

# GEPHE SUMMARY

TAS1R1 ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> Gephebase=^TAS1R1^#gephebase-summary-title)	Gephebase Gene GP00001415	GephelD Main curator
Published	Entry Status Courtier	

## PHENOTYPIC CHANGE

Trait Category	
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> Category=^Physiology^#gephebase-summary-title)	Trait
Taste sensitivity (umami) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Taste">https://www.gephebase.org/search-criteria?/and+Trait=^Taste</a> sensitivity (umami)^#gephebase-summary-title)	Trait State in Taxon A
-	Trait State in Taxon B
-	Ancestral State
Taxon A	Taxonomic Status

Taxon A	Latin Name	Taxon B	Latin Name
Ursus maritimus ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Ursus+maritimus^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Ursus+maritimus^#gephebase-summary-title</a> )		Ailurus fulgens ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Ailurus+fulgens^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Ailurus+fulgens^#gephebase-summary-title</a> )	
polar bear	Common Name	lesser panda	Common Name
Thalarctos maritimus; polar bear; white bear	Synonyms	lesser panda; red panda	Synonyms
species	Rank	species	Rank
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Laurasiatheria; Carnivora; Caniformia; Ursidae; Ursus		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Laurasiatheria; Carnivora; Caniformia; Ailuridae; Ailurus	
	Parent		Parent
Ursus () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9639">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9639</a> )	NCBI Taxonomy ID	Ailurus () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9648">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9648</a> )	NCBI Taxonomy ID
29073 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 29073">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 29073</a> )		9649 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9649">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9649</a> )	
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

Generic Gene Name	UniProtKB Mus musculus
Tas1r1	Q99PG6 ( <a href="http://www.uniprot.org/uniprot/Q99PG6">http://www.uniprot.org/uniprot/Q99PG6</a> )
TR1; T1r1; Gpr70; Tr1	GenebankID or UniProtKB
10090.ENSMUSP00000030792 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=10090.ENSMUSP00000030792">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=10090.ENSMUSP00000030792</a> )	0
	String
	Sequence Similarities
Belongs to the G-protein coupled receptor 3 family. TAS1R subfamily.	
GO:0004930 : G protein-coupled receptor activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004930">https://www.ebi.ac.uk/QuickGO/term/GO:0004930</a> )	GO - Molecular Function
GO:0008527 : taste receptor activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0008527">https://www.ebi.ac.uk/QuickGO/term/GO:0008527</a> )	GO - Biological Process
GO:0050917 : sensory perception of umami taste ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0050917">https://www.ebi.ac.uk/QuickGO/term/GO:0050917</a> )	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=%27Yes%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive%20Null=%27Yes%27#gephebase-summary-title))

Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=%27Coding%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular%20Type=%27Coding%27#gephebase-summary-title))

Aberration Type

Deletion ([https://www.gephebase.org/search-criteria?/and+Aberration Type=%27Deletion%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration%20Type=%27Deletion%27#gephebase-summary-title))

Deletion Size

1-9 bp

Molecular Details of the Mutation

1bp deletion (deletion of a C) in the sixth exon;

Experimental Evidence

Candidate Gene ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%27Candidate Gene%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental%20Evidence=%27Candidate%20Gene%27#gephebase-summary-title))

Main Reference

Comparative genomics reveals convergent evolution between the bamboo-eating giant and red pandas. (2017) (<https://pubmed.ncbi.nlm.nih.gov/28096377/>)

Authors

Hu Y; Wu Q; Ma S; Ma T; Shan L; Wang X; Nie Y; Ning Z; Yan L; Xiu Y; Wei F

Abstract

Phenotypic convergence between distantly related taxa often mirrors adaptation to similar selective pressures and may be driven by genetic convergence. The giant panda (*Ailuropoda melanoleuca*) and red panda (*Ailurus fulgens*) belong to different families in the order Carnivora, but both have evolved a specialized bamboo diet and adaptive pseudothumb, representing a classic model of convergent evolution. However, the genetic bases of these morphological and physiological convergences remain unknown. Through de novo sequencing the red panda genome and improving the giant panda genome assembly with added data, we identified genomic signatures of convergent evolution. Limb development genes DYNC2H1 and PCNT have undergone adaptive convergence and may be important candidate genes for pseudothumb development. As evolutionary responses to a bamboo diet, adaptive convergence has occurred in genes involved in the digestion and utilization of bamboo nutrients such as essential amino acids, fatty acids, and vitamins. Similarly, the umami taste receptor gene TAS1R1 has been pseudogenized in both pandas. These findings offer insights into genetic convergence mechanisms underlying phenotypic convergence and adaptation to a specialized bamboo diet.

Additional References

## RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

1 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=%27TAS1R1%27/and+Taxon ID=%2729073%27/or+Gene Gephebase=%27TAS1R1%27/and+Taxon ID=%279649%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene%20Gephebase=%27TAS1R1%27/and+Taxon%20ID=%2729073%27/or+Gene%20Gephebase=%27TAS1R1%27/and+Taxon%20ID=%279649%27#gephebase-summary-title))

## EXTERNAL LINKS

## COMMENTS

TAS1R1 has become a pseudogene because of one nucleotide deletion in the sixth exon - as confirmed by Sanger sequencing of three additional individuals