

GEPHE SUMMARY

	Gephebase Gene	GepheID
diacylglycerol acyltransferase 1 (DGAT1) (<a +diacylglycerol+acyltransferase+1+(dgat1)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+diacylglycerol+acyltransferase+1+(DGAT1)+"#gephebase-summary-title)	GP00000222	
	Martin	Main curator
Published	Entry Status	

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	
Milk fat content (<a +milk+fat+content+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Milk+fat+content+"#gephebase-summary-title)			
	Trait State in Taxon A		
Bos taurus Holstein		Trait State in Taxon B	
Bos taurus Friesian			
	Ancestral State		
Data not curated		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
Bos taurus (<a +bos+taurus+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Bos+taurus+"#gephebase-summary-title)		Bos taurus (<a +bos+taurus+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Bos+taurus+"#gephebase-summary-title)	
	Common Name		Common Name
cattle		cattle	
	Synonyms		Synonyms
Bos bovis; Bos primigenius taurus; cattle; bovine; cow; dairy cow; domestic cattle; domestic cow; Bos taurus Linnaeus, 1758; Bos Taurus		Bos bovis; Bos primigenius taurus; cattle; bovine; cow; dairy cow; domestic cattle; domestic cow; Bos taurus Linnaeus, 1758; Bos Taurus	
	Rank		Rank
species		species	
	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; Artiodactyla; Ruminantia; Pecora; Bovidae; Bovinae; Bos		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Laurasiatheria; Artiodactyla; Ruminantia; Pecora; Bovidae; Bovinae; Bos	
	Parent		Parent
Bos (oxen, cattle) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9903)		Bos (oxen, cattle) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9903)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
9913 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9913)		9913 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9913)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
Yes		Yes	
	Taxon A Description		Taxon B Description
Bos taurus Holstein		Bos taurus Friesian	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Mus musculus
Dgat1		Q9Z2A7 (http://www.uniprot.org/uniprot/Q9Z2A7)
	Synonyms	GenebankID or UniProtKB
ARAT; Dgat; C75990; D15Ertd23e		ABY56289 (https://www.ncbi.nlm.nih.gov/nuccore/ABY56289)
	String	
10090.ENSMUSP00000023214 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=10090.ENSMUSP00000023214)		
	Sequence Similarities	
Belongs to the membrane-bound acyltransferase family. Sterol o-acyltransferase subfamily.		
	GO - Molecular Function	
GO:0003846 : 2-acylglycerol O-acyltransferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003846)		
GO:0019992 : diacylglycerol binding (https://www.ebi.ac.uk/QuickGO/term/GO:0019992)		

GO:0004144 : diacylglycerol O-acyltransferase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0004144>)
GO:0005504 : fatty acid binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0005504>)
GO:0050252 : retinol O-fatty-acyltransferase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0050252>)
GO:0016746 : transferase activity, transferring acyl groups
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016746>)

GO - Biological Process

GO:0055089 : fatty acid homeostasis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0055089>)
GO:0046339 : diacylglycerol metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0046339>)
GO:0046486 : glycerolipid metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0046486>)
GO:0030073 : insulin secretion (<https://www.ebi.ac.uk/QuickGO/term/GO:0030073>)
GO:1902224 : ketone body metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:1902224>)
GO:0019915 : lipid storage (<https://www.ebi.ac.uk/QuickGO/term/GO:0019915>)
GO:0035336 : long-chain fatty-acyl-CoA metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0035336>)
GO:0046321 : positive regulation of fatty acid oxidation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0046321>)
GO:2000491 : positive regulation of hepatic stellate cell activation
(<https://www.ebi.ac.uk/QuickGO/term/GO:2000491>)
GO:0010867 : positive regulation of triglyceride biosynthetic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010867>)
GO:1903998 : regulation of eating behavior
(<https://www.ebi.ac.uk/QuickGO/term/GO:1903998>)
GO:1904729 : regulation of intestinal lipid absorption
(<https://www.ebi.ac.uk/QuickGO/term/GO:1904729>)
GO:1901738 : regulation of vitamin A metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:1901738>)
GO:0019432 : triglyceride biosynthetic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0019432>)
GO:0034379 : very-low-density lipoprotein particle assembly
(<https://www.ebi.ac.uk/QuickGO/term/GO:0034379>)

GO - Cellular Component

GO:0016021 : integral component of membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)
GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)
GO:0016020 : membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0016020>)
GO:0043231 : intracellular membrane-bounded organelle
(<https://www.ebi.ac.uk/QuickGO/term/GO:0043231>)
GO:0005789 : endoplasmic reticulum membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005789>)

No (<a #gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Presumptive Null=" no"="">https://www.gephebase.org/search-criteria?/and+Presumptive Null="No" #gephebase-summary-title)	Presumptive Null
Coding (<a #gephebase-summary-title"="" coding"="" href="https://www.gephebase.org/search-criteria?/and+Molecular Type=">https://www.gephebase.org/search-criteria?/and+Molecular Type="Coding" #gephebase-summary-title)	Molecular Type
SNP (<a #gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Aberration Type=" snp"="">https://www.gephebase.org/search-criteria?/and+Aberration Type="SNP" #gephebase-summary-title)	Aberration Type
Nonsynonymous	SNP Coding Change
K232A	Molecular Details of the Mutation
Linkage Mapping (<a #gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Experimental Evidence=" linkage="" mapping"="">https://www.gephebase.org/search-criteria?/and+Experimental Evidence="Linkage Mapping" #gephebase-summary-title)	Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Positional candidate cloning of a QTL in dairy cattle: identification of a missense mutation in the bovine DGAT1 gene with major effect on milk yield and composition. (2002)
(<https://pubmed.ncbi.nlm.nih.gov/11827942>)

Authors

Grisart B; Coppieters W; Farnir F; Karim L; Ford C; Berzi P; Cambisano N; Mni M; Reid S; Simon P; Spelman R; Georges M; Snell R

Abstract

We recently mapped a quantitative trait locus (QTL) with a major effect on milk composition--particularly fat content--to the centromeric end of bovine chromosome 14. We subsequently exploited linkage disequilibrium to refine the map position of this QTL to a 3-cM chromosome interval bounded by microsatellite markers BULGE13 and BULGE09. We herein report the positional candidate cloning of this QTL, involving (1) the construction of a BAC contig spanning the corresponding marker interval, (2) the demonstration that a very strong candidate gene, acylCoA:diacylglycerol acyltransferase (DGAT1), maps to that contig, and (3) the identification of a nonconservative K232A substitution in the DGAT1 gene with a major effect on milk fat content and other milk characteristics.

Additional References

Genetic and functional confirmation of the causality of the DGAT1 K232A quantitative trait nucleotide in affecting milk yield and composition. (2004)

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS