

GEPHE SUMMARY

	Gephebase Gene		GepheID
CG11699 (<a +cg11699+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+GeneGephebase=">https://www.gephebase.org/search-criteria?/and+GeneGephebase="+CG11699+"#gephebase-summary-title)		GP00001399	
	Entry Status	Prigent	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+TraitCategory=">https://www.gephebase.org/search-criteria?/and+TraitCategory="+Physiology+"#gephebase-summary-title)			
	Trait		
Xenobiotic resistance (<a +xenobioticresistance+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Xenobioticresistance+"#gephebase-summary-title)			
	Trait State in Taxon A		
Drosophila melanogaster common wild type			
	Trait State in Taxon B		
Drosophila melanogaster with increased resistance to benzaldehyde and carbofuran insecticide			
	Ancestral State		
Taxon A			
	Taxonomic Status		
Intraspecific (<a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=">https://www.gephebase.org/search-criteria?/and+TaxonomicStatus="+Intraspecific+"#gephebase-summary-title)			
Taxon A		Taxon B	
	Latin Name		Latin Name
Drosophila melanogaster (<a +drosophilamelanogaster+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+TaxonandSynonyms=">https://www.gephebase.org/search-criteria?/and+TaxonandSynonyms="+Drosophilamelanogaster+"#gephebase-summary-title)		Drosophila melanogaster (<a +drosophilamelanogaster+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+TaxonandSynonyms=">https://www.gephebase.org/search-criteria?/and+TaxonandSynonyms="+Drosophilamelanogaster+"#gephebase-summary-title)	
	Common Name		Common Name
fruit fly		fruit fly	
	Synonyms		Synonyms
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster		Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	
	Parent		Parent
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)		melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)		7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Drosophila melanogaster
Dmel\CG11699		Q9VYX5 (http://www.uniprot.org/uniprot/Q9VYX5)	
	Synonyms		GenebankID or UniProtKB
Dmel\CG11699; CG11699; Dmel_CG11699		32101 (https://www.ncbi.nlm.nih.gov/nuccore/32101)	
	String		
7227.FBpp0073359 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0073359)			
	Sequence Similarities		
-			
	GO - Molecular Function		
-			
	GO - Biological Process		
-			

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

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title>)

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

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

100-999 bp

insertion of a 186bp POGON1 element in the 3'UTR

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

A transposable element insertion confers xenobiotic resistance in Drosophila. (2014) (<https://pubmed.ncbi.nlm.nih.gov/25122208>)

Mateo L; Ullastres A; Gonz  lez J

The increase in availability of whole genome sequences makes it possible to search for evidence of adaptation at an unprecedented scale. Despite recent progress, our understanding of the adaptive process is still very limited due to the difficulties in linking adaptive mutations to their phenotypic effects. In this study, we integrated different levels of biological information to pinpoint the ecologically relevant fitness effects and the underlying molecular and biochemical mechanisms of a putatively adaptive TE insertion in *Drosophila melanogaster*: the pogo transposon FBti0019627. We showed that other than being incorporated into Kmn1 transcript, FBti0019627 insertion also affects the polyadenylation signal choice of CG11699 gene. Consequently, only the short 3'UTR transcript of CG11699 gene is produced and the expression level of this gene is higher in flies with the insertion. Our results indicated that increased CG11699 expression leads to xenobiotic stress resistance through increased ALDH-III activity: flies with FBti0019627 insertion showed increased survival rate in response to benzaldehyde, a natural xenobiotic, and to carbofuran, a synthetic insecticide. Although differences in survival rate between flies with and without the insertion were not always significant, when they were, they were consistent with FBti0019627 mediating resistance to xenobiotics. Taken together, our results provide a plausible explanation for the increase in frequency of FBti0019627 in natural populations of *D. melanogaster* and add to the limited number of examples in which a natural genetic mutation has been linked to its ecologically relevant phenotype. Furthermore, the widespread distribution of TEs across the tree of life and conservation of stress response pathways across organisms make our results relevant not only for *Drosophila*, but for other organisms as well.

RELATED GEPHE

19 (Acetylcholinesterase (Ace-2), alcohol dehydrogenase (Adh), Aldehyde dehydrogenase (Aldh), Cyp12d1, Cyp28d1, Cyp28d1-Cyp28d2, cyp6d2, cyp6g1, glutamate-gated chloride channel (GluCl), GSS (glutathione synthetase), GSTE1-E10 cluster, kin of irre (kire), para (kdr), PHGPx, resistance to dieldrin, RnrS, SOD1, Ugt86Dd, CHKov1)
(<https://www.gephebase.org/search-criteria?/or+Taxon ID=~7227~/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title>)

No matches found.

EXTERNAL LINKS

COMMENTS

@TE; the insertion eliminates a large transcript and increases the production of a short transcript. The transmembrane protein interacts and increases ALDH-III activity which metabolizes benzaldehyde and increase resistance to carbofuran. But the resistance is also affected by the genetic background