

GEPHE SUMMARY

pdm3 (https://www.gephebase.org/search-criteria/?and+Gene Gephebase="pdm3">#gephebase-summary-title)	Gephebase Gene	GP00002022	GephelD
	Entry Status	Courtier	Main curator
Published			

PHENOTYPIC CHANGE

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

Taxon A	Latin Name	Taxon B	Latin Name
Drosophila yakuba (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Drosophila+yakuba #gephebase-summary-title)		Drosophila santomea (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Drosophila+santomea #gephebase-summary-title)	
-	Common Name	-	Common Name
Drosophila yakuba Burla, 1954	Synonyms	-	Synonyms
species	Rank	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; Ephydriodea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	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; Ephydriodea; 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	melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	Parent
7245 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245)	NCBI Taxonomy ID	129105 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=129105)	NCBI Taxonomy ID
	is Taxon A an Infraspecies?		is Taxon B an Infraspecies?
No		No	

GENOTYPIC CHANGE

pdm3	Generic Gene Name	UniProtKB Drosophila melanogaster A0A0B4LEG2 (http://www.uniprot.org/uniprot/A0A0B4LEG2)
BcDNA:AT16994; CG11641; CG14755; CG42698; Dmel\CG42698; Pdm3; DmeL_CG42698	Synonyms	GenebankID or UniProtKB 0
-	String	
Belongs to the POU transcription factor family.	Sequence Similarities	
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)	GO - Molecular Function	
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)		GO - Biological Process
GO:0007411 : axon guidance (https://www.ebi.ac.uk/QuickGO/term/GO:0007411)		
GO:0007409 : axonogenesis (https://www.ebi.ac.uk/QuickGO/term/GO:0007409)		

GO:0007608 : sensory perception of smell
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007608>)
GO:0007412 : axon target recognition
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007412>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

No ([https://www.gephbase.org/search-criteria?/and+Presumptive Null=%27No%27#gephbase-summary-title](https://www.gephbase.org/search-criteria?/and+Presumptive%20Null=%27No%27#gephbase-summary-title))

Molecular Type

Cis-regulatory ([https://www.gephbase.org/search-criteria?/and+Molecular Type=%27Cis-regulatory%27#gephbase-summary-title](https://www.gephbase.org/search-criteria?/and+Molecular%20Type=%27Cis-regulatory%27#gephbase-summary-title))

Aberration Type

Unknown ([https://www.gephbase.org/search-criteria?/and+Aberration Type=%27Unknown%27#gephbase-summary-title](https://www.gephbase.org/search-criteria?/and+Aberration%20Type=%27Unknown%27#gephbase-summary-title))

Molecular Details of the Mutation

change in a cis-regulatory region - exact causing mutation(s) unknown - increased pdm3 abdominal expression associated with lighter color

Experimental Evidence

Linkage Mapping ([https://www.gephbase.org/search-criteria?/and+Experimental Evidence=%27Linkage Mapping%27#gephbase-summary-title](https://www.gephbase.org/search-criteria?/and+Experimental%20Evidence=%27Linkage%20Mapping%27#gephbase-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.

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Additional References

RELATED GEPHE

Related Genes

5 (Abdominal-B, ebony, tan, yellow, bab) ([https://www.gephbase.org/search-criteria?/or+Taxon ID=%277245%27/and+Trait=Coloration/or+Taxon ID=%27129105%27/and+Trait=Coloration/and+groupHaplotypes=true#gephbase-summary-title](https://www.gephbase.org/search-criteria?/or+Taxon%20ID=%277245%27/and+Trait=Coloration/or+Taxon%20ID=%27129105%27/and+Trait=Coloration/and+groupHaplotypes=true#gephbase-summary-title))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SexualTrait @SeveralMutationsWithEffect