

GEPHE SUMMARY

	Gephebase Gene		GepheID
nath-10 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~nath-10^#gephebase-summary-title)		GP00000718	
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category=~Morphology^#gephebase-summary-title)			
	Trait		
Fertility (sperm number; egg laying rate) (https://www.gephebase.org/search-criteria?/and+Trait=~Fertility (sperm number; egg laying rate)^#gephebase-summary-title)			
	Trait State in Taxon A		
C. elegans			
	Trait State in Taxon B		
C. elegans			
	Ancestral State		
Data not curated			
	Taxonomic Status		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific^#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
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?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Caenorhabditis elegans
nath-10		O01757 (http://www.uniprot.org/uniprot/O01757)	
	Synonyms		GenebankID or UniProtKB
F55A12.8		FO080647 (https://www.ncbi.nlm.nih.gov/nuccore/FO080647)	
	String		
6239.F55A12.8 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier= 6239.F55A12.8)			
	Sequence Similarities		
Belongs to the RNA cytidine acetyltransferase family. NAT10 subfamily.			
	GO - Molecular Function		
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)			
GO:1990883 : rRNA cytidine N-acetyltransferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:1990883)			
	GO - Biological Process		
GO:1904812 : rRNA acetylation involved in maturation of SSU-rRNA (https://www.ebi.ac.uk/QuickGO/term/GO:1904812)			
GO:0051391 : tRNA acetylation (https://www.ebi.ac.uk/QuickGO/term/GO:0051391)			
	GO - Cellular Component		

GO:0005730 : nucleolus (https://www.ebi.ac.uk/QuickGO/term/GO:0005730)

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

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

Met746Ile (according to Table S2 C>T but it should be G>A - Needs curation)

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Role of pleiotropy in the evolution of a cryptic developmental variation in *Caenorhabditis elegans*. (2012) (https://pubmed.ncbi.nlm.nih.gov/22235190)

Authors

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Abstract

Robust biological systems are expected to accumulate cryptic genetic variation that does not affect the system output in standard conditions yet may play an evolutionary role once phenotypically expressed under a strong perturbation. Genetic variation that is cryptic relative to a robust trait may accumulate neutrally as it does not change the phenotype, yet it could also evolve under selection if it affects traits related to fitness in addition to its cryptic effect. Cryptic variation affecting the vulval intercellular signaling network was previously uncovered among wild isolates of *Caenorhabditis elegans*. Using a quantitative genetic approach, we identify a non-synonymous polymorphism of the previously uncharacterized *nath-10* gene that affects the vulval phenotype when the system is sensitized with different mutations, but not in wild-type strains. *nath-10* is an essential protein acetyltransferase gene and the homolog of human NAT10. The *nath-10* polymorphism also presents non-cryptic effects on life history traits. The *nath-10* allele carried by the N2 reference strain leads to a subtle increase in the egg laying rate and in the total number of sperm, a trait affecting the trade-off between fertility and minimal generation time in hermaphrodite individuals. We show that this allele appeared during early laboratory culture of N2, which allowed us to test whether it may have evolved under selection in this novel environment. The derived allele indeed strongly outcompetes the ancestral allele in laboratory conditions. In conclusion, we identified the molecular nature of a cryptic genetic variation and characterized its evolutionary history. These results show that cryptic genetic variation does not necessarily accumulate neutrally at the whole-organism level, but may evolve through selection for pleiotropic effects that alter fitness. In addition, cultivation in the laboratory has led to adaptive evolution of the reference strain N2 to the laboratory environment, which may modify other phenotypes of interest.

Additional References

RELATED GEPHE

Related Genes

4 (fog-2, tra-2, npr-1, nurf-1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~6239^/and+Trait=Fertility/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Pleiotropy