

GEPHE SUMMARY

| | Gephebase Gene | GephelD |
|--|----------------|--------------|
| bab1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="bab1">#gephebase-summary-title) | GP00000131 | |
| | Entry Status | Main curator |
| Published | Courtier | |

PHENOTYPIC CHANGE

| | Trait Category |
|---|------------------------|
| Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category="Morphology">#gephebase-summary-title) | Trait |
| Coloration (abdomen) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (abdomen)^#gephebase-summary-title) | Trait State in Taxon A |
| monomorphic abdominal coloration - <i>Drosophila willistoni</i> | Trait State in Taxon B |
| dimorphic abdominal coloration - <i>Drosophila melanogaster</i> | Ancestral State |
| Taxon A | Taxonomic Status |

| Taxon A | Latin Name | Taxon B | Latin Name |
|--|-----------------------------|--|-----------------------------|
| <i>Drosophila willistoni</i> (#gephebase-summary-title) | Common Name | <i>Drosophila melanogaster</i> (#gephebase-summary-title) | Common Name |
| - | Synonyms | fruit fly | Synonyms |
| - | Rank | <i>Sophophora melanogaster</i> ; fruit fly; <i>Drosophila melanogaster</i> Meigen, 1830; <i>Sophophora melanogaster</i> (Meigen, 1830); <i>Drosophila melanogaster</i> | Rank |
| species | Lineage | species | 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; willistoni group; willistoni subgroup willistoni subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32367) | Parent | 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 melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351) | Parent |
| 7260 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7260) | NCBI Taxonomy ID | 7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227) | NCBI Taxonomy ID |
| No | is Taxon A an Infraspecies? | No | is Taxon B an Infraspecies? |

GENOTYPIC CHANGE

| | Generic Gene Name | UniProtKB <i>Drosophila melanogaster</i> |
|---|--|--|
| bab1 | Q9W0K7 (http://www.uniprot.org/uniprot/Q9W0K7) | GenebankID or UniProtKB |
| | Synonyms | |
| anon-WO0118547.639; bab; BAB; BAB-1; bab-I; Bab1; BAB1; bric-a-brac; CG13910; CG9097; Dmel\CG9097 | 0 | |
| 7227.FBpp0072538 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0072538) | String | |
| | Sequence Similarities | |
| - | GO - Molecular Function | |
| GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700) | | |
| GO:0003680 : AT DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003680) | | |

GO - Biological Process

GO:0006357 : regulation of transcription by RNA polymerase II
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0006357>)
 GO:0006355 : regulation of transcription, DNA-templated
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0006355>)
 GO:0007548 : sex differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0007548>)
 GO:0006351 : transcription, DNA-templated
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0006351>)
 GO:0048085 : adult chitin-containing cuticle pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048085>)
 GO:0007455 : eye-antennal disc morphogenesis
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0007455>)
 GO:0046660 : female sex differentiation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0046660>)
 GO:0007478 : leg disc morphogenesis
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0007478>)
 GO:0048086 : negative regulation of developmental pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048086>)
 GO:0048092 : negative regulation of male pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048092>)
 GO:0048070 : regulation of developmental pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048070>)
 GO:0048071 : sex-specific pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048071>)

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>)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

inter - ABD-B- and DSX- binding site spacing was reduced in regions I, II, and III

Experimental Evidence

gain of ABD-B binding site 13

Main Reference

Candidate Gene (<https://www.gephebase.org/search-criteria/?and+Experimental+Evidence=%Candidate+Gene%#gephebase-summary-title>)

Authors

The regulation and evolution of a genetic switch controlling sexually dimorphic traits in Drosophila. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18724934>)

Williams TM; Selegue JE; Werner T; Gompel N; Kopp A; Carroll SB

Abstract

Sexually dimorphic traits play key roles in animal evolution and behavior. Little is known, however, about the mechanisms governing their development and evolution. One recently evolved dimorphic trait is the male-specific abdominal pigmentation of *Drosophila melanogaster*, which is repressed in females by the Bric-À-brac (Bab) proteins. To understand the regulation and origin of this trait, we have identified and traced the evolution of the genetic switch controlling dimorphic bab expression. We show that the HOX protein Abdominal-B (ABD-B) and the sex-specific isoforms of Doublesex (DSX) directly regulate a bab cis-regulatory element (CRE). In females, ABD-B and DSX(F) activate bab expression whereas in males DSX(M) directly represses bab, which allows for pigmentation. A new domain of dimorphic bab expression evolved through multiple fine-scale changes within this CRE, whose ancestral role was to regulate other dimorphic features. These findings reveal how new dimorphic characters can emerge from genetic networks regulating pre-existing dimorphic traits.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SexualTrait

