

GEPHE SUMMARY

¹ 2-adrenergic octopamine receptor gene (AOR) (https://www.gephebase.org/search-criteria/?and+Gene Gephebase= ^ ¹ 2-adrenergic octopamine receptor gene (AOR)`#gephebase-summary-title)	Gephebase Gene	GephelD
	GP00002396	Main curator
	Courtier	
Published	Entry Status	

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria/?and+Trait Category="Physiology`#gephebase-summary-title")	Trait Category	
Xenobiotic resistance (amitraz) (https://www.gephebase.org/search-criteria/?and+Trait =^Xenobiotic resistance (amitraz)`#gephebase-summary-title")	Trait	
Rhipicephalus microplus - sensitive	Trait State in Taxon A	
Rhipicephalus microplus - resistant	Trait State in Taxon B	
Taxon A	Ancestral State	
Intraspecific (https://www.gephebase.org/search-criteria/?and+Taxonomic Status="Intraspecific`#gephebase-summary-title")	Taxonomic Status	
Taxon A		Taxon B
Rhipicephalus microplus (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Rhipicephalus+microplus`#gephebase-summary-title)	Latin Name	Latin Name
southern cattle tick	Common Name	Common Name
Boophilus microplus; Rhipicephalus (Boophilus) microplus; southern cattle tick; cattle tick; Rhipicephalus microplus (Canestrini, 1888)	Synonyms	Synonyms
species	Rank	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Parasitiformes; Ixodida; Ixodoidea; Ixodidae; Rhipicephalinae; Rhipicephalus; Boophilus	Lineage	Lineage
Boophilus () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6940)	Parent	Parent
6941 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6941)	NCBI Taxonomy ID	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

Oct-TyrR	Generic Gene Name	UniProtKB Drosophila melanogaster
	Synonyms	GenebankID or UniProtKB
CG7485; Dmel\CG7485; DmocT/tyr; DmTAR1; DmTyrR; DrmOTR; hono; l(3)neo30; OA-R; OAR_DROME; Ocr; OcR; Oct/Tyr; OctoR1; OctyR99AB; OTR; tar1; TAR1; Tyr; TyR; TYR; Tyr-dro; Tyr-OctR; TyrR	P22270 (http://www.uniprot.org/uniprot/P22270)	
7227.FBpp0078132 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0078132)	String	
Belongs to the G-protein coupled receptor 1 family.	Sequence Similarities	
GO:0004930 : G protein-coupled receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004930)	GO - Molecular Function	
GO:0008227 : G protein-coupled amine receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008227)		

GO:0004989 : octopamine receptor activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0004989>)

GO - Biological Process

GO:0007608 : sensory perception of smell

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007608>)

GO:0071880 : adenylate cyclase-activating adrenergic receptor signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0071880>)

GO:0007211 : octopamine or tyramine signaling pathway

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007211>)

GO:1900738 : positive regulation of phospholipase C-activating G protein-coupled receptor signaling pathway (<https://www.ebi.ac.uk/QuickGO/term/GO:1900738>)

GO:0010578 : regulation of adenylate cyclase activity involved in G protein-coupled receptor signaling pathway (<https://www.ebi.ac.uk/QuickGO/term/GO:0010578>)

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:0005887 : integral component of plasma membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)

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

-

Molecular Details of the Mutation

L64I

Experimental Evidence

Association Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=^Association+Mapping^#gephebase-summary-title>)

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Leu	Ile	64

Main Reference

Mutation in the Rmⁱ²AOR gene is associated with amitraz resistance in the cattle tick *Rhipicephalus microplus*. (2013) (<https://pubmed.ncbi.nlm.nih.gov/24082133>)

Authors

Corley SW; Jonsson NN; Piper EK; CutullÃ© C; Stear MJ; Seddon JM

Abstract

We aimed to describe the evolution of resistance to amitraz in *Rhipicephalus microplus* in the field and to test the association between amitraz resistance and the frequency of a mutation in the β^2 -adrenergic octopamine receptor gene (Rmⁱ²AOR). We established six populations of *Rhipicephalus microplus* ticks in similar paddocks by the admixture of ticks from strains known to be susceptible and resistant to amitraz and synthetic pyrethroids. Each population was managed using one of three acaricide treatment regimes: always amitraz, always spinosad, or rotation between amitraz and spinosad. We used microsatellites to elucidate population structure over time, an SNP in the para-sodium channel gene previously demonstrated to confer resistance to synthetic pyrethroids to quantify changes in resistance to synthetic pyrethroids over time, and a nonsynonymous SNP in the Rmⁱ²AOR, a gene that we proposed to confer resistance to amitraz, to determine whether selection with amitraz increased the frequency of this mutation. The study showed panmixia of the two strains and that selection of ticks with amitraz increased the frequency of the Rmⁱ²AOR mutation while increasing the prevalence of amitraz-resistance. We conclude that polymorphisms in the Rmⁱ²AOR gene are likely to confer resistance to amitraz.

Additional References

Genotype to phenotype, the molecular and physiological dimensions of resistance in arthropods. (2015) (<https://pubmed.ncbi.nlm.nih.gov/26047113>)

RELATED GEPHE

Related Genes

2 (para (kdr), resistance to dieldrin) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=^6941^/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

