

GEPHE SUMMARY

	Gephebase Gene		GepheID
GRAMD3 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~GRAMD3~#gephebase-summary-title)		GP00002391	
	Entry Status	Courtier	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category=~Morphology~#gephebase-summary-title)			
	Trait		
Coloration (skin) (https://www.gephebase.org/search-criteria?/and+Trait=~Coloration+skin~#gephebase-summary-title)			
	Trait State in Taxon A		
Gallus gallus			
	Trait State in Taxon B		
Gallus gallus			
	Ancestral State		
Data not curated			
	Taxonomic Status		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Domesticated~#gephebase-summary-title)			

Taxon A		Taxon B	
	Latin Name		Latin Name
Gallus gallus (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Gallus+gallus~#gephebase-summary-title)		Gallus gallus (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Gallus+gallus~#gephebase-summary-title)	
	Common Name		Common Name
chicken		chicken	
	Synonyms		Synonyms
Gallus gallus domesticus; chicken; bantam; chickens		Gallus gallus domesticus; chicken; bantam; chickens	
	Rank		Rank
species		species	
	Lineage		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		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		Parent
Gallus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9030)		Gallus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9030)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
9031 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9031)		9031 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9031)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Gallus gallus
GRAMD3		F1NDM3 (http://www.uniprot.org/uniprot/F1NDM3)	
	Synonyms		GenebankID or UniProtKB Gallus gallus
-			
	String		
9031.ENS GALP00000013389 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9031.ENS GALP00000013389)		F1NDM3 (https://www.ncbi.nlm.nih.gov/nucleotide/F1NDM3)	
	Sequence Similarities		
-			
	GO - Molecular Function		
-			
	GO - Biological Process		
-			
	GO - Cellular Component		
GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021)			

GO:0005881 : cytoplasmic microtubule
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005881>)

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

No coding mutation in GRAMD3. The expression of GRAMD3 gene in the dermis tissues of the shank was significantly ($P = 0.010738 < 0.05$) higher in 350-day-old Gushi chickens characterized by the dermal shank pigmentation than in one-day-old Gushi chickens. Variation in the flanking region of GRAMD3 probably leads to the abnormal expression of GRAMD3.

Experimental Evidence

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

Main Reference

Mapping of Id locus for dermal shank melanin in a Chinese indigenous chicken breed. (2017) (<https://pubmed.ncbi.nlm.nih.gov/29321357>)

Authors

Xu J; Lin S; Gao X; Nie Q; Luo Q; Zhang X

Abstract

The dermal shank pigmentation, one of the defining traits of chicken breeds, is caused by an abnormal deposition of melanin in the dermis of the shank. The abnormal deposition is controlled by the sex-linked inhibitor of dermal melanin (Id). In this study, we aim to locate the gene responsible for the dermal shank pigmentation in chickens by an association analysis and a differential expression analysis. Based on our results, 72 single-nucleotide polymorphisms (SNPs) located in Z chromosome (chrZ): 71-73 Mb (galGal3) were selected to further explore their relationships with the dermal shank pigmentation in pure lines of 96 Gushi hens and 96 Gushi hens with a yellow shank skin colour. The results of the association analysis showed that the SNPs located in chrZ: 72.58-72.99 Mb (galGal3) (chrZ: 79.02-79.44 Mb (galGal4)) are significantly associated with the dermal shank pigmentation. Based on the results of our previous studies and the present association analysis, the zinc-finger protein 608 (ZNF608), GRAM domain containing 3 (GRAMD3), aldehyde dehydrogenase 7 family member A1 (ALDH7A1), fem-1 homologue C (FEM1C), beta-1,4-galactosyltransferase 1 (B4GALT1) and versican (VCAN) genes were selected for the differential expression analysis. The gene expression profiles showed that the expression of GRAMD3 gene in the dermis tissues of the shank was significantly ($P = 0.010738 < 0.05$) higher in 350-day-old Gushi chickens characterized by the dermal shank pigmentation than in one-day-old Gushi chickens. The dermal shank pigmentation was not present in the one-day-old Gushi chickens. Additionally, the results of the association analysis and the expression analysis showed that GRAMD3 could be the most likely candidate gene for the Id locus. However, we did not detect a mutation, i.e. significantly associated with this trait within GRAMD3. Therefore, we concluded that the variations located in the flanking region of GRAMD3 led to the abnormal expression of GRAMD3, which requires further study.

Additional References

RELATED GEPHE

Related Genes

14 (ABCA1, Agouti (ASIP), CDKN2A, CYP19A1, EDN3, Endothelin receptor B2, MC1R, Melanophilin (MLPH), PMEL17, SLC45A2=MATP, SLCO1B3, SOX10, tyrosinase (TYR), tyrosinase-related protein 1 (TYRP1)) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~9031~/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS