

GEPHE SUMMARY

Gephebase Gene
Agouti (ASIP)

Entry Status
Draft

GepheID
GP00002129

Main curator
Santos

PHENOTYPIC CHANGE

Trait Category
Morphology

Trait
Coloration (skin)

Trait State in Taxon A
black skin in black-bone chicken

Trait State in Taxon B
white skin in black-bone chicken

Ancestral State
Data not curated

Taxonomic Status
Domesticated

Taxon A

Latin Name
Gallus gallus

Common Name
chicken

Synonyms
Gallus gallus domesticus; chicken; bantam; chickens

Rank
species

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; Galloanserae; Galliformes; Phasianidae; Phasianinae; Gallus

Parent
Gallus () - (Rank: genus)

NCBI Taxonomy ID
9031

is Taxon A an Intraspecies?
No

Taxon B

Latin Name
Gallus gallus

Common Name
chicken

Synonyms
Gallus gallus domesticus; chicken; bantam; chickens

Rank
species

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; Galloanserae; Galliformes; Phasianidae; Phasianinae; Gallus

Parent
Gallus () - (Rank: genus)

NCBI Taxonomy ID
9031

is Taxon B an Intraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
Asip

Synonyms
As; ASP; A_{cy}; ASIP; a

String
10090.ENSMUSP00000029123

Sequence Similarities
-

GO - Molecular Function
GO:0031779 : melanocortin receptor binding
GO:0031781 : type 3 melanocortin receptor binding
GO:0031782 : type 4 melanocortin receptor binding

GO - Biological Process
GO:0008343 : adult feeding behavior
GO:0006091 : generation of precursor metabolites and energy
GO:0071514 : genetic imprinting
GO:0009755 : hormone-mediated signaling pathway
GO:0042438 : melanin biosynthetic process

UniProtKB Mus musculus
Q03288

GenebankID or UniProtKB

GO:0032438 : melanosome organization
GO:0032402 : melanosome transport
GO:0043473 : pigmentation
GO:0048023 : positive regulation of melanin biosynthetic process
GO:0040030 : regulation of molecular function, epigenetic

GO - Cellular Component

GO:0005576 : extracellular region
GO:0005623 : cell

Presumptive Null

No

Molecular Type

Cis-regulatory

Aberration Type

Unknown

Molecular Details of the Mutation

-

Experimental Evidence

Candidate Gene

Main Reference

Association of a novel SNP in the ASIP gene with skin color in black-bone chicken. (2019)

Authors

Yu S; Wang G; Liao J

Abstract

The agouti signaling protein gene (ASIP) is a widely studied pigmentation gene that plays an important role in melanin synthesis. To determine the variety of ASIP expression in the Muchuan Black-Bone chicken, we examined genetic variation in the ASIP promoter region. A single nucleotide polymorphism (c.-1826A>T) was found to be associated with the skin color (dorsal and subalar) of black-bone chicken. Individuals with TT and AT genotypes had higher ASIP mRNA levels in the skin than did those with the AA genotype ($P \hat{A} < \hat{A} 0.01$). In addition, individuals with the TT genotype had higher ASIP mRNA levels than did those with the AT genotype ($P \hat{A} < \hat{A} 0.05$). Expression of melanogenesis-related genes (melanocortin 1 receptor and tyrosinase genes) was higher in the skin of chickens with the TT and AT genotypes than in those with the AA genotype ($P \hat{A} < \hat{A} 0.01$). A luciferase assay showed that promoter activity was higher in chickens with the TT genotype than in those with the AA genotype. Putative transcription factor prediction suggested that the c.-1826A>T mutation might shift the promoter binding affinity with differential transcription factors. In summary, we identified a novel mutation in the ASIP gene promoter that may affect chicken skin color by altering ASIP transcriptional activity.

Â© 2019 Stichting International Foundation for Animal Genetics.

Additional References

RELATED GEPHE

Related Genes

12 (ABCA1, CDKN2A/B locus, CYP19A1, EDN3, Endothelin receptor B2, MCTR, Melanophilin (MLPH), PMEL17, SLC45A2=MATP, SLCO1B3, SOX10, tyrosinase-related protein 1 (TYRP1))

Related Haplotypes

1

EXTERNAL LINKS

COMMENTS

@parallelism