

GEPHE SUMMARY

BMP receptor IB (BMPRIB) (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=^BMP receptor IB (BMPRIB)^#gephebase-summary-title)	Generic Gene Name	GP00000146	GephelD
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

Trait Category			
Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category=^Physiology^#gephebase-summary-title)	Trait		
Fertility (increased ovulation rate) (https://www.gephebase.org/search-criteria/?and+Trait=^Fertility+(increased+ovulation+rate)^#gephebase-summary-title)	Trait State in Taxon A		
Ovis aries	Trait State in Taxon B		
Ovis aries - Boorola strain of Australian Merino Sheep	Ancestral State		
Taxon A	Taxonomic Status		
Domesticated (https://www.gephebase.org/search-criteria/?and+Taxonomic Status=^Domesticated^#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Ovis aries (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Ovis+aries^#gephebase-summary-title)		Ovis aries (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Ovis+aries^#gephebase-summary-title)	
sheep	Common Name	sheep	Common Name
Ovis ammon aries; Ovis orientalis aries; Ovis ovis; sheep; domestic sheep; lambs; wild sheep; Ovis aries Linnaeus, 1758	Synonyms	Ovis ammon aries; Ovis orientalis aries; Ovis ovis; sheep; domestic sheep; lambs; wild sheep; Ovis aries Linnaeus, 1758	Synonyms
species	Rank	species	Rank
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; Caprinae; Ovis	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; Caprinae; Ovis	Lineage
Ovis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9935)	Parent	Ovis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9935)	Parent
9940 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9940)	NCBI Taxonomy ID	9940 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9940)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
			Taxon B Description
			Ovis aries - Boorola strain of Australian Merino Sheep

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Ovis aries
BMPR-IB	Synonyms	Q9BDI4 (http://www.uniprot.org/uniprot/Q9BDI4)
ALK6; FecB; BMPR-IB	String	GenebankID or UniProtKB AF357007 (https://www.ncbi.nlm.nih.gov/nucleotide/AF357007)
-	Sequence Similarities	
Belongs to the protein kinase superfamily. TKL Ser/Thr protein kinase family. TGFB receptor subfamily.		
	GO - Molecular Function	
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)		
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)		
GO:0004675 : transmembrane receptor protein serine/threonine kinase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004675)		
	GO - Biological Process	

GO:0002063 : chondrocyte development
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0002063>)
 GO:0030166 : proteoglycan biosynthetic process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0030166>)
 GO:0060350 : endochondral bone morphogenesis
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0060350>)
 GO:1902731 : negative regulation of chondrocyte proliferation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:1902731>)
 GO:0061036 : positive regulation of cartilage development
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0061036>)

GO - Cellular Component

GO:0016021 : integral component of membrane
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

Presumptive Null

No ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=%27No%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive%20Null=%27No%27#gephebase-summary-title))

Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=%27Coding%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular%20Type=%27Coding%27#gephebase-summary-title))

Aberration Type

SNP ([https://www.gephebase.org/search-criteria?/and+Aberration Type=%27SNP%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration%20Type=%27SNP%27#gephebase-summary-title))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

g.29382188A>G c.914A>G p.Q305R

Experimental Evidence

Linkage Mapping ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%27Linkage Mapping%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental%20Evidence=%27Linkage%20Mapping%27#gephebase-summary-title))

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Glu	Arg	305

Main Reference

Mutation in bone morphogenetic protein receptor-IB is associated with increased ovulation rate in Booroola MÃ©rino ewes. (2001) (<https://pubmed.ncbi.nlm.nih.gov/11320249>)

Authors

Mulsant P; Lecerf F; Fabre S; Schibler L; Monget P; Lanneluc I; Pisset C; Riquet J; Monniaux D; Callebaut I; Cribiu E; Thimonier J; Teyssier J; Bodin L; CognÃ© Y; Chitour N; Elsen JM
Abstract

Ewes from the Booroola strain of Australian MÃ©rino sheep are characterized by high ovulation rate and litter size. This phenotype is due to the action of the FecB(B) allele of a major gene named FecB, as determined by statistical analysis of phenotypic data. By genetic analysis of 31 informative half-sib families from heterozygous sires, we showed that the FecB locus is situated in the region of ovine chromosome 6 corresponding to the human chromosome 4q22-23 that contains the bone morphogenetic protein receptor IB (BMPR-IB) gene encoding a member of the transforming growth factor-beta (TGF-beta) receptor family. A nonconservative substitution (Q249R) in the BMPR-IB coding sequence was found to be associated fully with the hyperprolificacy phenotype of Booroola ewes. In vitro, ovarian granulosa cells from FecB(B)/FecB(B) ewes were less responsive than granulosa cells from FecB(+)/FecB(+) ewes to the inhibitory effect on steroidogenesis of GDF-5 and BMP-4, natural ligands of BMPR-IB. It is suggested that in FecB(B)/FecB(B) ewes, BMPR-IB would be inactivated partially, leading to an advanced differentiation of granulosa cells and an advanced maturation of ovulatory follicles.

Additional References

RELATED GEPHE

	Related Genes
3 (B4GALNT2, BMP15, GDF9) (https://www.gephebase.org/search-criteria?/or+Taxon ID=%279940%27+Trait=Fertility+groupHaplotypes=true#gephebase-summary-title)	Related Haplotypes
No matches found.	

EXTERNAL LINKS

COMMENTS

@SexualTrait <https://omia.org/OMIA000383/9940/>

