GEPHE SUMMARY

Gephebase Gene
lbh (limb bud and heart homolog) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^lbh (limb bud and heart homolog)^#gephebase-summary-title)

GepheID
GP00001387

Entry Status
Published

Main curator
Prigent

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Maylandia zebra

Trait State in Taxon B
Labeotropheus fuelleborni

Ancestral State
Taxon A

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

Taxon A

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

Common Name
zebra mbuna

Synonyms
Metriaclima zebra; Pseudotropheus sp. 'Pseudotropheus zebra complex'; Pseudotropheus zebra; zebra mbuna; Maylandia zebra (Boulenger, 1899)

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleosteomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Maylandia; Maylandia zebra complex

Parent
Maylandia zebra complex () - (Rank: species group) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 57445)

NCBI Taxonomy ID
106582 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 106582)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
blue mbuna

Synonyms
blue mbuna; Labeotropheus fuelleborni Ahl, 1926

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleosteomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Labeotropheus

Parent
Labeotropheus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 57306)

NCBI Taxonomy ID
57307 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 57307)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
LBH

Synonyms
-

String
9606.ENSP00000378733 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000378733)

Sequence Similarities
Belongs to the LBH family.

GO - Molecular Function
-

GO - Biological Process
GO:0045893 : positive regulation of transcription, DNA-templated

UniProtKB Homo sapiens
Q53QV2 (http://www.uniprot.org/uniprot/Q53QV2)

GenebankID or UniProtKB
()

(https://www.ebi.ac.uk/QuickGO/term/GO:0045893)
GO:0060644 : mammary gland epithelial cell differentiation
(https://www.ebi.ac.uk/QuickGO/term/GO:0060644)
GO:0033147 : negative regulation of intracellular estrogen receptor signaling pathway
(https://www.ebi.ac.uk/QuickGO/term/GO:0033147)
GO:2000737 : negative regulation of stem cell differentiation
(https://www.ebi.ac.uk/QuickGO/term/GO:2000737)
GO:2000103 : positive regulation of mammary stem cell proliferation
(https://www.ebi.ac.uk/QuickGO/term/GO:2000103)
GO:1904677 : positive regulation of somatic stem cell division
(https://www.ebi.ac.uk/QuickGO/term/GO:1904677)
GO:1904674 : positive regulation of somatic stem cell population maintenance
(https://www.ebi.ac.uk/QuickGO/term/GO:1904674)

GO - Cellular Component

GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)
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

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

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

G>A p.R17Q

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

A nonsynonymous mutation in the transcriptional regulator lbh is associated with cichlid craniofacial adaptation and neural crest cell development. (2014)
(https://pubmed.ncbi.nlm.nih.gov/25234704)

Authors

Powder KE; Cousin H; McLinden GP; Craig Albertson R

Abstract

Since the time of Darwin, biologists have sought to understand the origins and maintenance of life's diversity of form. However, the nature of the exact DNA mutations and molecular mechanisms that result in morphological differences between species remains unclear. Here, we characterize a nonsynonymous mutation in a transcriptional coactivator, limb bud and heart homolog (lbh), which is associated with adaptive variation in the lower jaw of cichlid fishes. Using both zebrafish and Xenopus, we demonstrate that lbh mediates migration of cranial neural crest cells, the cellular source of the craniofacial skeleton. A single amino acid change that is alternatively fixed in cichlids with differing facial morphologies results in discrete shifts in migration patterns of this multipotent cell type that are consistent with both embryological and adult craniofacial phenotypes. Among animals, this polymorphism in lbh represents a rare example of a coding change that is associated with continuous morphological variation. This work offers novel insights into the development and evolution of the craniofacial skeleton, underscores the evolutionary potential of neural crest cells, and extends our understanding of the genetic nature of mutations that underlie divergence in complex phenotypes.

Additional References

RELATED GEPHE

Related Genes

1 (BMP4 (uncertain)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^106582^/and+Trait=Cranio-facial morphology/or+Taxon ID=^57307^/and+Trait=Cranio-facial morphology/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS