

SLCO1B3 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~SLCO1B3~#gephebase-summary-title)	Gephebase Gene	GP00001065	GepheID
Published	Entry Status	Courtier	Main curator

Morphology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Morphology~#gephebase-summary-title)	Trait Category
Coloration (blue eggs) (https://www.gephebase.org/search-criteria?/and+Trait=~Coloration(blue eggs)~#gephebase-summary-title)	Trait
Gallus gallus	Trait State in Taxon A
Gallus gallus - Chinese blue-shelled breed	Trait State in Taxon B
Taxon A	Ancestral State
Domesticated (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Domesticated~#gephebase-summary-title)	Taxonomic Status
Taxon A	Taxon B
Gallus gallus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Gallusgallus~#gephebase-summary-title)	Gallus gallus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Gallusgallus~#gephebase-summary-title)
chicken	chicken
Gallus gallus domesticus; chicken; bantam; chickens	Gallus gallus domesticus; chicken; bantam; chickens
species	species
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
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)
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)
No	Yes
	Taxon B Description
	Gallus gallus - Chinese blue-shelled breed

SLC01B3	Generic Gene Name	Q9NPD5 (http://www.uniprot.org/uniprot/Q9NPD5)	UniProtKB Homo sapiens
LST3; HBLRR; LST-2; OATP8; OATP-8; OATP1B3; SLC21A8; LST-3TM13; LST2	Synonyms	AER35427 (https://www.ncbi.nlm.nih.gov/nuccore/AER35427)	GenebankID or UniProtKB
9606.ENSPO0000261196 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000261196)	String		
Belongs to the organo anion transporter (TC 2.A.60) family.	Sequence Similarities		
GO:0008514 : organic anion transmembrane transporter activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008514) GO:0015125 : bile acid transmembrane transporter activity (https://www.ebi.ac.uk/QuickGO/term/GO:0015125)	GO - Molecular Function		

GO:0015347 : sodium-independent organic anion transmembrane transporter activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0015347>)

GO - Biological Process

GO:0015711 : organic anion transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0015711>)

GO:0015721 : bile acid and bile salt transport

(<https://www.ebi.ac.uk/QuickGO/term/GO:0015721>)

GO:0043252 : sodium-independent organic anion transport

(<https://www.ebi.ac.uk/QuickGO/term/GO:0043252>)

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>)

GO:0016323 : basolateral plasma membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016323>)

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

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

TE (EAV-HP) promoter insertion resulting in uterus expression

Experimental Evidence

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

Main Reference

An EAV-HP insertion in 5' Flanking region of SLCO1B3 causes blue eggshell in the chicken. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23359636>)

Authors

Wang Z; Qu L; Yao J; Yang X; Li G; Zhang Y; Li J; Wang X; Bai J; Xu G; Deng X; Yang N; Wu C

Abstract

The genetic determination of eggshell coloration has not been determined in birds. Here we report that the blue eggshell is caused by an EAV-HP insertion that promotes the expression of SLCO1B3 gene in the uterus (shell gland) of the oviduct in chicken. In this study, the genetic map location of the blue eggshell gene was refined by linkage analysis in an F(2) chicken population, and four candidate genes within the refined interval were subsequently tested for their expression levels in the shell gland of the uterus from blue-shelled and non-blue-shelled hens. SLCO1B3 gene was found to be the only one expressed in the uterus of blue-shelled hens but not in that of non-blue-shelled hens. Results from a pyrosequencing analysis showed that only the allele of SLCO1B3 from blue-shelled chickens was expressed in the uterus of heterozygous hens (O*LC/O*N). SLCO1B3 gene belongs to the organic anion transporting polypeptide (OATP) family; and the OATPs, functioning as membrane transporters, have been reported for the transportation of amphipathic organic compounds, including bile salt in mammals. We subsequently resequenced the whole genomic region of SLCO1B3 and discovered an EAV-HP insertion in the 5' flanking region of SLCO1B3. The EAV-HP insertion was found closely associated with blue eggshell phenotype following complete Mendelian segregation. In situ hybridization also demonstrated that the blue eggshell is associated with ectopic expression of SLCO1B3 in shell glands of uterus. Our finding strongly suggests that the EAV-HP insertion is the causative mutation for the blue eggshell phenotype. The insertion was also found in another Chinese blue-shelled breed and an American blue-shelled breed. In addition, we found that the insertion site in the blue-shelled chickens from Araucana is different from that in Chinese breeds, which implied independent integration events in the blue-shelled chickens from the two continents, providing a parallel evolutionary example at the molecular level.

Additional References

RELATED GEPHE

Related Genes

14 (ABCA1, Agouti (ASIP), CDKN2A, CYP19A1, EDN3, Endothelin receptor B2, GRAMD3, MC1R, Melanophilin (MLPH), PMEL17, SLC45A2=MATP, 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

1 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^SLCO1B3^/and+Taxon ID=^9031^/or+Gene Gephebase=^SLCO1B3^/and+Taxon ID=^9031^#gephebase-summary-title>)

EXTERNAL LINKS

COMMENTS

2 independent insertions