

GEPHE SUMMARY

<p>GPRC6A (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=GPRC6A^#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00001672</p> <p>Prigent</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=Physiology^#gephebase-summary-title)</p> <p>Cell signaling (membrane receptor activity) (https://www.gephebase.org/search-criteria?/and+Trait=Cell signaling (membrane receptor activity)^#gephebase-summary-title)</p> <p>WT</p> <p>Intracellular retention lacking signaling function</p> <p>Taxon A</p> <p>Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=Intraspecific^#gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon A</p> <p>Latin Name</p> <p>Homo sapiens (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Homo sapiens^#gephebase-summary-title)</p> <p>Common Name</p> <p>human</p> <p>Synonyms</p> <p>human; man; Homo sapiens Linnaeus, 1758; Home sapiens; Homo sampiens; Homo sapeins; Homo sapian; Homo sapians; Homo sapien; Homo sapience; Homo sapiense; Homo sapients; Homo sapines; Homo spaiens; Homo spiens; Humo sapiens</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>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; Homo</p> <p>Parent</p> <p>Homo () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605)</p> <p>NCBI Taxonomy ID</p> <p>9606 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606)</p> <p>is Taxon A an Intraspecies?</p> <p>Yes</p> <p>Taxon A Description</p> <p>Human. Most of human populations</p>	<p>Taxon B</p> <p>Latin Name</p> <p>Homo sapiens (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Homo sapiens^#gephebase-summary-title)</p> <p>Common Name</p> <p>human</p> <p>Synonyms</p> <p>human; man; Homo sapiens Linnaeus, 1758; Home sapiens; Homo sampiens; Homo sapeins; Homo sapian; Homo sapians; Homo sapien; Homo sapience; Homo sapiense; Homo sapients; Homo sapines; Homo spaiens; Homo spiens; Humo sapiens</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>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; Homo</p> <p>Parent</p> <p>Homo () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605)</p> <p>NCBI Taxonomy ID</p> <p>9606 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606)</p> <p>is Taxon B an Intraspecies?</p> <p>Yes</p> <p>Taxon B Description</p> <p>Human. 6-13% of human populations</p>
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GENOTYPIC CHANGE

<p>GPRC6A</p> <p>GPCR; bA86F4.3</p> <p>9606.ENSP00000309493 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSP00000309493)</p> <p>Belongs to the G-protein coupled receptor 3 family.</p> <p>GO:0004930 : G protein-coupled receptor activity</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>Q5T6X5 (http://www.uniprot.org/uniprot/Q5T6X5)</p> <p>()</p>	<p>UniProtKB Homo sapiens</p> <p>GenebankID or UniProtKB</p>
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(<https://www.ebi.ac.uk/QuickGO/term/GO:0004930>)

GO - Biological Process

GO:0007186 : G protein-coupled receptor signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007186>)

GO:0019722 : calcium-mediated signaling

(<https://www.ebi.ac.uk/QuickGO/term/GO:0019722>)

GO:0043200 : response to amino acid

(<https://www.ebi.ac.uk/QuickGO/term/GO:0043200>)

GO - Cellular Component

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)

GO:0005887 : integral component of plasma membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)

GO:0009986 : cell surface (<https://www.ebi.ac.uk/QuickGO/term/GO:0009986>)

Presumptive Null

Yes ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes^#gephebase-summary-title](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](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](https://www.gephebase.org/search-criteria?/and+Aberration+Type=~SNP^#gephebase-summary-title))

SNP Coding Change

Nonsense

Molecular Details of the Mutation

C>T (aa57) located in the first exon resulting in a premature Stop-codon and non-functional protein

Experimental Evidence

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

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

Main Reference

Genetic Variations in the Human G Protein-coupled Receptor Class C, Group 6, Member A (GPCR6A) Control Cell Surface Expression and Function. (2017)

(<https://pubmed.ncbi.nlm.nih.gov/27986810>)

Authors

JÃ_rgensen S; Have CT; Underwood CR; Johansen LD; Wellendorph P; Gjesing AP; JÃ_rgensen CV; Quan S; Rui G; Inoue A; Linneberg A; Grarup N; Jun W; Pedersen O; Hansen T; BrÃ¼ner-Osborne H

Abstract

GPCR6A is a G protein-coupled receptor activated by l-amino acids, which, based on analyses of knock-out mice, has been suggested to have physiological functions in metabolism and testicular function. The human ortholog is, however, mostly retained intracellularly in contrast to the cell surface-expressed murine and goldfish orthologs. The latter orthologs are G-coupled and lead to intracellular accumulation of inositol phosphates and calcium release. In the present study we cloned the bonobo chimpanzee GPCR6A receptor, which is 99% identical to the human receptor, and show that it is cell surface-expressed and functional. By analyses of chimeric human/mouse and human/bonobo receptors, bonobo receptor mutants, and the single nucleotide polymorphism database at NCBI, we identify an insertion/deletion variation in the third intracellular loop responsible for the intracellular retention and lack of function of the human ortholog. Genetic analyses of the 1000 genome database and the Inter99 cohort of 6,000 Danes establish the distribution of genotypes among ethnic groups, showing that the cell surface-expressed and functional variant is much more prevalent in the African population than in European and Asian populations and that this variant is partly linked with a stop codon early in the receptor sequence (rs6907580, amino acid position 57). In conclusion, our data solve a more than decade-old question of why the cloned human GPCR6A receptor is not cell surface-expressed and functional and provide a genetic framework to study human phenotypic traits in large genome sequencing projects linked with physiological measurement and biomarkers.

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Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

3 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~GPCR6A^/and+Taxon ID=~9606^/or+Gene Gephebase=~GPCR6A^/and+Taxon ID=~9606^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~GPCR6A^/and+Taxon+ID=~9606^/or+Gene+Gephebase=~GPCR6A^/and+Taxon+ID=~9606^#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

The only physiological difference observed is elevated two-hour glucose levels after oral glucose tolerance test in women carrying the Stop-codon SNP (but n=3 only)

