

GEPHE SUMMARY

	Gephebase Gene		GepheID
Agouti-related peptide 2 (agrp2) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="Agouti-related peptide 2 (agrp2)"#gephebase-summary-title)		GP00001960	
	Entry Status	Santos	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category="Morphology"#gephebase-summary-title)	
	Trait
Coloration (stripes) (https://www.gephebase.org/search-criteria?/and+Trait = "Coloration (stripes)"#gephebase-summary-title)	
	Trait State in Taxon A
nonstriped	
	Trait State in Taxon B
striped	
	Ancestral State
Unknown	
	Taxonomic Status
Interspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status="Interspecific"#gephebase-summary-title)	

	Taxon A
	Latin Name
Pundamilia nyererei (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Pundamilia nyererei"#gephebase-summary-title)	
-	Common Name
	Synonyms
Haplochromis nyererei; Pundamilia nyererei (Witte-Maas & Witte, 1985); Pundamilia neyereri	
species	Rank
	Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala; Euteleosteorompha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Pundamilia	
	Parent
Pundamilia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=195936)	
303518	NCBI Taxonomy ID
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=303518)	
No	is Taxon A an Intraspecies?

	Taxon B #1
	Latin Name
Haplochromis sauvagei (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Haplochromis sauvagei"#gephebase-summary-title)	
-	Common Name
	Synonyms
Ctenochromis sauvagei; Haplochromis 'rock kribensis'; Paralabidochromis rockkribensis; Ptyochromis sauvagei; Ctenochromis sauvagei Pfeffer, 1896; Ptyochromis sauvagei (Pfeffer, 1896); ZMB 22.222; ZMB:22.222	
species	Rank
	Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala; Euteleosteorompha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Haplochromis	
	Parent
Haplochromis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8121)	
77313	NCBI Taxonomy ID
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=77313)	
No	is Taxon B an Intraspecies?

	Taxon B #2
	Latin Name
Haplochromis chilotes (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Haplochromis chilotes"#gephebase-summary-title)	
-	Common Name
	Synonyms
Paralabidochromis chilotes; Paratilapia chilotes; Haplochromis chilotes (Boulenger, 1911); Paratilapia chilotes Boulenger, 1911	
species	Rank
	Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala; Euteleosteorompha; Neoteleostei; Eurypterygia;	

Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Haplochromis

Parent

Haplochromis () - (Rank: genus)
(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8121>)

NCBI Taxonomy ID

257977
(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=257977>)

is Taxon B an Intraspecies?

No

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Danio rerio
asip2b	J3JQX9 (http://www.uniprot.org/uniprot/J3JQX9)	
	Synonyms	GenebankID or UniProtKB
A2; asip; agrp2; asip2; AgRP2	102202936 (https://www.ncbi.nlm.nih.gov/nucore/102202936)	
	String	
-	Sequence Similarities	
-		
	GO - Molecular Function	
GO:0070996 : type 1 melanocortin receptor binding (https://www.ebi.ac.uk/QuickGO/term/GO:0070996)		
	GO - Biological Process	
GO:0009755 : hormone-mediated signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0009755)		
GO:0043473 : pigmentation (https://www.ebi.ac.uk/QuickGO/term/GO:0043473)		
	GO - Cellular Component	
GO:0005576 : extracellular region (https://www.ebi.ac.uk/QuickGO/term/GO:0005576)		
No (<a +no+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Presumptive Null=">https://www.gephebase.org/search-criteria?/and+Presumptive Null="+No+"#gephebase-summary-title)		Presumptive Null
Cis-regulatory (<a +cis-regulatory+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Molecular Type=">https://www.gephebase.org/search-criteria?/and+Molecular Type="+Cis-regulatory+"#gephebase-summary-title)		Molecular Type
Unknown (<a +unknown+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Aberration Type=">https://www.gephebase.org/search-criteria?/and+Aberration Type="+Unknown+"#gephebase-summary-title)		Aberration Type
		Molecular Details of the Mutation
Causal mutation(s) are in a 1.1-kb interval within the first agrp2 intron		
		Experimental Evidence
Linkage Mapping (<a +linkage="" href="https://www.gephebase.org/search-criteria?/and+Experimental Evidence=" mapping+"#gephebase-summary-title"="">https://www.gephebase.org/search-criteria?/and+Experimental Evidence="+Linkage Mapping+"#gephebase-summary-title)		
		Main Reference
Agouti-related peptide 2 facilitates convergent evolution of stripe patterns across cichlid fish radiations. (2018) (https://pubmed.ncbi.nlm.nih.gov/30361373)		
		Authors
Kratochwil CF; Liang Y; Gerwin J; Woltering JM; Urban S; Henning F; Machado-Schiaffino G; Hulsey CD; Meyer A		
		Abstract
The color patterns of African cichlid fishes provide notable examples of phenotypic convergence. Across the more than 1200 East African rift lake species, melanin horizontal stripes have evolved numerous times. We discovered that regulatory changes of the gene agouti-related peptide 2 (agrp2) act as molecular switches controlling this evolutionarily labile phenotype. Reduced agrp2 expression is convergently associated with the presence of stripe patterns across species flocks. However, cis-regulatory mutations are not predictive of stripes across radiations, suggesting independent regulatory mechanisms. Genetic mapping confirms the link between the agrp2 locus and stripe patterns. The crucial role of agrp2 is further supported by a CRISPR-Cas9 knockout that reconstitutes stripes in a nonstriped cichlid. Thus, we unveil how a single gene affects the convergent evolution of a complex color pattern.		
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		Additional References
Evolutionary Dynamics of Structural Variation at a Key Locus for Color Pattern Diversification in Cichlid Fishes. (2019) (https://pubmed.ncbi.nlm.nih.gov/31821504)		

RELATED GEPHE

	Related Genes
No matches found.	
	Related Haplotypes
1 (<a #gephebase-summary-title"="" (agrp2)^="" +agouti-related="" 2="" and+taxon="" href="https://www.gephebase.org/search-criteria?/or+Gene Gephebase=" id="+257977" peptide="">https://www.gephebase.org/search-criteria?/or+Gene Gephebase="+Agouti-related peptide 2 (agrp2)^/and+Taxon ID="+303518^/or+Gene Gephebase="+Agouti-related peptide 2 (agrp2)^/and+Taxon ID="+77313^/or+Gene Gephebase="+Agouti-related peptide 2 (agrp2)^/and+Taxon ID="+257977"#gephebase-summary-title)	

EXTERNAL LINKS

COMMENTS

@Parallelism; tandem duplication of the terminal exon in cichlid lineage may have facilitated a functional shift of the protein