GEPHE SUMMARY

Gephebase Gene

Prolactin receptor (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Prolactin receptor^#gephebase-summary-title)

GepheID

GP00002281

Entry Status

Published

Main curator

Martin

PHENOTYPIC CHANGE

Trait Category

Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait

Feather (slow-feathering ; delay) (https://www.gephebase.org/search-criteria?/and+Trait=^Feather (slow-feathering ; delay)^#gephebase-summary-title)

Trait State in Taxon A

Fast feathering

Trait State in Taxon B

Slow feathering

Ancestral State

Taxon A

Taxonomic Status

Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Domesticated^#gephebase-summary-title)

Taxon A

Latin Name

Meleagris gallopavo mexicana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Meleagris gallopavo mexicana^#gephebase-summary-title)

Common Name

-

Synonyms

-

Rank

subspecies

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; Meleagridinae; Meleagris; Meleagris gallopavo

Parent

Lacerta () - (Rank:) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9103)

NCBI Taxonomy ID

165260 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 165260)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

Meleagris gallopavo mexicana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Meleagris gallopavo mexicana^#gephebase-summary-title)

Common Name

-

Synonyms

-

Rank

subspecies

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; Meleagridinae; Meleagris; Meleagris gallopavo

Parent

Lacerta () - (Rank:) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9103)

NCBI Taxonomy ID

165260 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 165260)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

PRLR

Synonyms

HPRL; MFAB; hPRLrI; RI-PRLR

String

9606.ENSP00000371432 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000371432)

Sequence Similarities

Belongs to the type I cytokine receptor family. Type 1 subfamily.

GO - Molecular Function

GO:0042803 : protein homodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0042803)
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)
GO:0017046 : peptide hormone binding (https://www.ebi.ac.uk/QuickGO/term/GO:0017046)
GO:0019955 : cytokine binding (https://www.ebi.ac.uk/QuickGO/term/GO:0019955)

UniProtKB Homo sapiens

P16471 (http://www.uniprot.org/uniprot/P16471)

GenebankID or UniProtKB

()

GO:0004896 : cytokine receptor activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0004896)
GO:0042978 : ornithine decarboxylase activator activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0042978)
GO:0004925 : prolactin receptor activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0004925)

GO - Biological Process

GO:0043066 : negative regulation of apoptotic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0043066)
GO:0007171 : activation of transmembrane receptor protein tyrosine kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0007171)
GO:0007166 : cell surface receptor signaling pathway
(https://www.ebi.ac.uk/QuickGO/term/GO:0007166)
GO:0120162 : positive regulation of cold-induced thermogenesis
(https://www.ebi.ac.uk/QuickGO/term/GO:0120162)
GO:0042976 : activation of Janus kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0042976)
GO:0060397 : JAK-STAT cascade involved in growth hormone signaling pathway
(https://www.ebi.ac.uk/QuickGO/term/GO:0060397)
GO:0042110 : T cell activation (https://www.ebi.ac.uk/QuickGO/term/GO:0042110)
GO:0007566 : embryo implantation (https://www.ebi.ac.uk/QuickGO/term/GO:0007566)
GO:0007595 : lactation (https://www.ebi.ac.uk/QuickGO/term/GO:0007595)
GO:0006694 : steroid biosynthetic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0006694)

GO - Cellular Component

GO:0016021 : integral component of membrane
(https://www.ebi.ac.uk/QuickGO/term/GO:0016021)
GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
GO:0043235 : receptor complex (https://www.ebi.ac.uk/QuickGO/term/GO:0043235)
GO:0005576 : extracellular region (https://www.ebi.ac.uk/QuickGO/term/GO:0005576)
GO:0009986 : cell surface (https://www.ebi.ac.uk/QuickGO/term/GO:0009986)
GO:0009897 : external side of plasma membrane
(https://www.ebi.ac.uk/QuickGO/term/GO:0009897)
GO:0031904 : endosome lumen (https://www.ebi.ac.uk/QuickGO/term/GO:0031904)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Deletion Size

1-9 bp

Molecular Details of the Mutation

g.9426018_9426022delTTGGT p.Glu726Aspfs*7 truncated PRLR protein that lacks 98 C-terminal AA ; this truncated PRLR protein is strikingly similar to the protein encoded by the slow feathering K allele in chicken

Experimental Evidence

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

Main Reference

Early and late feathering in turkey and chicken: same gene but different mutations. (2018) (https://pubmed.ncbi.nlm.nih.gov/29566646)

Authors

Derks MFL; Herrero-Medrano JM; Crooijmans RPMA; Vereijken A; Long JA; Megens HJ; Groenen MAM

Abstract

Sex-linked slow (SF) and fast (FF) feathering rates at hatch have been widely used in poultry breeding for autosexing at hatch. In chicken, the sex-linked K (SF) and k+ (FF) alleles are responsible for the feathering rate phenotype. Allele K is dominant and a partial duplication of the prolactin receptor gene has been identified as the causal mutation. Interestingly, some domesticated turkey lines exhibit similar slow- and fast-feathering phenotypes, but the underlying genetic components and causal mutation have never been investigated. In this study, our aim was to investigate the molecular basis of feathering rate at hatch in domestic turkey.

We performed a sequence-based case-control association study and detected a genomic region on chromosome Z, which is statistically associated with rate of feathering at hatch in turkey. We identified a 5-bp frameshift deletion in the prolactin receptor (PRLR) gene that is responsible for slow feathering at hatch. All female cases (SF turkeys) were hemizygous for this deletion, while 188 controls (FF turkeys) were hemizygous or homozygous for the reference allele. This frameshift mutation introduces a premature stop codon and six novel amino acids (AA), which results in a truncated PRLR protein that lacks 98 C-terminal AA.

We present the causal mutation for feathering rate in turkey that causes a partial C-terminal loss of the prolactin receptor, and this truncated PRLR protein is strikingly similar to the protein encoded by the slow feathering K allele in chicken.

Additional References

RELATED GEPHE

Related Genes

1 (MC1R) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^165260^/and+Trait=Feather/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Parallelism https://omia.org/OMIA000380/9103/ ; strikingly similar mutation in chicken