalpha, and RNA encoding wild-type and mutant subunits was injected into Xenopus oocytes. Nodulisporic acid directly activated wild-type and mutant DmGluClalpha channels. However, mutant channels were approximately 10-fold less sensitive to activation by nodulisporic acid, as well as ivermectin and the endogenous ligand glutamate, providing direct evidence that nodulisporic acid and ivermectin act on DmGluClalpha channels.	Abstract

Additional References

RELATED GEPHE

19 (Acetylcholinesterase (Ace-2), alcohol dehydrogenase (Adh), Aldehyde dehydrogenase (Aldh), CG11699, Cyp12d1, Cyp28d1, Cyp28d1-Cyp28d2, cyp6d2, cyp6g1, GSS (glutathione	Related Genes
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synthetase), GSTE1-E10 cluster, kin of irre (kire), para (kdr), PHGPx, resistance to dieldrin, RnrS, SOD1, Ugt86Dd, CHKov1) ([https://www.gephebase.org/search-criteria?/or+TaxonID=^7227^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+TaxonID=^7227^/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS