

## GEPHE SUMMARY

<p>glutamate-gated chloride channel (GluCl) (<a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^glutamate-gated+chloride+channel+(GluCl)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^glutamate-gated+chloride+channel+(GluCl)^#gephebase-summary-title</a>)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>GP00002603</p> <p>Courtier</p> <p>Entry Status</p>	<p>GepheID</p> <p>Main curator</p>
--	---	------------------------------------

## PHENOTYPIC CHANGE

<p>Physiology (<a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title</a>)</p> <p>Xenobiotic resistance (insecticide; ivermectin) (<a href="https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(insecticide;+ivermectin)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(insecticide;+ivermectin)^#gephebase-summary-title</a>)</p> <p>Cooperia onchophora - sensitive</p> <p>Cooperia onchophora - resistant</p> <p>Taxon A</p> <p>Intraspecific (<a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title</a>)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Cooperia onchophora</p> <p>(<a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Cooperia+onchophora^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Cooperia+onchophora^#gephebase-summary-title</a>)</p> <p>-</p> <p>-</p> <p>species</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Strongylida; Trichostrongyloidea; Cooperiidae; Cooperia</p> <p>Cooperia () - (Rank: genus)</p> <p>(<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=27827">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=27827</a>)</p> <p>27828</p> <p>(<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=27828">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=27828</a>)</p> <p>No</p>	<p>Cooperia onchophora</p> <p>(<a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Cooperia+onchophora^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Cooperia+onchophora^#gephebase-summary-title</a>)</p> <p>-</p> <p>-</p> <p>species</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Strongylida; Trichostrongyloidea; Cooperiidae; Cooperia</p> <p>Cooperia () - (Rank: genus)</p> <p>(<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=27827">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=27827</a>)</p> <p>27828</p> <p>(<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=27828">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=27828</a>)</p> <p>No</p>
--	---	--	--

## GENOTYPIC CHANGE

<p>GluClalpha</p> <p>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</p> <p>7227.FBpp0099473</p> <p>(<a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0099473">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0099473</a>)</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>UniProtKB Drosophila melanogaster</p> <p>Q94900 (<a href="http://www.uniprot.org/uniprot/Q94900">http://www.uniprot.org/uniprot/Q94900</a>)</p> <p>()</p> <p>GenebankID or UniProtKB</p>
---	--	---

Belongs to the ligand-gated ion channel (TC 1.A.9) family. Glutamate-gated chloride channel (TC 1.A.9.4) subfamily.

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>)

Presumptive Null

No ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title](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](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](https://www.gephebase.org/search-criteria?/and+Aberration+Type+SNP^#gephebase-summary-title))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

E114G V235A L256F in the GluCl $\alpha$ 3 ortholog and V60A R101Hin the GluCl $\beta$  ortholog.

Experimental Evidence

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

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

Main Reference

Mutations in the extracellular domains of glutamate-gated chloride channel  $\alpha$ 3 and  $\beta$  subunits from ivermectin-resistant *Cooperia oncophora* affect agonist sensitivity. (2004)

(<https://pubmed.ncbi.nlm.nih.gov/15147506>)

Authors

Njue AI; Hayashi J; Kinne L; Feng XP; Prichard RK

Abstract

Two full-length glutamate-gated chloride channel (GluCl) cDNAs, encoding GluCl $\alpha$ 3 and GluCl $\beta$  subunits, were cloned from ivermectin-susceptible (IVS) and -resistant (IVR) *Cooperia oncophora* adult worms. The IVS and IVR GluCl $\alpha$ 3 subunits differ at three amino acid positions, while the IVS and IVR GluCl $\beta$  subunits differ at two amino acid positions. The aim of this study was to determine whether mutations in the IVR subunits affect agonist sensitivity. The subunits were expressed singly and in combination in *Xenopus laevis* oocytes. Electrophysiological whole-cell voltage-clamp recordings showed that mutations in the IVR GluCl $\alpha$ 3 caused a modest but significant threefold loss of sensitivity to glutamate, the natural ligand for GluCl receptors. As well, a significant decrease in sensitivity to the anthelmintics ivermectin and moxidectin was observed in the IVR GluCl $\alpha$ 3 receptor. Mutations in the IVR GluCl $\beta$  subunit abolished glutamate sensitivity. Co-expressing the IVS GluCl $\alpha$ 3 and GluCl $\beta$  subunits resulted in heteromeric channels that were more sensitive to glutamate than the respective homomeric channels, demonstrating co-assembly of the subunits. In contrast, the heteromeric IVR channels were less sensitive to glutamate than the homomeric IVR GluCl $\alpha$ 3 channels. The heteromeric IVS channels were significantly more sensitive to glutamate than the heteromeric IVR channels. Of the three amino acids distinguishing the IVS and IVR GluCl $\alpha$ 3 subunits, only one of them, L256F, accounted for the differences in response between the IVS and IVR GluCl $\alpha$ 3 homomeric channels.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS