GEPHE SUMMARY

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

GepheID
GP00001221

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait
Coloration (wing spot) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (wing spot)^#gephebase-summary-title)

Trait State in Taxon A
Drosophila elegans

Trait State in Taxon B
Drosophila gunungcola

Ancestral State
Data not curated

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

Taxon A

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

Common Name
-

Synonyms
Drosophila elegans Bock & Wheeler, 1972

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; elegans subgroup

Parent
elegans subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32348)

NCBI Taxonomy ID
30023 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 30023)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Drosophila gunungcola (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila gunungcola^#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; melanogaster group; elegans subgroup

Parent
elegans subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32348)

NCBI Taxonomy ID
103775 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 103775)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
y

Synonyms
CG3757; Dmel\CG3757; EG:125H10.2; T6; Y

String
7227.FBpp0070070 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0070070)

Sequence Similarities
Belongs to the major royal jelly protein family.

GO - Molecular Function
-

GO - Biological Process
GO:0042438 : melanin biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0042438)
GO:0048082 : regulation of adult chitin-containing cuticle pigmentation

UniProtKB Drosophila melanogaster
P09957 (http://www.uniprot.org/uniprot/P09957)

GenebankID or UniProtKB
CAJ57653 (https://www.ncbi.nlm.nih.gov/nuccore/CAJ57653)

(https://www.ebi.ac.uk/QuickGO/term/GO:0048082)
GO:0048066 : developmental pigmentation
(https://www.ebi.ac.uk/QuickGO/term/GO:0048066)
GO:0048067 : cuticle pigmentation (https://www.ebi.ac.uk/QuickGO/term/GO:0048067)
GO:0006583 : melanin biosynthetic process from tyrosine
(https://www.ebi.ac.uk/QuickGO/term/GO:0006583)
GO:0048065 : male courtship behavior, veined wing extension
(https://www.ebi.ac.uk/QuickGO/term/GO:0048065)
GO:0060179 : male mating behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0060179)

GO - Cellular Component

GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)
GO:0005576 : extracellular region (https://www.ebi.ac.uk/QuickGO/term/GO:0005576)
GO:0070451 : cell hair (https://www.ebi.ac.uk/QuickGO/term/GO:0070451)

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

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

Molecular Details of the Mutation

within a 740bp-element; at least two and no more than seven point mutations involved

Experimental Evidence

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

Main Reference

Repeated morphological evolution through cis-regulatory changes in a pleiotropic gene. (2006) (https://pubmed.ncbi.nlm.nih.gov/16625197)

Authors

Prud'homme B; Gompel N; Rokas A; Kassner VA; Williams TM; Yeh SD; True JR; Carroll SB

Abstract

The independent evolution of morphological similarities is widespread. For simple traits, such as overall body colour, repeated transitions by means of mutations in the same gene may be common. However, for more complex traits, the possible genetic paths may be more numerous; the molecular mechanisms underlying their independent origins and the extent to which they are constrained to follow certain genetic paths are largely unknown. Here we show that a male wing pigmentation pattern involved in courtship display has been gained and lost multiple times in a Drosophila clade. Each of the cases we have analysed (two gains and two losses) involved regulatory changes at the pleiotropic pigmentation gene yellow. Losses involved the parallel inactivation of the same cis-regulatory element (CRE), with changes at a few nucleotides sufficient to account for the functional divergence of one element between two sibling species. Surprisingly, two independent gains of wing spots resulted from the co-option of distinct ancestral CREs. These results demonstrate how the functional diversification of the modular CREs of pleiotropic genes contributes to evolutionary novelty and the independent evolution of morphological similarities.

Additional References

Genetics of divergence in male wing pigmentation and courtship behavior between Drosophila elegans and D. gunungcola. (2006) (https://pubmed.ncbi.nlm.nih.gov/16570069)

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS