

GEPHE SUMMARY

MC1R (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~MC1R~#gephebase-summary-title)	Gephebase Gene	GP00000595	GepheID
	Entry Status	Martin	Main curator
	Published		

PHENOTYPIC CHANGE

		Trait Category	
Morphology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Morphology~#gephebase-summary-title)		Trait	
Coloration (coat) (https://www.gephebase.org/search-criteria?/and+Trait=~Coloration(coat)~#gephebase-summary-title)		Trait State in Taxon A	
Rattus tanezumi		Trait State in Taxon B	
Rattus rattus		Ancestral State	
Data not curated		Taxonomic Status	
Interspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Interspecific~#gephebase-summary-title)			
Taxon A		Taxon B	
Rattus tanezumi		Rattus rattus	
(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Rattus tanezumi~#gephebase-summary-title)		(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Rattus rattus~#gephebase-summary-title)	
Common Name		Common Name	
Oriental house rat		black rat	
Synonyms		Synonyms	
Rattus brunneusculus; Oriental house rat; Tanezumi rat; Rattus brunneusculus (Hodgson, 1845); Rattus tanezumi Temminch, 1844		Rattus rattoides; black rat; house rat; roof rat; Rattus rattoides (Pictet & Pictet, 1844); Rattus rattus (Linnaeus, 1758)	
Rank		Rank	
species		species	
Lineage		Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Rattus		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Rattus	
Parent		Parent	
Rattus () - (Rank: genus)		Rattus () - (Rank: genus)	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 10114)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 10114)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
35732		10117	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 35732)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 10117)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
No		No	

GENOTYPIC CHANGE

		Generic Gene Name	
MC1R		Q01726 (http://www.uniprot.org/uniprot/Q01726)	UniProtKB Homo sapiens
		Synonyms	GenebankID or UniProtKB
CMM5; MSH-R; SHEP2; MSHR		BAJ76692 (https://www.ncbi.nlm.nih.gov/nuccore/BAJ76692)	
		String	
9606.ENSPP00000451605			
(http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPP00000451605)			
		Sequence Similarities	
Belongs to the G-protein coupled receptor 1 family.			
		GO - Molecular Function	
GO:0008528 : G protein-coupled peptide receptor activity			
(https://www.ebi.ac.uk/QuickGO/term/GO:0008528)			
GO:0004977 : melanocortin receptor activity			
(https://www.ebi.ac.uk/QuickGO/term/GO:0004977)			
GO:0004980 : melanocyte-stimulating hormone receptor activity			
(https://www.ebi.ac.uk/QuickGO/term/GO:0004980)			

GO:0031625 : ubiquitin protein ligase binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:0031625>)

GO - Biological Process

GO:0007275 : multicellular organism development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007275>)
GO:0045944 : positive regulation of transcription by RNA polymerase II
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045944>)
GO:0042438 : melanin biosynthetic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042438>)
GO:0043473 : pigmentation (<https://www.ebi.ac.uk/QuickGO/term/GO:0043473>)
GO:0007186 : G protein-coupled receptor signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007186>)
GO:0051897 : positive regulation of protein kinase B signaling
(<https://www.ebi.ac.uk/QuickGO/term/GO:0051897>)
GO:0019233 : sensory perception of pain
(<https://www.ebi.ac.uk/QuickGO/term/GO:0019233>)
GO:0007189 : adenylate cyclase-activating G protein-coupled receptor signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007189>)
GO:0035556 : intracellular signal transduction
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035556>)
GO:0007187 : G protein-coupled receptor signaling pathway, coupled to cyclic nucleotide second messenger (<https://www.ebi.ac.uk/QuickGO/term/GO:0007187>)
GO:0032720 : negative regulation of tumor necrosis factor production
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032720>)
GO:0010739 : positive regulation of protein kinase A signaling
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010739>)
GO:0090037 : positive regulation of protein kinase C signaling
(<https://www.ebi.ac.uk/QuickGO/term/GO:0090037>)
GO:0009650 : UV protection (<https://www.ebi.ac.uk/QuickGO/term/GO:0009650>)
GO:0070914 : UV-damage excision repair
(<https://www.ebi.ac.uk/QuickGO/term/GO:0070914>)

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>)

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>)

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title>)

SNP (<https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title>)

Nonsynonymous

Glu93Lys

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

Presumptive Null

Molecular Type

Aberration Type

SNP Coding Change

Molecular Details of the Mutation

Experimental Evidence

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

Origin of agouti-melanistic polymorphism in Wild Black Rats (*Rattus rattus*) inferred from Mc1r gene sequences. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21800996>)

Kambe Y; Tanikawa T; Matsumoto Y; Tomozawa M; Aplin KP; Suzuki H

We examined nucleotide changes that underlie coat color variation in Black Rats (the *Rattus rattus* species complex), which show polymorphism in dorsal fur color, including either grayish brown (agouti) or black (melanistic) forms. We examined the full coding sequence of a gene known to produce melanism in other vertebrates-melanocortin-1-receptor gene Mc1r (954 bp) - using samples of both *R. rattus* (with 2n = 38) and its close relative Asian Black Rat (*R. tanezumii*; 2n = 42). We used 61 specimens from Japan with karyotype-known individuals and four samples from Pakistan. We found 11 allele sequences and constructed a network tree that shows two distinct clusters, with allelic segregation according to karyotype and by inference, representing the two species. We found that a nucleotide substitution from G to A at site 280, producing an amino acid change from glutamic acid to lysine, was associated with the dominant trait of the melanistic form of the coat color in *R. rattus*. Notably, the derived SNP 280A was found in a single allele, with the ancestral SNP 280G present in seven alleles. By contrast, all three alleles for *R. tanezumii* retain the ancestral SNP 280G. These results suggest a possible recent origin of melanism in *R. rattus*.

Main Reference

Authors

Abstract

Additional References

RELATED GEPHE

No matches found.

No matches found.

Related Genes

Related Haplotypes

EXTERNAL LINKS

COMMENTS