

GEPHE SUMMARY

Gephebase Gene		GepheID
srg-36/37 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~srg-36/37^#gephebase-summary-title)	GP00001075	
Entry Status	Martin	Main curator
Published		

PHENOTYPIC CHANGE

Trait Category			
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology^#gephebase-summary-title)		Trait	
Diapause (resistance to dauer-inducing pheromone) (https://www.gephebase.org/search-criteria?/and+Trait=~Diapause (resistance to dauer-inducing pheromone)^#gephebase-summary-title)		Trait State in Taxon A	
C. elegans - N2		Trait State in Taxon B	
C. elegans CC1		Ancestral State	
Data not curated		Taxonomic Status	
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Domesticated^#gephebase-summary-title)			
Taxon A		Taxon B	
Caenorhabditis elegans (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Caenorhabditis+elegans^#gephebase-summary-title)		Caenorhabditis elegans (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Caenorhabditis+elegans^#gephebase-summary-title)	
Common Name		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	
Rank		Rank	
species		species	
Lineage		Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis	
Parent		Parent	
Caenorhabditis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6237)		Caenorhabditis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6237)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
6239 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6239)		6239 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6239)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
Yes		Yes	
Taxon A Description		Taxon B Description	
C. elegans - N2		C. elegans CC1	

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Caenorhabditis elegans
srg-34	Synonyms	Q9XXQ5 (http://www.uniprot.org/uniprot/Q9XXQ5)
CELE_Y51A2D.12; Y51A2D.12	String	GenebankID or UniProtKB
6239.Y51A2D.12 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=6239.Y51A2D.12)	Sequence Similarities	BX284605 (https://www.ncbi.nlm.nih.gov/nuccore/BX284605)
Belongs to the nematode receptor-like protein srg family.		
GO - Molecular Function		
GO:0004888 : transmembrane signaling receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004888)		
GO - Biological Process		
GO:0007606 : sensory perception of chemical stimulus (https://www.ebi.ac.uk/QuickGO/term/GO:0007606)		

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

Yes (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes~#gephebase-summary-title>)

Gene Loss (<https://www.gephebase.org/search-criteria?/and+Molecular Type=~Gene Loss~#gephebase-summary-title>)

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

100-999 bp

6795bp deletion

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

Parallel evolution of domesticated *Caenorhabditis* species targets pheromone receptor genes. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21849976>)

McGrath PT; Xu Y; Ailion M; Garrison JL; Butcher RA; Bargmann CI

Evolution can follow predictable genetic trajectories, indicating that discrete environmental shifts can select for reproducible genetic changes. Conspecific individuals are an important feature of an animal's environment, and a potential source of selective pressures. Here we show that adaptation of two *Caenorhabditis* species to growth at high density, a feature common to domestic environments, occurs by reproducible genetic changes to pheromone receptor genes. Chemical communication through pheromones that accumulate during high-density growth causes young nematode larvae to enter the long-lived but non-reproductive dauer stage. Two strains of *Caenorhabditis elegans* grown at high density have independently acquired multigenic resistance to pheromone-induced dauer formation. In each strain, resistance to the pheromone ascaroside C3 results from a deletion that disrupts the adjacent chemoreceptor genes *serpentine* receptor class g (*srg*)-36 and -37. Through misexpression experiments, we show that these genes encode redundant G-protein-coupled receptors for ascaroside C3. Multigenic resistance to dauer formation has also arisen in high-density cultures of a different nematode species, *Caenorhabditis briggsae*, resulting in part from deletion of an *srg* gene paralogous to *srg*-36 and *srg*-37. These results demonstrate rapid remodelling of the chemoreceptor repertoire as an adaptation to specific environments, and indicate that parallel changes to a common genetic substrate can affect life-history traits across species.

RELATED GEPHE

2 (nurf-1, scd-2) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~6239~/and+Trait=Diapause/and+groupHaplotypes=true#gephebase-summary-title>)

1 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~srg-36/37~/and+Taxon ID=~6239~/or+Gene Gephebase=~srg-36/37~/and+Taxon ID=~6239~#gephebase-summary-title>)

EXTERNAL LINKS

COMMENTS

Cluster of paralogous genes