

GEPHE SUMMARY

CHKov1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^CHKov1^#gephebase-summary-title)	Gephebase Gene	GP00000182	GephelD
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Trait #1	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)	Trait
Pathogen resistance (https://www.gephebase.org/search-criteria?/and+Trait=^Pathogen+resistance^#gephebase-summary-title)	Trait
Drosophila melanogaster - susceptible	Trait State in Taxon A
Drosophila melanogaster - resistant	Trait State in Taxon B

Trait #2	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)	Trait
Xenobiotic resistance (insecticide) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic+resistance+(insecticide)^#gephebase-summary-title)	Trait
-	Trait State in Taxon A
-	Trait State in Taxon B
-	

Taxon A	Ancestral State	Taxonomic Status	
Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+melanogaster^#gephebase-summary-title)		Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title)	
fruit fly			
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster			
species			
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; Ephydriidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup			
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)			
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227)			
	Lineage	Latin Name	Latin Name
		Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+melanogaster^#gephebase-summary-title)	
		fruit fly	Common Name
		Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	Synonyms
		species	Rank
		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; Ephydriidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	Lineage
		melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)	Parent
		7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227)	NCBI Taxonomy ID
		is Taxon A an Infraspecies?	
No			
		is Taxon B an Infraspecies?	

GENOTYPIC CHANGE

CHKov1	Generic Gene Name	UniProtKB Drosophila melanogaster
CG10618	Synonyms	GenebankID or UniProtKB
-	String	
-	Sequence Similarities	
-	GO - Molecular Function	
-	GO - Biological Process	
-	GO - Cellular Component	
No (https://www.gephbase.org/search-criteria?/and+Presumptive Null=^No^#gephbase-summary-title)		Presumptive Null
Coding (https://www.gephbase.org/search-criteria?/and+Molecular Type=^Coding^#gephbase-summary-title)		Molecular Type
Insertion (https://www.gephbase.org/search-criteria?/and+Aberration Type=^Insertion^#gephbase-summary-title)		Aberration Type
1-10 kb		Insertion Size
Insertion of a Doc TE element resulting in novel; seemingly functional short protein		Molecular Details of the Mutation
Linkage Mapping (https://www.gephbase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#gephbase-summary-title)		Experimental Evidence
Successive increases in the resistance of Drosophila to viral infection through a transposon insertion followed by a Duplication. (2011) (https://pubmed.ncbi.nlm.nih.gov/22028673)		Main Reference
Magwire MM; Bayer F; Webster CL; Cao C; Jiggins FM		Authors
To understand the molecular basis of how hosts evolve resistance to their parasites, we have investigated the genes that cause variation in the susceptibility of Drosophila melanogaster to viral infection. Using a host-specific pathogen of <i>D. melanogaster</i> called the sigma virus (Rhabdoviridae), we mapped a major-effect polymorphism to a region containing two paralogous genes called CHKov1 and CHKov2. In a panel of inbred fly lines, we found that a transposable element insertion in the protein coding sequence of CHKov1 is associated with increased resistance to infection. Previous research has shown that this insertion results in a truncated messenger RNA that encodes a far shorter protein than the susceptible allele. This resistant allele has rapidly increased in frequency under directional selection and is now the commonest form of the gene in natural populations. Using genetic mapping and site-specific recombination, we identified a third genotype with considerably greater resistance that is currently rare in the wild. In these flies there have been two duplications, resulting in three copies of both the truncated allele of CHKov1 and CHKov2 (one of which is also truncated). Remarkably, the truncated allele of CHKov1 has previously been found to confer resistance to organophosphate insecticides. As estimates of the age of this allele predate the use of insecticides, it is likely that this allele initially functioned as a defence against viruses and fortuitously "pre-adapted" flies to insecticides. These results demonstrate that strong selection by parasites for increased host resistance can result in major genetic changes and rapid shifts in allele frequencies; and, contrary to the prevailing view that resistance to pathogens can be a costly trait to evolve, the pleiotropic effects of these changes can have unexpected benefits.	Abstract	
Pesticide resistance via transposition-mediated adaptive gene truncation in Drosophila. (2005) (https://pubmed.ncbi.nlm.nih.gov/16051794)		Additional References

RELATED GEPHE

Related Genes
 34 (18-wheeler, CG8492, Dipterin, Drosomycin-like 5, Ge-1, GNBP1, GNBP2, Immune deficiency, Lectin-24A, pastrel, PGRP-LC, ref(2)P, SR-CII, Tehao, Ubiquitin conjugating enzyme E2H (Ubc-E2H), Acetylcholinesterase (Ace-2), alcohol dehydrogenase (Adh), Aldehyde dehydrogenase (Aldh), CG11699, Cyp12d1, Cyp28d1, Cyp28d1-Cyp28d2, cyp6d2, cyp6g1, glutamate-gated chloride channel (GluCl), GSS (glutathione synthetase), GSTE1-E10 cluster, kin of ire (kire), para (kdr), PHGPx, resistance to dieldrin, RnrS, SOD1, Ugt86Dd) (<https://www.gephbase.org/search-criteria?/or+Taxon ID=^7227^/and+Trait=Pathogen resistance/or+Taxon ID=^7227^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephbase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@TE - <http://flybase.org/reports/FBal0190391>

