GEPHE SUMMARY

Gephebase Gene
miR-15a-16 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^miR-15a-16^#gephebase-summary-title)

GepheID
GP00002247

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

Taxon A

Latin Name
Gallus gallus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Gallus gallus^#gephebase-summary-title)

Common Name
chicken

Synonyms
Gallus gallus domesticus; chicken; bantam; chickens

Rank
species

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

Parent
Gallus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9030)

NCBI Taxonomy ID
9031 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9031)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Gallus gallus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Gallus gallus^#gephebase-summary-title)

Common Name
chicken

Synonyms
Gallus gallus domesticus; chicken; bantam; chickens

Rank
species

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

Parent
Gallus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9030)

NCBI Taxonomy ID
9031 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9031)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
-

Synonyms
-

String
-

Sequence Similarities
-

GO - Molecular Function
-

GO - Biological Process
-

GO - Cellular Component
-

UniProtKB
()

GenebankID or UniProtKB
()

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=^Cis-regulatory^#gephebase-summary-title)

Aberration Type

Insertion (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Insertion^#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=^Linkage Mapping^#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 (Fstâ€‰>â€‰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=^9031^/and+Trait=Body size/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

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