

GEPHE SUMMARY

	Gephebase Gene	GephelD
ARHGAP15 (https://www.gephebase.org/search-criteria/?and+Gene Gephebase=^ARHGAP15^#gephebase-summary-title)	GP00000103	
	Entry Status	Main curator
Published	Martin	

PHENOTYPIC CHANGE

Trait Category		Trait	
Trait State in Taxon A		Trait State in Taxon B	Ancestral State
Bos indicus (zebu) ; other susceptible breeds			
Bos taurus (N'dama breed)			
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
Bos taurus (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Bos+taurus^#gephebase-summary-title)		Bos taurus (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Bos+taurus^#gephebase-summary-title)	
cattle	Common Name	cattle	Common Name
Bos bovis; Bos primigenius taurus; cattle; bovine; cow; dairy cow; domestic cattle; domestic cow; Bos taurus Linnaeus, 1758; Bos Taurus	Synonyms	Bos bovis; Bos primigenius taurus; cattle; bovine; cow; dairy cow; domestic cattle; domestic cow; Bos taurus Linnaeus, 1758; Bos Taurus	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; Bovinae; Bos	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	Lineage
Bos (oxen, cattle) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9903)	Parent	Bos (oxen, cattle) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9903)	Parent
9913 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9913)	NCBI Taxonomy ID	9913 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9913)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
		Bos taurus (N'dama breed)	Taxon B Description

GENOTYPIC CHANGE

Arhgap15	Generic Gene Name	UniProtKB Mus musculus
5830480G12Rik	Synonyms	GenebankID or UniProtKB
10090.ENSMUSP00000056461 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=10090.ENSMUSP00000056461)	String	AAI34461 (https://www.ncbi.nlm.nih.gov/nuccore/AAI34461)
-	Sequence Similarities	
GO:0005096 : GTPase activator activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005096)	GO - Molecular Function	GO - Biological Process
GO:0007165 : signal transduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007165)		

GO:0008360 : regulation of cell shape
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008360>)
GO:0043087 : regulation of GTPase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0043087>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
GO:0016020 : membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0016020>)

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

H282P

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	-	-	-

Main Reference

Genetic and expression analysis of cattle identifies candidate genes in pathways responding to *Trypanosoma congolense* infection. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21593421>)

Authors

Noyes H; Brass A; Obara I; Anderson S; Archibald AL; Bradley DG; Fisher P; Freeman A; Gibson J; Gicheru M; Hall L; Hanotte O; Hulme H; McKeever D; Murray C; Oh SJ; Tate C; Smith K; Tapio M; Wambugu J; Williams DJ; Agaba M; Kemp SJ

Abstract

African bovine trypanosomiasis caused by *Trypanosoma* sp., is a major constraint on cattle productivity in sub-Saharan Africa. Some African Bos taurus breeds are highly tolerant of infection, but the potentially more productive Bos indicus zebu breeds are much more susceptible. Zebu cattle are well adapted for plowing and haulage, and increasing their tolerance of trypanosomiasis could have a major impact on crop cultivation as well as dairy and beef production. We used three strategies to obtain short lists of candidate genes within QTL that were previously shown to regulate response to infection. We analyzed the transcriptomes of trypanotolerant N'Dama and susceptible Boran cattle after infection with *Trypanosoma congolense*. We sequenced EST libraries from these two breeds to identify polymorphisms that might underlie previously identified quantitative trait loci (QTL), and we assessed QTL regions and candidate loci for evidence of selective sweeps. The scan of the EST sequences identified a previously undescribed polymorphism in ARHGAP15 in the Bta2 trypanotolerance QTL. The polymorphism affects gene function in vitro and could contribute to the observed differences in expression of the MAPK pathway in vivo. The expression data showed that TLR and MAPK pathways responded to infection, and the former contained TICAM1, which is within a QTL on Bta7. Genetic analyses showed that selective sweeps had occurred at TICAM1 and ARHGAP15 loci in African taurine cattle, making them strong candidates for the genes underlying the QTL. Candidate QTL genes were identified in other QTL by their expression profile and the pathways in which they participate.

Additional References

RELATED GEPHE

Related Genes

1 (TICAM1) (<https://www.gephebase.org/search-criteria/?or+Taxon+ID=%9913%and+Trait=Pathogen+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS