GEPHE SUMMARY

Gephebase Gene

TAS2R38 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^TAS2R38^#gephebase-summary-title)

Entry Status

Published

GepheID

GP00001112

Main curator

Martin

PHENOTYPIC CHANGE

Trait Category

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait

Taste sensitivity (bitter) (https://www.gephebase.org/search-criteria?/and+Trait=^Taste sensitivity (bitter)^#gephebase-summary-title)

Trait State in Taxon A

Pan troglodytes Taster

Trait State in Taxon B

Pan troglodytes Non taster

Ancestral State

Data not curated

Taxonomic Status

Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name

Pan troglodytes (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Pan troglodytes^#gephebase-summary-title)

Common Name

chimpanzee

Synonyms

chimpanzee; Chimpansee troglodytes

Rank

species

Lineage

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; Hominoidea; Hominidae; Homininae; Pan

Parent

Pan (chimpanzees) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9596)

NCBI Taxonomy ID

9598 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9598)

is Taxon A an Infraspecies?

Yes

Taxon A Description

Pan troglodytes Taster

Taxon B

Latin Name

Pan troglodytes (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Pan troglodytes^#gephebase-summary-title)

Common Name

chimpanzee

Synonyms

chimpanzee; Chimpansee troglodytes

Rank

species

Lineage

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; Hominoidea; Hominidae; Homininae; Pan

Parent

Pan (chimpanzees) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9596)

NCBI Taxonomy ID

9598 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9598)

is Taxon B an Infraspecies?

Yes

Taxon B Description

Pan troglodytes Non taster

GENOTYPIC CHANGE

Generic Gene Name

TAS2R38

Synonyms

PTC; T2R38; T2R61; THIOT

String

9606.ENSP00000448219 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000448219)

Sequence Similarities

Belongs to the G-protein coupled receptor T2R family.

GO - Molecular Function

GO:0004930 : G protein-coupled receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004930)
GO:0033038 : bitter taste receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0033038)

UniProtKB Homo sapiens

P59533 (http://www.uniprot.org/uniprot/P59533)

GenebankID or UniProtKB

AFH77563 (https://www.ncbi.nlm.nih.gov/nuccore/AFH77563)

GO - Biological Process

GO:0007186 : G protein-coupled receptor signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0007186)
GO:0001580 : detection of chemical stimulus involved in sensory perception of bitter taste (https://www.ebi.ac.uk/QuickGO/term/GO:0001580)

GO - Cellular Component

GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021)
GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)

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

M1R; eliminates start codon; protein initiates at later Met. Protein apparently null for signalling

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Independent evolution of bitter-taste sensitivity in humans and chimpanzees. (2006) (https://pubmed.ncbi.nlm.nih.gov/16612383)

Authors

Wooding S; Bufe B; Grassi C; Howard MT; Stone AC; Vazquez M; Dunn DM; Meyerhof W; Weiss RB; Bamshad MJ

Abstract

It was reported over 65 years ago that chimpanzees, like humans, vary in taste sensitivity to the bitter compound phenylthiocarbamide (PTC). This was suggested to be the result of a shared balanced polymorphism, defining the first, and now classic, example of the effects of balancing selection in great apes. In humans, variable PTC sensitivity is largely controlled by the segregation of two common alleles at the TAS2R38 locus, which encode receptor variants with different ligand affinities. Here we show that PTC taste sensitivity in chimpanzees is also controlled by two common alleles of TAS2R38; however, neither of these alleles is shared with humans. Instead, a mutation of the initiation codon results in the use of an alternative downstream start codon and production of a truncated receptor variant that fails to respond to PTC in vitro. Association testing of PTC sensitivity in a cohort of captive chimpanzees confirmed that chimpanzee TAS2R38 genotype accurately predicts taster status in vivo. Therefore, although Fisher et al.'s observations were accurate, their explanation was wrong. Humans and chimpanzees share variable taste sensitivity to bitter compounds mediated by PTC receptor variants, but the molecular basis of this variation has arisen twice, independently, in the two species.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@BalancingSelection