GEPHE SUMMARY

Gephebase Gene
srx-44 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^srx-44^#gephebase-summary-title)

GepheID
GP00001504

Entry Status
Published

Main curator
Courtier

PHENOTYPIC CHANGE

Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait
Pheromone response (ascaroside) (https://www.gephebase.org/search-criteria?/and+Trait=^Pheromone response (ascaroside)^#gephebase-summary-title)

Trait State in Taxon A
C. elegans roam-1 behavior (pheromone sensitive)

Trait State in Taxon B
C. elegans - strain MY14 (pheromone insensitive)

Ancestral State
Taxon A

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Caenorhabditis elegans (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Caenorhabditis elegans^#gephebase-summary-title)

Common Name
-

Synonyms
roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis

Parent
Caenorhabditis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6237)

NCBI Taxonomy ID
6239 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6239)

is Taxon A an Infraspecies?
Yes

Taxon A Description
C. elegans - N2 strain

Taxon B

Latin Name
Caenorhabditis elegans (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Caenorhabditis elegans^#gephebase-summary-title)

Common Name
-

Synonyms
roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis

Parent
Caenorhabditis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6237)

NCBI Taxonomy ID
6239 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6239)

is Taxon B an Infraspecies?
Yes

Taxon B Description
C. elegans - strain MY14

GENOTYPIC CHANGE

Generic Gene Name
srx-43

Synonyms
T10C6.3

String
6239.T10C6.3 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 6239.T10C6.3)

Sequence Similarities
Belongs to the G-protein coupled receptor 1 family.

GO - Molecular Function
GO:0016503 : pheromone receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016503)

GO - Biological Process
GO:0035641 : locomotory exploration behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0035641)
GO:0019722 : calcium-mediated signaling

UniProtKB Caenorhabditis elegans
O45767 (http://www.uniprot.org/uniprot/O45767)

GenebankID or UniProtKB
()

(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