## GEPHE SUMMARY

Gephebase Gene

nurf-1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^nurf-1^#gephebase-summary-title)

GepheID

GP00001318

Entry Status

Published

Main curator

Courtier

## PHENOTYPIC CHANGE

Trait #1

Trait Category

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

Trait

Fertility (reproductive timing; egg laying rate) (https://www.gephebase.org/search-criteria?/and+Trait=^Fertility (reproductive timing; egg laying rate)^#gephebase-summary-title)

Trait State in Taxon A

C. elegans

Trait State in Taxon B

C. elegans - LSJ2 laboratory strain

Trait #2

Trait Category

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

Trait

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

Trait State in Taxon A

-

Trait State in Taxon B

-

Trait #3

Trait Category

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

Trait

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

Trait State in Taxon A

-

Trait State in Taxon B

-

Trait #4

Trait Category

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

Trait

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

Trait State in Taxon A

-

Trait State in Taxon B

-

Ancestral State

Taxon A

Taxonomic Status

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

Taxon A

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 A an Infraspecies?

No

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 - LSJ2 laboratory strain

## GENOTYPIC CHANGE

Generic Gene Name

nurf-1

Synonyms

F26H11.2

String

6239.F26H11.2a (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 6239.F26H11.2a )

Sequence Similarities

Belongs to the BPTF family.

GO - Molecular Function

GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)

GO - Biological Process

GO:0007275 : multicellular organism development (https://www.ebi.ac.uk/QuickGO/term/GO:0007275)
GO:0045944 : positive regulation of transcription by RNA polymerase II (https://www.ebi.ac.uk/QuickGO/term/GO:0045944)
GO:0006325 : chromatin organization (https://www.ebi.ac.uk/QuickGO/term/GO:0006325)

GO - Cellular Component

GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)

UniProtKB Caenorhabditis elegans

Q6BER5 (http://www.uniprot.org/uniprot/Q6BER5)

GenebankID or UniProtKB

NM_064594.6 (https://www.ncbi.nlm.nih.gov/nuccore/NM_064594.6)

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

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

Deletion Size

10-99 bp

Molecular Details of the Mutation

60bp deletion

Experimental Evidence

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

Main Reference

Selection on a Subunit of the NURF Chromatin Remodeler Modifies Life History Traits in a Domesticated Strain of Caenorhabditis elegans. (2016) (https://pubmed.ncbi.nlm.nih.gov/27467070)

Authors

Large EE; Xu W; Zhao Y; Brady SC; Long L; Butcher RA; Andersen EC; McGrath PT

Abstract

Evolutionary life history theory seeks to explain how reproductive and survival traits are shaped by selection through allocations of an individual's resources to competing life functions. Although life-history traits evolve rapidly, little is known about the genetic and cellular mechanisms that control and couple these tradeoffs. Here, we find that two laboratory-adapted strains of C. elegans descended from a single common ancestor that lived in the 1950s have differences in a number of life-history traits, including reproductive timing, lifespan, dauer formation, growth rate, and offspring number. We identified a quantitative trait locus (QTL) of large effect that controls 24%-75% of the total trait variance in reproductive timing at various timepoints. Using CRISPR/Cas9-induced genome editing, we show this QTL is due in part to a 60 bp deletion in the 3′ end of the nurf-1 gene, which is orthologous to the human gene encoding the BPTF component of the NURF chromatin remodeling complex. Besides reproduction, nurf-1 also regulates growth rate, lifespan, and dauer formation. The fitness consequences of this deletion are environment specific-it increases fitness in the growth conditions where it was fixed but decreases fitness in alternative laboratory growth conditions. We propose that chromatin remodeling, acting through nurf-1, is a pleiotropic regulator of life history trade-offs underlying the evolution of multiple traits across different species.

Additional References

## RELATED GEPHE

Related Genes

6 (fog-2, tra-2, nath-10, npr-1, scd-2, srg-36/37) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^6239^/and+Trait=Fertility/or+Taxon ID=^6239^/and+Trait=Lifespan/or+Taxon ID=^6239^/and+Trait=Growth rate/or+Taxon ID=^6239^/and+Trait=Diapause/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

@Pleiotropy @GxE - The mutation is advantageous in the LSJ2 growth conditions (poor food; liquid); but disadvantageous in the N2 growth conditions (good food; agar plates). The ancestral npr-1 allele appears to be required for nurf-1