

GEPHE SUMMARY

MC1R (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="MC1R"#gephebase-summary-title)	Gephebase Gene	GP00001339	GepheID
Reviewed	Entry Status	Prigent	Main curator

PHENOTYPIC CHANGE

Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category="Morphology"#gephebase-summary-title)	Trait Category		
Coloration (coat) (<a coloration"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="Coloration (coat)#gephebase-summary-title)	Trait		
European barn owl-White	Trait State in Taxon A		
European barn owl-Rufous	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status="Intraspecific"#gephebase-summary-title)	Taxonomic Status		
	Taxon A		Taxon B
	Latin Name		Latin Name
Tyto alba (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="Tyto alba"#gephebase-summary-title)	Latin Name	Tyto alba (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="Tyto alba"#gephebase-summary-title)	Latin Name
Barn owl	Common Name	Barn owl	Common Name
Strix alba; Barn owl; Schleiereule; Tyto alba (Scopoli, 1769)	Synonyms	Strix alba; Barn owl; Schleiereule; Tyto alba (Scopoli, 1769)	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Saurischia; Theropoda; Coelurosauria; Aves; Neognathae; Strigiformes; Tytonidae; Tyto	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Saurischia; Theropoda; Coelurosauria; Aves; Neognathae; Strigiformes; Tytonidae; Tyto	Lineage
Tyto () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=56312)	Parent	Tyto () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=56312)	Parent
56313 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=56313)	NCBI Taxonomy ID	56313 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=56313)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

MC1R	Generic Gene Name	Q01726 (http://www.uniprot.org/uniprot/Q01726)	UniProtKB Homo sapiens
CMM5; MSH-R; SHEP2; MSHR	Synonyms	()	GenebankID or UniProtKB
9606.ENSP00000451605 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSP00000451605)	String		
Belongs to the G-protein coupled receptor 1 family.	Sequence Similarities		
GO:0008528 : G protein-coupled peptide receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008528)	GO - Molecular Function		
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>)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

p.Val126Ile

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Val	Ile	126

Main Reference

Effect of the MC1R gene on sexual dimorphism in melanin-based colorations. (2015) (<https://pubmed.ncbi.nlm.nih.gov/25857339>)

Authors

San-Jose LM; Ducrest AL; Ducret V; B  ziers P; Simon C; Wakamatsu K; Roulin A

Abstract

Variants of the melanocortin-1 receptor (MC1R) gene result in abrupt, naturally selected colour morphs. These genetic variants may differentially affect sexual dimorphism if one morph is naturally selected in the two sexes but another morph is naturally or sexually selected only in one of the two sexes (e.g. to confer camouflage in reproductive females or confer mating advantage in males). Therefore, the balance between natural and sexual selections can differ between MC1R variants, as suggest studies showing interspecific correlations between sexual dimorphism and the rate of nonsynonymous vs. synonymous amino acid substitutions at the MC1R. Surprisingly, how MC1R is related to within-species sexual dimorphism, and thereby to sex-specific selection, has not yet been investigated. We tackled this issue in the barn owl (*Tyto alba*), a species showing pronounced variation in the degree of reddish pheomelanin-based coloration and in the number and size of black feather spots. We found that a valine (V)-to-isoleucine (I) substitution at position 126 explains up to 30% of the variation in the three melanin-based colour traits and in feather melanin content. Interestingly, MC1R genotypes also differed in the degree of sexual colour dimorphism, with individuals homozygous for the II MC1R variant being 2 times redder and 2.5 times less sexually dimorphic than homozygous individuals for the VV MC1R variant. These findings support that MC1R interacts with the expression of sexual dimorphism and suggest that a gene with major phenotypic effects and weakly influenced by variation in body condition can participate in sex-specific selection processes.

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Additional References

Beyond mean allelic effects: A locus at the major color gene MC1R associates also with differing levels of phenotypic and genetic (co)variance for coloration in barn owls. (2017) (<https://pubmed.ncbi.nlm.nih.gov/28861897>)

The genetic basis of color-related local adaptation in a ring-like colonization around the Mediterranean. (2016) (<https://pubmed.ncbi.nlm.nih.gov/26773815>)

MC1R variants affect the expression of melanocortin and melanogenic genes and the association between melanocortin genes and coloration. (2017) (<https://pubmed.ncbi.nlm.nih.gov/27664794>)

RELATED GEPHE

No matches found.

No matches found.

Related Genes

Related Haplotypes

EXTERNAL LINKS

COMMENTS

rufous allele is dominant over white allele @SexualDimorphism @Pleiotropy