

GEPHE SUMMARY

	Gephebase Gene	GephelD
miR-15a-16 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase^miR-15a-16^#gephebase-summary-title)	GP00002247	Main curator
	Entry Status	Martin
Published		

PHENOTYPIC CHANGE

	Trait Category	
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category^Morphology^#gephebase-summary-title)		Trait
Body size (weight) (https://www.gephebase.org/search-criteria?/and+Trait Category^Body size^#gephebase-summary-title)		Trait State in Taxon A
Normal weight - several breeds and Red Jungle Fowl		Trait State in Taxon B
High-weight lines including several commercial broiler breeds		Ancestral State
Taxon A		Taxonomic Status
Gallus gallus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms^Gallus gallus^#gephebase-summary-title)	Latin Name	Latin Name
chicken	Common Name	Common Name
Gallus gallus domesticus; chicken; bantam; chickens	Synonyms	Synonyms
species	Rank	Rank
	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		
Gallus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9030)	Parent	Parent
9031 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9031)	NCBI Taxonomy ID	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

-	Generic Gene Name	UniProtKB
-	0	
-	Synonyms	GenebankID or UniProtKB
-	0	
-	String	
-	Sequence Similarities	
-	GO - Molecular Function	
-	GO - Biological Process	
-	GO - Cellular Component	
-		Presumptive Null
Yes (https://www.gephebase.org/search-criteria?/and+Presumptive Null^Yes^#gephebase-summary-title)		Molecular Type

Cis-regulatory ([https://www.gephebase.org/search-criteria/?and+Molecular Type=%22Cis-regulatory%22#gephebase-summary-title](https://www.gephebase.org/search-criteria/?and+Molecular%20Type=%22Cis-regulatory%22#gephebase-summary-title))

Aberration Type

Insertion ([https://www.gephebase.org/search-criteria/?and+Aberration Type=%22Insertion%22#gephebase-summary-title](https://www.gephebase.org/search-criteria/?and+Aberration%20Type=%22Insertion%22#gephebase-summary-title))

Insertion Size

10-99 bp

Molecular Details of the Mutation

54-bp insertion introducing splicing site that affect the mature transcript

Experimental Evidence

Linkage Mapping ([https://www.gephebase.org/search-criteria/?and+Experimental Evidence=%22Linkage Mapping%22#gephebase-summary-title](https://www.gephebase.org/search-criteria/?and+Experimental%20Evidence=%22Linkage%20Mapping%22#gephebase-summary-title))

Main Reference

A short insertion mutation disrupts genesis of miR-16 and causes increased body weight in domesticated chicken. (2016) (<https://pubmed.ncbi.nlm.nih.gov/27808177>)

Authors

Jia X; Lin H; Nie Q; Zhang X; Lamont SJ

Abstract

Body weight is one of the most important quantitative traits with high heritability in chicken. We previously mapped a quantitative trait locus (QTL) for body weight by genome-wide association study (GWAS) in an F2 chicken resource population. To identify the causal mutations linked to this QTL, expression profiles were determined on livers of high-weight and low-weight chicken lines by microarray. Combining the expression pattern with SNP effects by GWAS, miR-16 was identified as the most likely potential candidate with a 3.8-fold decrease in high-weight lines. Re-sequencing revealed that a 54-bp insertion mutation in the upstream region of miR-15a-16 displayed high allele frequencies in high-weight commercial broiler line. This mutation resulted in lower miR-16 expression by introducing three novel splicing sites instead of the missing 5' terminal splicing of mature miR-16. Elevating miR-16 significantly inhibited DF-1 chicken embryo cell proliferation, consistent with a role in suppression of cellular growth. The 54-bp insertion was significantly associated with increased body weight, bone size and muscle mass. Also, the insertion mutation tended towards fixation in commercial broilers ($F_{ST} > 0.4$). Our findings revealed a novel causative mutation for body weight regulation that aids our basic understanding of growth regulation in birds.

Additional References

RELATED GEPHE

Related Genes

3 (Growth Hormone Receptor (GHR), TMEM263, RB1) ([https://www.gephebase.org/search-criteria/?or+Taxon ID=%229031%22&and+Trait=Body size&and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria/?or+Taxon%20ID=%229031%22&and+Trait=Body%20size&and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

microRNA ; <https://omia.org/OMIA002077/9031/>