GEPHE SUMMARY

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

GepheID
GP00001165

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

Trait State in Taxon A
Sus scrofa

Trait State in Taxon B
Sus scrofa

Ancestral State
Data not curated

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

Taxon A

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

Common Name
pig

Synonyms
pig; pigs; swine; wild boar; Sus scrofa Linnaeus, 1758; Sus scrofus

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Laurasiatheria; Cetartiodactyla; Suina; Suidae; Sus

Parent
Sus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9822)

NCBI Taxonomy ID
9823 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9823)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
domestic pig

Synonyms
Sus domestica; Sus domesticus; Sus scrofa domestica; domestic pig

Rank
subspecies

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Laurasiatheria; Cetartiodactyla; Suina; Suidae; Sus; Sus scrofa

Parent
Sus scrofa (pig) - (Rank: species) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9823)

NCBI Taxonomy ID
9825 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9825)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
Vrtn

Synonyms
7420416P09Rik

String
10090.ENSMUSP00000093207 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=10090.ENSMUSP00000093207)

Sequence Similarities
Belongs to the vertnin family.

GO - Molecular Function
-

GO - Biological Process
-

GO - Cellular Component
-

UniProtKB Mus musculus
Q3SYK4 (http://www.uniprot.org/uniprot/Q3SYK4)

GenebankID or UniProtKB
BAJ11938 (https://www.ncbi.nlm.nih.gov/nuccore/BAJ11938)

Presumptive Null
Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

unknown ; observed transposon insertion in intron and promoter variation

Experimental Evidence

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

Main Reference

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

Authors

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

Abstract

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).

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

Related Genes

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 Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@TE