

# GEPHE SUMMARY

	Gephebase Gene	GephelD
Prolactin receptor ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> Gephebase="Prolactin receptor">#gephebase-summary-title)	GP00002280	
	Entry Status	Main curator
Published	Martin	

## PHENOTYPIC CHANGE

	Trait Category
Morphology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> Category="Morphology">#gephebase-summary-title)	Trait
Feather (slow-feathering ; delay) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Feather (slow-feathering ; delay)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Feather (slow-feathering ; delay)^#gephebase-summary-title</a> )	Trait State in Taxon A
Fast feathering in White Leghorn and Broiler	Trait State in Taxon B
Slow feathering in White Leghorn and Broiler ; dominant and sex-linked used for industrial sexing.	Ancestral State
Taxon A	Taxonomic Status

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

## GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Homo sapiens
PRLR	P16471 ( <a href="http://www.uniprot.org/uniprot/P16471">http://www.uniprot.org/uniprot/P16471</a> )	
	Synonyms	GenebankID or UniProtKB
HPRL; MFAB; hPRLrl; RI-PRLR	0	
	String	
9606.ENSP00000371432 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000371432">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000371432</a> )		
	Sequence Similarities	
Belongs to the type I cytokine receptor family. Type 1 subfamily.		
	GO - Molecular Function	
GO:0042803 : protein homodimerization activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0042803">https://www.ebi.ac.uk/QuickGO/term/GO:0042803</a> )		
GO:0046872 : metal ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0046872">https://www.ebi.ac.uk/QuickGO/term/GO:0046872</a> )		
GO:0017046 : peptide hormone binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0017046">https://www.ebi.ac.uk/QuickGO/term/GO:0017046</a> )		

GO:0019955 : cytokine binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0019955>)

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

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

Aberration Type

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

Insertion Size

100-1000 kb

Molecular Details of the Mutation

tandem duplication of 176324 basepairs resulting in a partially duplicated PRLR (dPRLR) gene nearly identical to the original PRLR ; except for its lack of a 149-amino acid C-terminal tail - which may titrate PRL ligands and act as a dominant-negative receptor

Experimental Evidence

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

Main Reference

Partial duplication of the PRLR and SPEF2 genes at the late feathering locus in chicken. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18713476>)

Authors

Elferink MG; VallÅ©e AA; Jungerius AP; Croojmans RP; Groenen MA

Abstract

One of the loci responsible for feather development in chickens is K. The K allele is partially dominant to the k+ allele and causes a retard in the emergence of flight feathers at hatch. The K locus is sex linked and located on the Z chromosome. Therefore, the locus can be utilized to produce phenotypes that identify the sexes of chicks at hatch. Previous studies on the organization of the K allele concluded the integration of endogenous retrovirus 21 (ev21) into one of two large homologous segments located on the Z chromosome of late feathering chickens. In this study, a detailed molecular analysis of the K locus and a DNA test to distinguish between homozygous and heterozygous late feathering males are presented.

The K locus was investigated with quantitative PCR by examining copy number variations in a total of fourteen markers surrounding the ev21 integration site. The results showed a duplication at the K allele and sequence analysis of the breakpoint junction indicated a tandem duplication of 176,324 basepairs. The tandem duplication of this region results in the partial duplication of two genes: the prolactin receptor and the gene encoding sperm flagellar protein 2. Sequence analysis revealed that the duplication is similar in Broiler and White Leghorn. In addition, twelve late feathering animals, including Broiler, White Leghorn, and Brown Layer lines, contained a 78 bp breakpoint junction fragment, indicating that the duplication is similar in all breeds. The breakpoint junction was used to develop a TaqMan-based quantitative PCR test to allow distinction between homozygous and heterozygous late feathering males. In total, 85.3% of the animals tested were correctly assigned, 14.7% were unassigned and no animals were incorrectly assigned.

The detailed molecular analysis presented in this study revealed the presence of a tandem duplication in the K allele. The duplication resulted in the partial duplication of two genes; the prolactin receptor and the gene encoding sperm flagellar protein 2. Furthermore, a DNA test was developed to distinguish between homozygous and heterozygous late feathering males.

Additional References

Endogenous viral gene ev21 is not responsible for the expression of late feathering in chickens. (2018) (<https://pubmed.ncbi.nlm.nih.gov/29253229>)

## RELATED GEPHE

Related Genes

17 (ABCA1, CDKN2A, CYP19A1, Endothelin receptor B2, MC1R, PMEL17, SLC45A2=MATP, SOX10, tyrosinase (TYR), tyrosinase-related protein 1 (TYRP1), FGF20, GDF7, HOXC8 - uncertain, KRT6A, KRT75L4, Hoxb8, PDSS2) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=^9031^/and+Trait=Feather/and+groupHaplotypes=true#gephebase-summary-title>)

No matches found.

## EXTERNAL LINKS

## COMMENTS

@CNV @Dominance @Parallelism <https://omia.org/OMIA000380/9031/> ; strikingly similar mutation in turkey