

# GEPHE SUMMARY

	Gephebase Gene	GephelD
Agouti (ASIP) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Agouti (ASIP)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Agouti (ASIP)^#gephebase-summary-title</a> )	GP00002061	Main curator
Published	Entry Status	Courtier

## PHENOTYPIC CHANGE

	Trait Category
Morphology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title</a> )	Trait
Coloration (coat) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (coat)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (coat)^#gephebase-summary-title</a> )	Trait State in Taxon A
winter-white	Trait State in Taxon B
winter-gray	Ancestral State
Taxon A	Taxonomic Status
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title</a> )	

Taxon A	Latin Name	Taxon B	Latin Name
Lepus timidus ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Lepus timidus^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Lepus timidus^#gephebase-summary-title</a> )	Common Name	Lepus timidus ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Lepus timidus^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Lepus timidus^#gephebase-summary-title</a> )	Common Name
Mountain hare	Synonyms	Mountain hare	Synonyms
Lepus tanaiticus; Mountain hare; Lepus timidus Linnaeus, 1758	Rank	Lepus tanaiticus; Mountain hare; Lepus timidus Linnaeus, 1758	Rank
species	Lineage	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; Glires; Lagomorpha; Leporidae; Lepus	Parent	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Glires; Lagomorpha; Leporidae; Lepus	Parent
Lepus (hares) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9980">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9980</a> )	NCBI Taxonomy ID	Lepus (hares) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9980">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9980</a> )	NCBI Taxonomy ID
62621 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62621">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62621</a> )		62621 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62621">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62621</a> )	
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

Asip	Generic Gene Name	UniProtKB Mus musculus
As; ASP; A<math>\gamma</math>; ASIP; a	Synonyms	GenebankID or UniProtKB
10090.ENSMUSP00000029123 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=10090.ENSMUSP00000029123">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=10090.ENSMUSP00000029123</a> )	String	0
-	Sequence Similarities	
GO:0031779 : melanocortin receptor binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0031779">https://www.ebi.ac.uk/QuickGO/term/GO:0031779</a> )	GO - Molecular Function	
GO:0031781 : type 3 melanocortin receptor binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0031781">https://www.ebi.ac.uk/QuickGO/term/GO:0031781</a> )		
GO:0031782 : type 4 melanocortin receptor binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0031782">https://www.ebi.ac.uk/QuickGO/term/GO:0031782</a> )		
	GO - Biological Process	

GO:0008343 : adult feeding behavior  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008343>)  
GO:0006091 : generation of precursor metabolites and energy  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006091>)  
GO:0071514 : genetic imprinting (<https://www.ebi.ac.uk/QuickGO/term/GO:0071514>)  
GO:0009755 : hormone-mediated signaling pathway  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009755>)  
GO:0042438 : melanin biosynthetic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042438>)  
GO:0032438 : melanosome organization  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032438>)  
GO:0032402 : melanosome transport  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032402>)  
GO:0043473 : pigmentation (<https://www.ebi.ac.uk/QuickGO/term/GO:0043473>)  
GO:0048023 : positive regulation of melanin biosynthetic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048023>)  
GO:0040030 : regulation of molecular function, epigenetic  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0040030>)

#### GO - Cellular Component

GO:0005576 : extracellular region (<https://www.ebi.ac.uk/QuickGO/term/GO:0005576>)  
GO:0005623 : cell (<https://www.ebi.ac.uk/QuickGO/term/GO:0005623>)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

exact mutation(s) unknown

Experimental Evidence

Association Mapping (<https://www.gephebase.org/search-criteria/?and+Experimental+Evidence=%Association+Mapping%#gephebase-summary-title>)

Main Reference

Introgression drives repeated evolution of winter coat color polymorphism in hares. (2019) (<https://pubmed.ncbi.nlm.nih.gov/31712446>)

Authors

Giska I; Farelo L; Pimenta J; Seixas FA; Ferreira MS; Marques JP; Miranda I; Letty J; Jenny H; Hackländer K; Magnussen E; Melo-Ferreira J

Abstract

Changing from summer-brown to winter-white pelage or plumage is a crucial adaptation to seasonal snow in more than 20 mammal and bird species. Many of these species maintain nonwhite winter morphs, locally adapted to less snowy conditions, which may have evolved independently. Mountain hares (*Lepus timidus*) from Fennoscandia were introduced into the Faroe Islands in 1855. While they were initially winter-white, within ~1465 yr all Faroese hares became winter-gray, a morph that occurs in the source population at low frequency. The documented population history makes this a valuable model for understanding the genetic basis and evolution of the seasonal trait polymorphism. Through whole-genome scans of differentiation and single-nucleotide polymorphism (SNP) genotyping, we associated winter coat color polymorphism to the genomic region of the pigmentation gene *Agouti*, previously linked to introgression-driven winter coat color variation in the snowshoe hare (*Lepus americanus*). Lower *Agouti* expression in the skin of winter-gray individuals during the autumn molt suggests that regulatory changes may underlie the color polymorphism. Variation in the associated genomic region shows signatures of a selective sweep in the Faroese population, suggesting that positive selection drove the fixation of the variant after the introduction. Whole-genome analyses of several hare species revealed that the winter-gray variant originated through introgression from a noncolor changing species, in keeping with the history of ancient hybridization between the species. Our findings show the recurrent role of introgression in generating winter coat color variation by repeatedly recruiting the regulatory region of *Agouti* to modulate seasonal coat color change.

Additional References

## RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

@Introgression of the winter-gray allele from Iberian hares (*Lepus granatensis*)

