GEPHE SUMMARY

Gephebase Gene

Kcnj13 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Kcnj13^#gephebase-summary-title)

Entry Status

Published

GepheID

GP00002364

Main curator

Santos

PHENOTYPIC CHANGE

Trait Category

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

Trait

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

Trait State in Taxon A

Stripes

Trait State in Taxon B

Bars

Ancestral State

Taxon A

Taxonomic Status

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

Taxon A

Latin Name

Danio rerio (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Danio rerio^#gephebase-summary-title)

Common Name

zebrafish

Synonyms

Brachydanio rerio; Brachydanio rerio frankei; Cyprinus rerio; Danio frankei; Danio rerio frankei; zebrafish; leopard danio; zebra danio; zebra fish; Cyprinus rerio Hamilton, 1822; Danio rerio (Hamilton, 1822); Brachidanio rerio

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Otomorpha; Ostariophysi; Otophysi; Cypriniphysae; Cypriniformes; Cyprinidae; Danio

Parent

Danio () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7954)

NCBI Taxonomy ID

7955 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7955)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

Danio aesculapii (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Danio aesculapii^#gephebase-summary-title)

Common Name

-

Synonyms

Danio aesculapii Kullander & Fang, 2009

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Otomorpha; Ostariophysi; Otophysi; Cypriniphysae; Cypriniformes; Cyprinoidei; Danionidae; Danioninae; Danio

Parent

Danio () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7954)

NCBI Taxonomy ID

1142201 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 1142201)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

Kcnj13

Synonyms

Kir7.1

String

10090.ENSMUSP00000108838 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 10090.ENSMUSP00000108838)

Sequence Similarities

Belongs to the inward rectifier-type potassium channel (TC 1.A.2.1) family. KCNJ13 subfamily.

GO - Molecular Function

GO:0005242 : inward rectifier potassium channel activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005242)

GO - Biological Process

GO:1990573 : potassium ion import across plasma membrane

UniProtKB Mus musculus

P86046 (http://www.uniprot.org/uniprot/P86046)

GenebankID or UniProtKB

()

(https://www.ebi.ac.uk/QuickGO/term/GO:1990573)
GO:0034765 : regulation of ion transmembrane transport
(https://www.ebi.ac.uk/QuickGO/term/GO:0034765)

GO - Cellular Component

GO:0016021 : integral component of membrane
(https://www.ebi.ac.uk/QuickGO/term/GO:0016021)
GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

-

Experimental Evidence

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

Main Reference

Evolution of the potassium channel gene Kcnj13 underlies colour pattern diversification in Danio fish. (2020) (https://pubmed.ncbi.nlm.nih.gov/33277491)

Authors

Podobnik M; FrohnhÃ¶fer HG; Dooley CM; Eskova A; NÃ¼sslein-Volhard C; Irion U

Abstract

The genetic basis of morphological variation provides a major topic in evolutionary developmental biology. Fish of the genus Danio display colour patterns ranging from horizontal stripes, to vertical bars or spots. Stripe formation in zebrafish, Danio rerio, is a self-organizing process based on cell-contact mediated interactions between three types of chromatophores with a leading role of iridophores. Here we investigate genes known to regulate chromatophore interactions in zebrafish that might have evolved to produce a pattern of vertical bars in its sibling species, Danio aesculapii. Mutant D. aesculapii indicate a lower complexity in chromatophore interactions and a minor role of iridophores in patterning. Reciprocal hemizygosity tests identify the potassium channel gene obelix/Kcnj13 as evolved between the two species. Complementation tests suggest evolutionary change through divergence in Kcnj13 function in two additional Danio species. Thus, our results point towards repeated and independent evolution of this gene during colour pattern diversification.

Additional References

RELATED GEPHE

Related Genes

2 (csf1a, edn3b) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7955^/and+Trait=Coloration/or+Taxon ID=^1142201^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS