

## GEPHE SUMMARY

<p>HECW-1 (<a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~HECW-1~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~HECW-1~#gephebase-summary-title</a>)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00000452</p> <p>Martin</p>	<p>GepheID</p> <p>Main curator</p>
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## PHENOTYPIC CHANGE

<p>Behavior (<a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=~Behavior~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=~Behavior~#gephebase-summary-title</a>)</p> <p>Pathogen avoidance (<a href="https://www.gephebase.org/search-criteria?/and+Trait=~Pathogen+avoidance~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=~Pathogen+avoidance~#gephebase-summary-title</a>)</p> <p>C. elegans - N2</p> <p>C.elegans wild strains</p> <p>Data not curated</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>Taxon A</p> <p>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>)</p> <p>-</p> <p>roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900</p> <p>species</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis</p> <p>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>)</p> <p>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>)</p> <p>is Taxon A an Intraspecies?</p> <p>Yes</p> <p>C. elegans - N2</p>	<p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Rank</p> <p>Lineage</p> <p>Parent</p> <p>NCBI Taxonomy ID</p> <p>is Taxon B an Intraspecies?</p> <p>Taxon B Description</p>	<p>Taxon B</p> <p>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>)</p> <p>-</p> <p>roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900</p> <p>species</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis</p> <p>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>)</p> <p>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>)</p> <p>is Taxon B an Intraspecies?</p> <p>Yes</p> <p>C.elegans wild strains</p>	<p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Rank</p> <p>Lineage</p> <p>Parent</p> <p>NCBI Taxonomy ID</p> <p>is Taxon B an Intraspecies?</p> <p>Taxon B Description</p>
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## GENOTYPIC CHANGE

<p>hecw-1</p> <p>F45H7.6</p> <p>6239.F45H7.6 (<a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=6239.F45H7.6">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=6239.F45H7.6</a>)</p> <p>-</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p> <p>GO - Biological Process</p>	<p>G5EEJ0 (<a href="http://www.uniprot.org/uniprot/G5EEJ0">http://www.uniprot.org/uniprot/G5EEJ0</a>)</p> <p>BX284603 (<a href="https://www.ncbi.nlm.nih.gov/nucleotide/BX284603">https://www.ncbi.nlm.nih.gov/nucleotide/BX284603</a>)</p>	<p>UniProtKB Caenorhabditis elegans</p> <p>GenebankID or UniProtKB</p>
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GO:0061630 : ubiquitin protein ligase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0061630>)

GO:0016567 : protein ubiquitination (<https://www.ebi.ac.uk/QuickGO/term/GO:0016567>)

GO:0006511 : ubiquitin-dependent protein catabolic process (<https://www.ebi.ac.uk/QuickGO/term/GO:0006511>)

GO:0000209 : protein polyubiquitination  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0000209)  
 GO:0048814 : regulation of dendrite morphogenesis  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0048814)  
 GO:0045732 : positive regulation of protein catabolic process  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0045732)  
 GO:2000650 : negative regulation of sodium ion transmembrane transporter activity  
 (https://www.ebi.ac.uk/QuickGO/term/GO:2000650)  
 GO:0043161 : proteasome-mediated ubiquitin-dependent protein catabolic process  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0043161)  
 GO:1900424 : regulation of defense response to bacterium  
 (https://www.ebi.ac.uk/QuickGO/term/GO:1900424)

GO - Cellular Component

GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)

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

Y322C

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	-	-	-

Main Reference

Natural polymorphisms in *C. elegans* HECW-1 E3 ligase affect pathogen avoidance behaviour. (2011) (https://pubmed.ncbi.nlm.nih.gov/22089131)

Authors

Chang HC; Paek J; Kim DH

Abstract

Heritable variation in behavioural traits generally has a complex genetic basis, and thus naturally occurring polymorphisms that influence behaviour have been defined only in rare instances. The isolation of wild strains of *Caenorhabditis elegans* has facilitated the study of natural genetic variation in this species and provided insights into its diverse microbial ecology. *C. elegans* responds to bacterial infection with conserved innate immune responses and, although lacking the immunological memory of vertebrate adaptive immunity, shows an aversive learning response to pathogenic bacteria. Here, we report the molecular characterization of naturally occurring coding polymorphisms in a *C. elegans* gene encoding a conserved HECT domain-containing E3 ubiquitin ligase, HECW-1. We show that two distinct polymorphisms in neighbouring residues of HECW-1 each affect *C. elegans* behavioural avoidance of a lawn of *Pseudomonas aeruginosa*. Neuron-specific rescue and ablation experiments and genetic interaction analysis indicate that HECW-1 functions in a pair of sensory neurons to inhibit *P. aeruginosa* lawn avoidance behaviour through inhibition of the neuropeptide receptor NPR-1 (ref. 10), which we have previously shown promotes *P. aeruginosa* lawn avoidance behaviour. Our data establish a molecular basis for natural variation in a *C. elegans* behaviour that may undergo adaptive changes in response to microbial pathogens.

Additional References

## RELATED GEPHE

Related Genes

1 (npr-1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~6239^/and+Trait=Pathogen avoidance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~HECW-1^/and+Taxon ID=~6239^/or+Gene Gephebase=~HECW-1^/and+Taxon ID=~6239^#gephebase-summary-title)

## EXTERNAL LINKS

## COMMENTS

