

GEPHE SUMMARY

TAS2R16 (<a +tas2r16+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+GeneGephebase=">https://www.gephebase.org/search-criteria?/and+GeneGephebase="+TAS2R16+"#gephebase-summary-title)	Gephebase Gene	GP00001957	GepheID
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

Behavior, Physiology (<a #gephebase-summary-title"="" +behavior+"="" and+traitcategory="+Physiology+" href="https://www.gephebase.org/search-criteria?/and+TraitCategory=">https://www.gephebase.org/search-criteria?/and+TraitCategory="+Behavior+"/and+TraitCategory="+Physiology+"#gephebase-summary-title)	Trait Category
Taste sensitivity (bitter) (<a (bitter)+"#gephebase-summary-title"="" +taste="" href="https://www.gephebase.org/search-criteria?/and+Trait=" sensitivity="">https://www.gephebase.org/search-criteria?/and+Trait="+Taste sensitivity (bitter)+"#gephebase-summary-title)	Trait
TAS2R16 recognizes arbutin as an agonist	Trait State in Taxon A
TAS2R16 recognizes arbutin as an inverse agonist and possibly exhibits constitutive activity	Trait State in Taxon B
	Ancestral State
Taxon A	
Intergeneric or Higher (<a +intergeneric="" higher+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=" or="">https://www.gephebase.org/search-criteria?/and+TaxonomicStatus="+Intergeneric or Higher+"#gephebase-summary-title)	Taxonomic Status

Taxon A #1 Carlito syrichta (<a +carlito="" href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=" syrichta+"#gephebase-summary-title"="">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="+Carlito syrichta+"#gephebase-summary-title) Philippine tarsier Tarsius syrichta; Philippine tarsier; Tarsius syrichta (Linnaeus, 1758) species cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Tarsiiformes; Tarsiidae; Carlito Carlito () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1868481) 1868482 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1868482) is Taxon A an Intraspecies? No	Taxon B #1 Varecia variegata (<a +varecia="" href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=" variegata+"#gephebase-summary-title"="">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="+Varecia variegata+"#gephebase-summary-title) ruffed lemur Lemur variegatus; ruffed lemur; variegated lemur species cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Strepsirrhini; Lemuriformes; Lemuridae; Varecia Varecia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9454) 9455 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9455) is Taxon B an Intraspecies? No
---	--

Taxon A #2 Trachypithecus poliocephalus (<a +trachypithecus="" href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=" poliocephalus+"#gephebase-summary-title"="">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="+Trachypithecus poliocephalus+"#gephebase-summary-title) White-headed langur Presbytis leucocephalus; Trachypithecus leucocephalus; White-headed langur; white-headed langur species cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Simiiformes; Catarrhini; Cercopithecoidea; Cercopithecidae; Colobinae; Trachypithecus Trachypithecus (leaf monkeys) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=54136)	Taxon B #2 Eulemur macaco (<a +eulemur="" href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=" macaco+"#gephebase-summary-title"="">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="+Eulemur macaco+"#gephebase-summary-title) black lemur Lemur macaco; Petterus macaco; black lemur; Eulemur macaco (Linnaeus, 1766) species cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Strepsirrhini; Lemuriformes; Lemuridae; Eulemur Eulemur () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=13513) NCBI Taxonomy ID
---	--

465719 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 465719) No	NCBI Taxonomy ID		30602 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 30602) No
	Taxon B #3		
	Eulemur fulvus (<a +eulemur+fulvus+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Eulemur fulvus"#gephebase-summary-title) brown lemur Lemur fulvus; Petterus fulvus; brown lemur species cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Strepsirrhini; Lemuriformes; Lemuridae; Eulemur Eulemur () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 13513) NCBI Taxonomy ID 13515 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 13515) is Taxon B an Intraspecies? No		
	Common Name		
Synonyms			
Rank			
Lineage			
Parent			

	Taxon B #4		
	Nycticebus pygmaeus (<a +nycticebus+pygmaeus+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Nycticebus pygmaeus"#gephebase-summary-title) pygmy slow loris Nycticebus intermedius; pygmy slow loris; Nycticebus intermedius Dao Van Tien, 1960; Nycticebus pygmaeus Bonhote, 1907 species cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Strepsirrhini; Lorisiformes; Lorisidae; Nycticebus Nycticebus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9469) NCBI Taxonomy ID 101278 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 101278) is Taxon B an Intraspecies? No		
	Common Name		
	Synonyms		
Rank			
Lineage			
Parent			

GENOTYPIC CHANGE

-	Generic Gene Name	UniProtKB
-	Synonyms	GenebankID or UniProtKB
-	String	
-	Sequence Similarities	
-	GO - Molecular Function	
-	GO - Biological Process	

GO - Cellular Component

-

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

Ser282Leu TCG>TTG

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title>)

	Taxon A	Taxon B	Position
Codon	TCG	TTG	-
Amino-acid	Ser	Leu	-

Main Reference

A natural point mutation in the bitter taste receptor TAS2R16 causes inverse agonism of arbutin in lemur gustation. (2019) (<https://pubmed.ncbi.nlm.nih.gov/31161904>)

Authors

Itoigawa A; Hayakawa T; Suzuki-Hashido N; Imai H

Abstract

Bitter taste enables the detection of potentially harmful substances and is mediated by bitter taste receptors, TAS2Rs, in vertebrates. Few antagonists and inverse agonists of TAS2Rs have been identified, especially natural compounds. TAS2R16s in humans, apes and Old World monkeys (Catarrhini, Anthropeidea) recognize β^2 -glucoside analogues as specific agonists. Here, we investigated responses of TAS2R16 to β^2 -glucosides in non-anthropoid primates, namely lemurs (Lemuriformes, Strepsirrhini). Salicin acted as an agonist on lemur TAS2R16. Arbutin acted as an agonist in the ring-tailed lemur (Lemur catta) but as an inverse agonist in black lemur (Eulemur macaco) and black-and-white ruffed lemur (Varecia variegata). We identified a strepsirrhine-specific amino acid substitution responsible for the inverse agonism of arbutin. In a food preference test, salicin bitterness was inhibited by arbutin in the black lemur. Structural modelling revealed this locus was important for a rearrangement of the intracellular end of transmembrane helix 7 (TM7). Accordingly, arbutin is the first known natural inverse agonist of TAS2Rs, contributing to our understanding of receptor-ligand interactions and the molecular basis of the unique feeding habit diversification in lemurs. Furthermore, the identification of a causal point mutation suggests that TAS2R can acquire functional changes according to feeding habits and environmental conditions.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS