

## GEPHE SUMMARY

	Gephebase Gene		GepheID
lbh (limb bud and heart homolog) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+lbh+(limb+bud+and+heart+homolog)+#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+lbh+(limb+bud+and+heart+homolog)+#gephebase-summary-title</a> )		GP00001387	
	Entry Status	Prigent	Main curator
Published			

## PHENOTYPIC CHANGE

	Trait Category		
Morphology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Category+Morphology+#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category+Morphology+#gephebase-summary-title</a> )			
	Trait		
Cranio-facial morphology (mandible) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Craneo-facial+morphology+(mandible)+#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Craneo-facial+morphology+(mandible)+#gephebase-summary-title</a> )			
	Trait State in Taxon A		
Maylandia zebra			
	Trait State in Taxon B		
Labeotropheus fuelleborni			
	Ancestral State		
Taxon A			
	Taxonomic Status		
Interspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status+Interspecific+#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status+Interspecific+#gephebase-summary-title</a> )			
	Taxon A	Taxon B	
	Latin Name		Latin Name
Maylandia zebra ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Maylandia+zebra+#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Maylandia+zebra+#gephebase-summary-title</a> )		Labeotropheus fuelleborni ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Labeotropheus+fuelleborni+#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Labeotropheus+fuelleborni+#gephebase-summary-title</a> )	
	Common Name		Common Name
zebra mbuna		blue mbuna	
	Synonyms		Synonyms
Metriaclima zebra; Pseudotropheus sp. 'Pseudotropheus zebra complex'; Pseudotropheus zebra; zebra mbuna; Maylandia zebra (Boulenger, 1899)		blue mbuna; Labeotropheus fuelleborni Ahl, 1926	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleostomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorpha; Euacanthomorpha; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Maylandia; Maylandia zebra complex		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleostomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorpha; Euacanthomorpha; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Labeotropheus	
	Parent		Parent
Maylandia zebra complex () - (Rank: species group) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=57445">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=57445</a> )		Labeotropheus () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=57306">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=57306</a> )	
	NCBI Taxonomy ID		NCBI Taxonomy ID
106582 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=106582">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=106582</a> )		57307 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=57307">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=57307</a> )	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

## GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Homo sapiens
LBH		Q53QV2 ( <a href="http://www.uniprot.org/uniprot/Q53QV2">http://www.uniprot.org/uniprot/Q53QV2</a> )	
	Synonyms		GenebankID or UniProtKB
-		()	
	String		
9606.ENSPO0000378733 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000378733">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000378733</a> )			
	Sequence Similarities		
Belongs to the LBH family.			
	GO - Molecular Function		
-			
	GO - Biological Process		
GO:0045893 : positive regulation of transcription, DNA-templated			

(<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.

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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

