GEPHE SUMMARY

Gephebase Gene
BMP receptor IB (BMPRIB) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^BMP receptor IB (BMPRIB)^#gephebase-summary-title)

GepheID
GP00000146

Entry Status
Published

Main curator
Martin

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
Ovis aries (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Ovis aries^#gephebase-summary-title)

Common Name
sheep

Synonyms
Ovis ammon aries; Ovis orientalis aries; Ovis ovis; sheep; domestic sheep; lambs; wild sheep; Ovis aries Linnaeus, 1758

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; Artiodactyla; Ruminantia; Pecora; Bovidae; Caprinae; Ovis

Parent
Ovis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9935)

NCBI Taxonomy ID
9940 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9940)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
sheep

Synonyms
Ovis ammon aries; Ovis orientalis aries; Ovis ovis; sheep; domestic sheep; lambs; wild sheep; Ovis aries Linnaeus, 1758

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; Artiodactyla; Ruminantia; Pecora; Bovidae; Caprinae; Ovis

Parent
Ovis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9935)

NCBI Taxonomy ID
9940 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9940)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Ovis aries - Boorola strain of Australian Merino Sheep

GENOTYPIC CHANGE

Generic Gene Name
BMPR-IB

Synonyms
ALK6; FecB; BMPR-IB

String
-

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

UniProtKB Ovis aries
Q9BDI4 (http://www.uniprot.org/uniprot/Q9BDI4)

GenebankID or UniProtKB
AF357007 (https://www.ncbi.nlm.nih.gov/nuccore/AF357007)

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=^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

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

Experimental Evidence

Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#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; Pisselet C; Riquet J; Monniaux D; Callebaut I; Cribiu E; Thimonier J; Teyssier J; Bodin L; CogniÃ© 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=^9940^/and+Trait=Fertility/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

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