## GEPHE SUMMARY

Gephebase Gene
glb-5 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^glb-5^#gephebase-summary-title)

GepheID
GP00000399

Entry Status
Published

Main curator
Martin

## PHENOTYPIC CHANGE

Trait #1

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

Trait
CO2 avoidance (https://www.gephebase.org/search-criteria?/and+Trait=^CO2 avoidance^#gephebase-summary-title)

Trait State in Taxon A
C. elegans - N2

Trait State in Taxon B
C.elegans - CB4856

Trait #2

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

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

Trait State in Taxon A
-

Trait State in Taxon B
-

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

### 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 -CB4856

## GENOTYPIC CHANGE

Generic Gene Name

glb-5

Synonyms

C18C4.1; CELE_C18C4.1

String

6239.C18C4.1b
(http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 6239.C18C4.1b )

UniProtKB Caenorhabditis elegans

A3RMS5 (http://www.uniprot.org/uniprot/A3RMS5)

GenebankID or UniProtKB

BX284605 (https://www.ncbi.nlm.nih.gov/nuccore/BX284605)

Sequence Similarities

Belongs to the globin family.

GO - Molecular Function

GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)
GO:0020037 : heme binding (https://www.ebi.ac.uk/QuickGO/term/GO:0020037)
GO:0005344 : oxygen carrier activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005344)
GO:0019826 : oxygen sensor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0019826)

GO - Biological Process

GO:0003032 : detection of oxygen (https://www.ebi.ac.uk/QuickGO/term/GO:0003032)

GO - Cellular Component

-

Presumptive Null

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

Molecular Type

Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title)

Aberration Type

Indel (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Indel^#gephebase-summary-title)

Indel Size

100-999 bp

Molecular Details of the Mutation

765bp insertion/duplication resulting in a truncation of the last 179 amino acids of the protein and the inclusion of 40 different residues

Experimental Evidence

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

Main Reference

Quantitative mapping of a digenic behavioral trait implicates globin variation in C. elegans sensory behaviors. (2009) (https://pubmed.ncbi.nlm.nih.gov/19285466)

Authors

McGrath PT; Rockman MV; Zimmer M; Jang H; Macosko EZ; Kruglyak L; Bargmann CI

Abstract

Most heritable behavioral traits have a complex genetic basis, but few multigenic traits are understood at a molecular level. Here we show that the C. elegans strains N2 and CB4856 have opposite behavioral responses to simultaneous changes in environmental O(2) and CO(2). We identify two quantitative trait loci (QTL) that affect this trait and map each QTL to a single-gene polymorphism. One gene, npr-1, encodes a previously described neuropeptide receptor whose high activity in N2 promotes CO(2) avoidance. The second gene, glb-5, encodes a neuronal globin domain protein whose high activity in CB4856 modifies behavioral responses to O(2) and combined O(2)/CO(2) stimuli. glb-5 acts in O(2)-sensing neurons to increase O(2)-evoked calcium signals, implicating globins in sensory signaling. An analysis of wild C. elegans strains indicates that the N2 alleles of npr-1 and glb-5 arose recently in the same strain background, possibly as an adaptation to laboratory conditions.

Additional References

Long-range regulatory polymorphisms affecting a GABA receptor constitute a quantitative trait locus (QTL) for social behavior in Caenorhabditis elegans. (2012) (https://pubmed.ncbi.nlm.nih.gov/23284308)
Natural variation in a neural globin tunes oxygen sensing in wild Caenorhabditis elegans. (2009) (https://pubmed.ncbi.nlm.nih.gov/19262507)

## RELATED GEPHE

Related Genes

3 (arcp-1, exp-1, npr-1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^6239^/and+Trait=CO2 avoidance/or+Taxon ID=^6239^/and+Trait=Aggregation behavior/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS