

Gephebase Gene	GepheID
peel-1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=~peel-1*#gephebase-summary-title)	GP00001321
Entry Status	Courtier
Published	Main curator

Physiology (#https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology)		Trait Category	
Hybrid incompatibility (#https://www.gephebase.org/search-criteria?/and+Trait=~Hybrid+incompatibility)		Trait	
C. elegans		Trait State in Taxon A	
C. elegans - Germany strain MY19		Trait State in Taxon B	
Taxon A		Ancestral State	
Intraspecific (#https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific)		Taxonomic Status	
Taxon A		Taxon B	
Caenorhabditis elegans (#https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Caenorhabditis+elegans)		Caenorhabditis elegans (#https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Caenorhabditis+elegans)	
-		-	
roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900		roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900	
species		species	
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	
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)	
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		Yes	
		Taxon B Description	
		C. elegans - Germany strain MY19	

peel-1	Generic Gene Name	UniProtKB <i>Caenorhabditis elegans</i>
	Synonyms	GenebankID or UniProtKB
CELE_Y39G10AR.25; Y39G10AR.25		HQ291556.1 (https://www.ncbi.nlm.nih.gov/nuccore/HQ291556.1)
6239.Y39G10AR.25	String	
(http://string-db.org/newstring.cgi/show_network_section.pl?identifier= 6239.Y39G10AR.25)		
	Sequence Similarities	
-		
	GO - Molecular Function	
-		
	GO - Biological Process	
-		
	GO - Cellular Component	
GO:0016021 : integral component of membrane		

(https://www.ebi.ac.uk/QuickGO/term/GO:0016021)	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
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Deletion^#gephebase-summary-title)	Deletion Size
1-9 bp	Molecular Details of the Mutation
1bp deletion creating a frameshift starting at amino acid position 43. Total length of wild-type protein is 174 amino acids.	Experimental Evidence
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping^#gephebase-summary-title)	Main Reference
A novel sperm-delivered toxin causes late-stage embryo lethality and transmission ratio distortion in <i>C. elegans</i> . (2011) (https://pubmed.ncbi.nlm.nih.gov/21814493)	Authors
Seidel HS; Ailion M; Li J; van Oudenaarden A; Rockman MV; Kruglyak L	Abstract
The evolutionary fate of an allele ordinarily depends on its contribution to host fitness. Occasionally, however, genetic elements arise that are able to gain a transmission advantage while simultaneously imposing a fitness cost on their hosts. We previously discovered one such element in <i>C. elegans</i> that gains a transmission advantage through a combination of paternal-effect killing and zygotic self-rescue. Here we demonstrate that this element is composed of a sperm-delivered toxin, peel-1, and an embryo-expressed antidote, zeel-1. peel-1 and zeel-1 are located adjacent to one another in the genome and co-occur in an insertion/deletion polymorphism. peel-1 encodes a novel four-pass transmembrane protein that is expressed in sperm and delivered to the embryo via specialized, sperm-specific vesicles. In the absence of zeel-1, sperm-delivered PEEL-1 causes lethal defects in muscle and epidermal tissue at the 2-fold stage of embryogenesis. zeel-1 is expressed transiently in the embryo and encodes a novel six-pass transmembrane domain fused to a domain with sequence similarity to zyg-11, a substrate-recognition subunit of an E3 ubiquitin ligase. zeel-1 appears to have arisen recently, during an expansion of the zyg-11 family, and the transmembrane domain of zeel-1 is required and partially sufficient for antidote activity. Although PEEL-1 and ZEEL-1 normally function in embryos, these proteins can act at other stages as well. When expressed ectopically in adults, PEEL-1 kills a variety of cell types, and ectopic expression of ZEEL-1 rescues these effects. Our results demonstrate that the tight physical linkage between two novel transmembrane proteins has facilitated their co-evolution into an element capable of promoting its own transmission to the detriment of organisms carrying it.	
Widespread genetic incompatibility in <i>C. elegans</i> maintained by balancing selection. (2008) (https://pubmed.ncbi.nlm.nih.gov/18187622)	Additional References

RELATED GEPHE

	Related Genes
1 (peel-1/zeel-1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~6239^/and+Trait=Hybrid incompatibility/and+groupHaplotypes=true#gephebase-summary-title)	Related Haplotypes
1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~peel-1^/and+Taxon ID=~6239^/or+Gene Gephebase=~peel-1^/and+Taxon ID=~6239^#gephebase-summary-title)	

EXTERNAL LINKS

COMMENTS

Two other mutations disrupting peel-1 have been found in wild strains. A 19-kb deletion removing peel-1 and zeel-1 genes has also been characterized ; Presumptive Null Mutation