

## GEPHE SUMMARY

	Gephebase Gene		GepheID
Potassium channel subfamily K ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> )		GP00002348	
Gephebase="Potassium channel subfamily K"#gephebase-summary-title)			Main curator
Published	Entry Status	Courtier	

## PHENOTYPIC CHANGE

	Trait Category		
Morphology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> )			
Category="Morphology"#gephebase-summary-title)	Trait		
Fin morphology (skeleton; dorsal fin; caudal fin; tail; paired fin)			
( <a "="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="</a> Fin morphology (skeleton; dorsal fin; caudal fin; tail; paired fin)"#gephebase-summary-title)	Trait State in Taxon A		
median and paired fins of standard size			
wild goldfish and many strains of domesticated goldfish	Trait State in Taxon B		
elongation of all median and paired fins			
14 strains of domesticated goldfish	Ancestral State		
Taxon A			
	Taxonomic Status		
Domesticated ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> )			
Status="Domesticated"#gephebase-summary-title)			
Taxon A		Taxon B	
	Latin Name		Latin Name
Carassius auratus		Carassius auratus	
( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms="Carassius auratus"#gephebase-summary-title)		( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> and Synonyms="Carassius auratus"#gephebase-summary-title)	
	Common Name		Common Name
goldfish		goldfish	
	Synonyms		Synonyms
Carassius carassius auratus; Cyprinus auratus; goldfish; Carassius auratus (Linnaeus, 1758); Cyprinus auratus Linnaeus, 1758; Carassius auratus		Carassius carassius auratus; Cyprinus auratus; goldfish; Carassius auratus (Linnaeus, 1758); Cyprinus auratus Linnaeus, 1758; Carassius auratus	
	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; Otomorpha; Ostariophysi; Otophysi; Cypriniphysae; Cypriniformes; Cyprinoidei; Cyprinidae; Cyprininae; Carassius		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; Cyprinidae; Cyprininae; Carassius	
	Parent		Parent
Carassius () - (Rank: genus)		Carassius () - (Rank: genus)	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7956">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7956</a> )		( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7956">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7956</a> )	
	NCBI Taxonomy ID		NCBI Taxonomy ID
7957		7957	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7957">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7957</a> )		( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7957">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7957</a> )	
	is Taxon A an Infrappecies?		is Taxon B an Infrappecies?
No		No	

## GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Homo sapiens
KCNK5		O95279 ( <a href="http://www.uniprot.org/uniprot/O95279">http://www.uniprot.org/uniprot/O95279</a> )	
	Synonyms		GenebankID or UniProtKB
TASK2; K2p5.1; KCNK5b; TASK-2		()	
	String		
9606.ENSP0000035257			
( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSP0000035257">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSP0000035257</a> )			
	Sequence Similarities		
Belongs to the two pore domain potassium channel (TC 1.A.1.8) family.			
	GO - Molecular Function		
GO:0005249 : voltage-gated potassium channel activity			
( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005249">https://www.ebi.ac.uk/QuickGO/term/GO:0005249</a> )			

GO:0005267 : potassium channel activity  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0005267)  
 GO:0022841 : potassium ion leak channel activity  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0022841)

GO - Biological Process

GO:0006813 : potassium ion transport  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0006813)  
 GO:1990573 : potassium ion import across plasma membrane  
 (https://www.ebi.ac.uk/QuickGO/term/GO:1990573)  
 GO:0071805 : potassium ion transmembrane transport  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0071805)  
 GO:0034765 : regulation of ion transmembrane transport  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0034765)  
 GO:0097623 : potassium ion export across plasma membrane  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0097623)  
 GO:0007588 : excretion (https://www.ebi.ac.uk/QuickGO/term/GO:0007588)  
 GO:0060075 : regulation of resting membrane potential  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0060075)  
 GO:0030322 : stabilization of membrane potential  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0030322)

GO - Cellular Component

GO:0005887 : integral component of plasma membrane  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0005887)

Presumptive Null

Yes (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Yes^#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

Substitution of a hydrophobic amino acid (valine) with a hydrophilic amino acid (glutamic acid) appears to cause a critical alteration of channel gating. In total there are five amino acid substitutions or deletions in *knk5b5* in goldfish with the long-tail phenotype.

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	GTA	GAA	-
Amino-acid	Val	Glu	165

Main Reference

The Genetic Basis of Morphological Diversity in Domesticated Goldfish. (2020) (https://pubmed.ncbi.nlm.nih.gov/32392470)

Authors

Kon T; Omori Y; Fukuta K; Wada H; Watanabe M; Chen Z; Iwasaki M; Mishina T; Matsuzaki SS; Yoshihara D; Arakawa J; Kawakami K; Toyoda A; Burgess SM; Noguchi H; Furukawa T

Abstract

Although domesticated goldfish strains exhibit highly diversified phenotypes in morphology, the genetic basis underlying these phenotypes is poorly understood. Here, based on analysis of transposable elements in the allotetraploid goldfish genome, we found that its two subgenomes have evolved asymmetrically since a whole-genome duplication event in the ancestor of goldfish and common carp. We conducted whole-genome sequencing of 27 domesticated goldfish strains and wild goldfish. We identified more than 60 million genetic variations and established a population genetic structure of major goldfish strains. Genome-wide association studies and analysis of strain-specific variants revealed genetic loci associated with several goldfish phenotypes, including dorsal fin loss, long-tail, telescope-eye, albinism, and heart-shaped tail. Our results suggest that accumulated mutations in the asymmetrically evolved subgenomes led to generation of diverse phenotypes in the goldfish domestication history. This study is a key resource for understanding the genetic basis of phenotypic diversity among goldfish strains.

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Additional References

RELATED GEPHE

Related Genes

2 (chordin, Wnt receptor) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7957^/and+Trait=Fin morphology/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

