

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

Molecular Type

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

Aberration Type

unknown ; observed transposon insertion in intron and promoter variation

Molecular Details of the Mutation

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

Experimental Evidence

Identification of a second gene associated with variation in vertebral number in domestic pigs. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21232157>)

Main Reference

Mikawa S; Sato S; Nii M; Morozumi T; Yoshioka G; Imaeda N; Yamaguchi T; Hayashi T; Awata T

Authors

The number of vertebrae in pigs varies and is associated with body size. Wild boars have 19 vertebrae, but European commercial breeds for pork production have 20 to 23 vertebrae. We previously identified two quantitative trait loci (QTLs) for number of vertebrae on *Sus scrofa* chromosomes (SSC) 1 and 7, and reported that an orphan nuclear receptor, NR6A1, was located at the QTL on SSC1. At the NR6A1 locus, wild boars and Asian local breed pigs had the wild-type allele and European commercial-breed pigs had an allele associated with increased numbers of vertebrae (number-increase allele).

Abstract

Here, we performed a map-based study to define the other QTL, on SSC7, for which we detected genetic diversity in European commercial breeds. Haplotype analysis with microsatellite markers revealed a 41-kb conserved region within all the number-increase alleles in the present study. We also developed single nucleotide polymorphisms (SNPs) in the 450-kb region around the QTL and used them for a linkage disequilibrium analysis and an association study in 199 independent animals. Three haplotype blocks were detected, and SNPs in the 41-kb region presented the highest associations with the number of vertebrae. This region encodes an uncharacterized hypothetical protein that is not a member of any other known gene family. Orthologs appear to exist not only in mammals but also birds and fish. This gene, which we have named *vertnin* (VRTN) is a candidate for the gene associated with variation in vertebral number. In pigs, the number-increase allele was expressed more abundantly than the wild-type allele in embryos. Among candidate polymorphisms, there is an insertion of a SINE element (PRE1) into the intron of the Q allele as well as the SNPs in the promoter region.

Genetic diversity of VRTN is the suspected cause of the heterogeneity of the number of vertebrae in commercial-breed pigs, so the polymorphism information should be directly useful for assessing the genetic ability of individual animals. The number-increase allele of swine VRTN was suggested to add an additional thoracic segment to the animal. Functional analysis of VRTN may provide novel findings in the areas of developmental biology.

Additional References

RELATED GEPHE

2 (GCNF (NR6A1), *Vertnin* (VRTN) [possibly a pseudo-replicate of other Pig entry]) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=9823#/and+Trait=Vertebrae+number/or+Taxon+ID=9825#/and+Trait=Vertebrae+number/and+groupHaplotypes=true#gephebase-summary-title>)

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

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