GEPHE SUMMARY

Gephebase Gene
bab1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^bab1^#gephebase-summary-title)

GepheID
GP00000131

Entry Status
Published

Main curator
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 - Drosophila willistoni

Trait State in Taxon B
dimorphic abdominal coloration - Drosophila melanogaster

Ancestral State
Taxon A

Taxonomic Status
Interspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Interspecific^#gephebase-summary-title)

Taxon A

Latin Name
Drosophila willistoni (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila willistoni^#gephebase-summary-title)

Common Name
-

Synonyms
-

Rank
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; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; willistoni group; willistoni subgroup

Parent
willistoni subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32367)

NCBI Taxonomy ID
7260 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7260)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila melanogaster^#gephebase-summary-title)

Common Name
fruit fly

Synonyms
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster

Rank
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; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup

Parent
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)

NCBI Taxonomy ID
7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
bab1

Synonyms
anon-WO0118547.639; bab; BAB; BAB-1; bab-I; Bab1; BAB1; bric-a-brac; CG13910; CG9097; Dmel\CG9097

String
7227.FBpp0072538 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0072538)

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)

UniProtKB Drosophila melanogaster
Q9W0K7 (http://www.uniprot.org/uniprot/Q9W0K7)

GenebankID or UniProtKB
()

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
gain of ABD-B binding site 13

Experimental Evidence

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

Main Reference

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

Authors

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-Ã -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