

## GEPHE SUMMARY

<p>pdm3 (<a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~pdm3~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~pdm3~#gephebase-summary-title</a>)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00002022</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
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## PHENOTYPIC CHANGE

<p>Morphology (<a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=~Morphology~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=~Morphology~#gephebase-summary-title</a>)</p>		<p>Trait Category</p>		
<p>Coloration (abdomen; male) (<a href="https://www.gephebase.org/search-criteria?/and+Trait=~Coloration+abdomen+male~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=~Coloration+abdomen+male~#gephebase-summary-title</a>)</p>		<p>Trait</p>		
<p>dark posterior male abdomen</p>		<p>Trait State in Taxon A</p>		
<p>light posterior male abdomen</p>		<p>Trait State in Taxon B</p>		
<p>Taxon A</p>		<p>Ancestral State</p>		
<p>Interspecific (<a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Interspecific~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Interspecific~#gephebase-summary-title</a>)</p>		<p>Taxonomic Status</p>		
<p>Taxon A</p>	<p>Latin Name</p>	<p>Taxon B</p>	<p>Latin Name</p>	
<p><i>Drosophila yakuba</i> (<a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Drosophila+yakuba~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Drosophila+yakuba~#gephebase-summary-title</a>)</p>	<p><i>Drosophila santomea</i> (<a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Drosophila+santomea~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Drosophila+santomea~#gephebase-summary-title</a>)</p>	<p><i>Drosophila yakuba</i> (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351</a>)</p>	<p><i>Drosophila santomea</i> (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=129105">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=129105</a>)</p>	
<p>-</p>	<p>-</p>	<p>-</p>	<p>-</p>	
<p><i>Drosophila yakuba</i> Burla, 1954</p>	<p><i>Drosophila yakuba</i> Burla, 1954</p>	<p><i>Drosophila yakuba</i> Burla, 1954</p>	<p><i>Drosophila yakuba</i> Burla, 1954</p>	
<p>species</p>	<p>species</p>	<p>species</p>	<p>species</p>	
<p>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; Acalyptera; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup</p>		<p>Lineage</p>	<p>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; Acalyptera; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup</p>	
<p>melanogaster subgroup () - (Rank: species subgroup) (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245</a>)</p>		<p>Parent</p>	<p>melanogaster subgroup () - (Rank: species subgroup) (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245</a>)</p>	
<p>7245 (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7245</a>)</p>		<p>NCBI Taxonomy ID</p>	<p>129105 (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=129105">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=129105</a>)</p>	
<p>No</p>		<p>is Taxon A an Infrasppecies?</p>	<p>No</p>	

## GENOTYPIC CHANGE

<p>pdm3</p>	<p>Generic Gene Name</p>	<p>A0A0B4LEG2 (<a href="http://www.uniprot.org/uniprot/A0A0B4LEG2">http://www.uniprot.org/uniprot/A0A0B4LEG2</a>)</p>	<p>UniProtKB <i>Drosophila melanogaster</i></p>	
<p>BcDNA:AT16994; CG11641; CG14755; CG42698; Dmel\CG42698; Pdm3; Dmel_CG42698</p>	<p>Synonyms</p>	<p>()</p>	<p>GenebankID or UniProtKB</p>	
<p>-</p>	<p>String</p>			
<p>Belongs to the POU transcription factor family.</p>		<p>Sequence Similarities</p>		
<p>GO:0003700 : DNA-binding transcription factor activity (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003700">https://www.ebi.ac.uk/QuickGO/term/GO:0003700</a>)</p>		<p>GO - Molecular Function</p>		
<p>GO:0003677 : DNA binding (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003677">https://www.ebi.ac.uk/QuickGO/term/GO:0003677</a>)</p>		<p>GO - Biological Process</p>		
<p>GO:0007411 : axon guidance (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0007411">https://www.ebi.ac.uk/QuickGO/term/GO:0007411</a>)</p>		<p>GO:0007409 : axonogenesis (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0007409">https://www.ebi.ac.uk/QuickGO/term/GO:0007409</a>)</p>		

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

Molecular Type

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

Aberration Type

Unknown ([https://www.gephebase.org/search-criteria?/and+Aberration Type="+Unknown^"#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=))

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

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.gephebase.org/search-criteria?/or+Taxon ID="+7245^"/and+Trait=Coloration/or+Taxon ID="+129105^"/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=))

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

@SexualTrait @SeveralMutationsWithEffect