

GEPHE SUMMARY

	Gephebase Gene		GepheID
Muscle-specific adenosine monophosphate-activated protein kinase (PRKAG3) (<a +muscle-specific+adenosine+monophosphate-activated+protein+kinase+(prkag3)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+Muscle-specific+adenosine+monophosphate-activated+protein+kinase+(PRKAG3)+"#gephebase-summary-title)		GP00002333	
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)		Trait	
Glycogen content (muscles) (<a +glycogen+content+(muscles)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Glycogen+content+(muscles)+"#gephebase-summary-title)		Trait State in Taxon A	
Sus scrofa		Trait State in Taxon B	
Sus scrofa - Hampshire - muscle with higher glycogen and distinct cooking and curing traits		Ancestral State	
Taxon A		Taxonomic Status	
Domesticated (<a +domesticated+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Domesticated+"#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Sus scrofa (<a +sus+scrofa+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Sus+scrofa+"#gephebase-summary-title)		Sus scrofa domesticus (<a +sus+scrofa+domesticus+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Sus+scrofa+domesticus+"#gephebase-summary-title)	
	Common Name		Common Name
pig		domestic pig	
	Synonyms		Synonyms
pig; pigs; swine; wild boar; Sus scrofa Linnaeus, 1758; Sus scrofa		Sus domestica; Sus domesticus; Sus scrofa domestica; domestic pig	
	Rank		Rank
species		subspecies	
	Lineage		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		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		Parent
Sus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9822)		Sus scrofa (pig) - (Rank: species) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9823)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
9823 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9823)		9825 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9825)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		Yes	
			Taxon B Description
		Sus scrofa - Hampshire	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Mus musculus
Prkag3		Q8BGM7 (http://www.uniprot.org/uniprot/Q8BGM7)	
	Synonyms		GenebankID or UniProtKB
Amkg3; Ampkg3; AMPKg3L; AMPKg3S		AAP12533 (https://www.ncbi.nlm.nih.gov/nuccore/AAP12533)	
	String		
10090.ENSMUSP00000080342 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=10090.ENSMUSP00000080342)			
	Sequence Similarities		
Belongs to the 5'-AMP-activated protein kinase gamma subunit family.			
	GO - Molecular Function		
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)			
GO:0019901 : protein kinase binding (https://www.ebi.ac.uk/QuickGO/term/GO:0019901)			
GO:0004679 : AMP-activated protein kinase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004679)			

GO:0005978 : glycogen biosynthetic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005978>)
GO:0006633 : fatty acid biosynthetic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006633>)
GO:0006096 : glycolytic process (<https://www.ebi.ac.uk/QuickGO/term/GO:0006096>)
GO:0071900 : regulation of protein serine/threonine kinase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0071900>)
GO:0014873 : response to muscle activity involved in regulation of muscle adaptation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0014873>)

GO - Cellular Component

GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)
GO:0005654 : nucleoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005654>)
GO:0031588 : nucleotide-activated protein kinase complex
(<https://www.ebi.ac.uk/QuickGO/term/GO:0031588>)

Presumptive Null

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title>)

Molecular Type

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

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

p.(I249V)

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Ile	Val	249

Main Reference

Evidence for new alleles in the protein kinase adenosine monophosphate-activated gamma(3)-subunit gene associated with low glycogen content in pig skeletal muscle and improved meat quality. (2001) (<https://pubmed.ncbi.nlm.nih.gov/11729159>)

Authors

Ciobanu D; Bastiaansen J; Malek M; Helm J; Woollard J; Plastow G; Rothschild M

Abstract

Several quantitative trait loci (QTL) affecting muscle glycogen content and related traits were mapped to pig chromosome 15 using a three-generation intercross between Berkshire x Yorkshire pigs. On the basis of the QTL location the PRKAG3 (protein kinase, AMP-activated, gamma(3)-subunit) gene was considered to be a good candidate for the observed effects. Differences in the PRKAG3 gene sequences of the founder animals of the intercross were analyzed. The RN(-) mutation previously reported was not present in the cross but three missense substitutions and a polymorphic short interspersed element (SINE) were identified. To confirm the hypothesis that at least one of these mutations was associated with differences in meat quality, >1800 animals from several unrelated commercial lines were genotyped for the candidate substitutions and an association study was performed. The results demonstrate the presence of new economically important alleles of the PRKAG3 gene affecting the glycogen content in the muscle and the resulting meat quality. Haplotype analysis was shown to resolve the effects of PRKAG3 more clearly than analysis of individual polymorphisms. Because of their prevalence in the more common commercial breeds, the potential implications for the pig industry and consumers are considerably greater than the original discovery of the RN(-) mutation. Furthermore, these results illustrate that additional alleles of genes involved in major mutations may play a significant role in quantitative trait variation.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

1 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~Muscle-specific adenosine monophosphate-activated protein kinase \(PRKAG3\)~/and+Taxon ID=~9823~/or+Gene Gephebase=~Muscle-specific adenosine monophosphate-activated protein kinase \(PRKAG3\)~/and+Taxon ID=~9825~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~Muscle-specific adenosine monophosphate-activated protein kinase (PRKAG3)~/and+Taxon ID=~9823~/or+Gene Gephebase=~Muscle-specific adenosine monophosphate-activated protein kinase (PRKAG3)~/and+Taxon ID=~9825~#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

@AllelicSeries <https://omia.org/OMIA001085/9823/>

