

GEPHE SUMMARY

srx-44 (#gephebase-summary-title)	Gephebase Gene	GP00001504	GephelD
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Physiology (#gephebase-summary-title)	Trait Category		
Pheromone response (ascaroside) (https://www.gephebase.org/search-criteria?/and+Trait=^Pheromone response (ascaroside)#gephebase-summary-title)	Trait		
C. elegans roam-1 behavior (pheromone sensitive)	Trait State in Taxon A		
C. elegans - strain MY14 (pheromone insensitive)	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific (#gephebase-summary-title)	Taxonomic Status		
Taxon A	Latin Name	Taxon B	Latin Name
Caenorhabditis elegans (#gephebase-summary-title)	Common Name	Caenorhabditis elegans (#gephebase-summary-title)	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	
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) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6237)	Parent	Caenorhabditis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6237)	Parent
6239 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6239)	NCBI Taxonomy ID	6239 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6239)	NCBI Taxonomy ID
Yes	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
C. elegans - N2 strain	Taxon A Description	C. elegans - strain MY14	Taxon B Description

GENOTYPIC CHANGE

srx-43	Generic Gene Name	O45767 (http://www.uniprot.org/uniprot/O45767)	UniProtKB Caenorhabditis elegans
T10C6.3	Synonyms	0	GenebankID or UniProtKB
6239.T10C6.3 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 6239.T10C6.3)	String		
Belongs to the G-protein coupled receptor 1 family.	Sequence Similarities		
GO:0016503 : pheromone receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016503)	GO - Molecular Function		
GO:0035641 : locomotory exploration behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0035641)	GO - Biological Process		
GO:0019722 : calcium-mediated signaling			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0019722>)

GO:0071444 : cellular response to pheromone

(<https://www.ebi.ac.uk/QuickGO/term/GO:0071444>)

GO - Cellular Component

GO:0016021 : integral component of membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)

GO:0043204 : perikaryon (<https://www.ebi.ac.uk/QuickGO/term/GO:0043204>)

GO:0097730 : non-motile cilium (<https://www.ebi.ac.uk/QuickGO/term/GO:0097730>)

Presumptive Null

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

Molecular Type

Cis-regulatory (<https://www.gephebase.org/search-criteria/?and+Molecular+Type=%Cis-regulatory%#gephebase-summary-title>)

Aberration Type

Unknown (<https://www.gephebase.org/search-criteria/?and+Aberration+Type=%Unknown%#gephebase-summary-title>)

Molecular Details of the Mutation

Phenotypic change mapped to a small region located between 34bp and 72 bp upstream of the srx-44 start codon. This DNA region contains 9 changes between N2 strain and MY14 strain.

Experimental Evidence

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

Main Reference

Regulatory changes in two chemoreceptor genes contribute to a *Caenorhabditis elegans* QTL for foraging behavior. (2016) (<https://pubmed.ncbi.nlm.nih.gov/27893361>)

Authors

Greene JS; Dobosiewicz M; Butcher RA; McGrath PT; Bargmann CI

Abstract

Natural isolates of *C. elegans* differ in their sensitivity to pheromones that inhibit exploratory behavior. Previous studies identified a QTL for pheromone sensitivity that includes alternative alleles of srx-43, a chemoreceptor that inhibits exploration through its activity in ASI sensory neurons. Here we show that the QTL is multigenic and includes alternative alleles of srx-44, a second chemoreceptor gene that modifies pheromone sensitivity. srx-44 either promotes or inhibits exploration depending on its expression in the ASJ or ADL sensory neurons, respectively. Naturally occurring pheromone insensitivity results in part from previously described changes in srx-43 expression levels, and in part from increased srx-44 expression in ASJ, which antagonizes ASI and ADL. Antagonism between the sensory neurons results in cellular epistasis that is reflected in their transcription of insulin genes that regulate exploration. These results and genome-wide evidence suggest that chemoreceptor genes may be preferred sites of adaptive variation in *C. elegans*.

Additional References

Balancing selection shapes density-dependent foraging behaviour. (2016) (<https://pubmed.ncbi.nlm.nih.gov/27799655>)

RELATED GEPHE

Related Genes

1 (srx-43) (<https://www.gephebase.org/search-criteria/?or+Taxon+ID=%6239%and+Trait=Pheromone+response/and+groupHaplotypes=true%#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Epistasis Depending on its site of expression in either ADL or ASJ srx-44 enhances or inhibits the response to pheromones. The roam-1 QTL for pheromone regulation of foraging behavior reflects changes in at least two genes: srx-44 and srx-43. GxG interaction: The activity of srx-44 is only detectable in the presence of a functional srx-43 gene. Roam-1 QTL is under balancing selection such that both alleles are actively maintained in wild populations