

GEPHE SUMMARY

ebony (<a +ebony+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+ebony+"#gephebase-summary-title)	Gephebase Gene	GP00002024	GepheID
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Morphology (<a +morphology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Morphology+"#gephebase-summary-title)	Trait Category		
Coloration (abdomen; male) (<a +coloration+(abdomen;+male)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Coloration+(abdomen;+male)+"#gephebase-summary-title)	Trait		
dark posterior male abdomen	Trait State in Taxon A		
light posterior male abdomen	Trait State in Taxon B		
Taxon A	Ancestral State		
Interspecific (<a +interspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Interspecific+"#gephebase-summary-title)	Taxonomic Status		

Taxon A	Latin Name	Taxon B	Latin Name
<i>Drosophila yakuba</i> (<a +drosophila+yakuba+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Drosophila+yakuba+"#gephebase-summary-title)	<i>Drosophila santomea</i> (<a +drosophila+santomea+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Drosophila+santomea+"#gephebase-summary-title)		
-	-		
<i>Drosophila yakuba</i> Burla, 1954			
species	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; Acalypratae; 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; Acalypratae; Ephydroidea; 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)	melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)		
7245 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245)	129105 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=129105)		
is Taxon A an Infrasppecies?	is Taxon B an Infrasppecies?		
No	No		

GENOTYPIC CHANGE

e	Generic Gene Name	UniProtKB <i>Drosophila melanogaster</i>
ebony; CG3331	Synonyms	O76858 (http://www.uniprot.org/uniprot/O76858)
-	String	0
-	Sequence Similarities	
GO:0000036 : acyl carrier activity (https://www.ebi.ac.uk/QuickGO/term/GO:0000036)	GO - Molecular Function	
GO:0003833 : beta-alanyl-dopamine synthase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003833)		
GO:0031177 : phosphopantetheine binding (https://www.ebi.ac.uk/QuickGO/term/GO:0031177)		
GO:0048085 : adult chitin-containing cuticle pigmentation	GO - Biological Process	

(<https://www.ebi.ac.uk/QuickGO/term/GO:0048085>)
 GO:0042417 : dopamine metabolic process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0042417>)
 GO:0007623 : circadian rhythm (<https://www.ebi.ac.uk/QuickGO/term/GO:0007623>)
 GO:0048082 : regulation of adult chitin-containing cuticle pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048082>)
 GO:0048066 : developmental pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048066>)
 GO:0043042 : amino acid adenylation by nonribosomal peptide synthase
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0043042>)
 GO:0007593 : chitin-based cuticle sclerotization
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0007593>)
 GO:0048067 : cuticle pigmentation (<https://www.ebi.ac.uk/QuickGO/term/GO:0048067>)
 GO:0001692 : histamine metabolic process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0001692>)
 GO:0045475 : locomotor rhythm (<https://www.ebi.ac.uk/QuickGO/term/GO:0045475>)
 GO:0006583 : melanin biosynthetic process from tyrosine
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0006583>)
 GO:0048022 : negative regulation of melanin biosynthetic process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048022>)
 GO:0042440 : pigment metabolic process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0042440>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Insertion Size

100-999 bp

Molecular Details of the Mutation

insertion of a partial 481 bp fragment related to a transposable element of the helitron class - maybe other causing mutations as well at this ebony locus (including one fixed amino acid change whose phenotypic effect has not been investigated) - increased expression associated with lighter pigmentation

Experimental Evidence

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

Main Reference

Changes throughout a Genetic Network Mask the Contribution of Hox Gene Evolution. (2019) (<https://pubmed.ncbi.nlm.nih.gov/31257142>)

Authors

Liu Y; Ramos-Womack M; Han C; Reilly P; Brackett KL; Rogers W; Williams TM; Andolfatto P; Stern DL; Rebeiz M

Abstract

Hox genes pattern the anterior-posterior axis of animals and are posited to drive animal body plan evolution, yet their precise role in evolution has been difficult to determine. Here, we identified evolutionary modifications in the Hox gene *Abd-B* that dramatically altered its expression along the body plan of *Drosophila santomea*. *Abd-B* is required for pigmentation in *Drosophila yakuba*, the sister species of *D. santomea*, and changes to *Abd-B* expression would be predicted to make large contributions to the loss of body pigmentation in *D. santomea*. However, manipulating *Abd-B* expression in current-day *D. santomea* does not affect pigmentation. We attribute this epistatic interaction to four other genes within the *D. santomea* pigmentation network, three of which have evolved expression patterns that do not respond to *Abd-B*. Our results demonstrate how body plans may evolve through small evolutionary steps distributed throughout Hox-regulated networks. Polygenicity and epistasis may hinder efforts to identify genes and mechanisms underlying macroevolutionary traits.

Copyright © 2019 Elsevier Ltd. All rights reserved.

Additional References

RELATED GEPHE

Related Genes

5 (Abdominal-B, pdm3, tan, yellow, bab) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^7245^/and+Trait=Coloration/or+Taxon ID=^129105^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SexualTrait @SeveralMutationsWithEffect @TE

