

## GEPHE SUMMARY

	Gephebase Gene		GepheID
Na/K-ATPase alpha-subunit ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> )		GP00000705	
Gephebase= <sup>^</sup> Na/K-ATPase alpha-subunit <sup>^</sup> #gephebase-summary-title)			Main curator
Published	Entry Status	Martin	

## PHENOTYPIC CHANGE

	Trait Category	
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> )		
Category= <sup>^</sup> Physiology <sup>^</sup> #gephebase-summary-title)	Trait	
Xenobiotic resistance (cardiac glycosides) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=&lt;sup&gt;^&lt;/sup&gt;Xenobiotic resistance (cardiac glycosides)&lt;sup&gt;^&lt;/sup&gt;#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=<sup>^</sup>Xenobiotic resistance (cardiac glycosides)<sup>^</sup>#gephebase-summary-title</a> )		
	Trait State in Taxon A	
Other beetles		
	Trait State in Taxon B	
Rhyssomatus lineaticollis		
	Ancestral State	
Taxon A		
	Taxonomic Status	
Interspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> )		
Status= <sup>^</sup> Interspecific <sup>^</sup> #gephebase-summary-title)		

Taxon A	Latin Name	Taxon B	Latin Name
Coleoptera		Rhyssomatus lineaticollis	
( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> )		( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> )	
Synonyms= <sup>^</sup> Coleoptera <sup>^</sup> #gephebase-summary-title)	Common Name	lineaticollis <sup>^</sup> #gephebase-summary-title)	Common Name
beetles		-	
	Synonyms		Synonyms
beetles		Rhyssomatus lineaticollis (Say, 1824)	
	Rank		Rank
order		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia;		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia;	
Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta;		Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta;	
Dicondylia; Pterygota; Neoptera; Holometabola		Dicondylia; Pterygota; Neoptera; Holometabola; Coleoptera; Polyphaga; Cucujiformia;	
	Parent	Curculionoidea; Curculionidae; Molytinae; Cleogonini; Rhyssomatus	Parent
Holometabola () - (Rank: cohort)		Rhyssomatus () - (Rank: genus)	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33392">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33392</a> )	NCBI Taxonomy ID	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=672673">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=672673</a> )	NCBI Taxonomy ID
7041		1206597	
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7041">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7041</a> )		( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1206597">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1206597</a> )	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

## GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Danaus plexippus
K+ ATPase alpha subunit		R4ZHW8 ( <a href="http://www.uniprot.org/uniprot/R4ZHW8">http://www.uniprot.org/uniprot/R4ZHW8</a> )	
	Synonyms		GenebankID or UniProtKB
Na+		0	
	String		
-			
	Sequence Similarities		
Belongs to the cation transport ATPase (P-type) (TC 3.A.3) family. Type IIC subfamily.			
	GO - Molecular Function		
GO:0005524 : ATP binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005524">https://www.ebi.ac.uk/QuickGO/term/GO:0005524</a> )			
GO:0046872 : metal ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0046872">https://www.ebi.ac.uk/QuickGO/term/GO:0046872</a> )			
GO:0005391 : sodium:potassium-exchanging ATPase activity			
( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005391">https://www.ebi.ac.uk/QuickGO/term/GO:0005391</a> )			
	GO - Biological Process		
-			
	GO - Cellular Component		
GO:0016021 : integral component of membrane			
( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0016021">https://www.ebi.ac.uk/QuickGO/term/GO:0016021</a> )			

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

Presumptive Null

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

Molecular Type

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

Aberration Type

Nonsynonymous

SNP Coding Change

C104Y

Molecular Details of the Mutation

Candidate Gene ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=))

Experimental Evidence

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

Main Reference

Parallel molecular evolution in an herbivore community. (2012) (<https://pubmed.ncbi.nlm.nih.gov/23019645>)

Authors

Zhen Y; Aardema ML; Medina EM; Schumer M; Andolfatto P

Abstract

Numerous insects have independently evolved the ability to feed on plants that produce toxic secondary compounds called cardenolides and can sequester these compounds for use in their defense. We surveyed the protein target for cardenolides, the alpha subunit of the sodium pump, Na(+),K(+)-ATPase (ATP $\hat{\pm}$ ), in 14 species that feed on cardenolide-producing plants and 15 outgroups spanning three insect orders. Despite the large number of potential targets for modulating cardenolide sensitivity, amino acid substitutions associated with host-plant specialization are highly clustered, with many parallel substitutions. Additionally, we document four independent duplications of ATP $\hat{\pm}$  with convergent tissue-specific expression patterns. We find that unique substitutions are disproportionately associated with recent duplications relative to parallel substitutions. Together, these findings support the hypothesis that adaptation tends to take evolutionary paths that minimize negative pleiotropy.

Additional References

## RELATED GEPHE

Related Genes

6 (ABCB1, Acetylcholinesterase (Ace-2), Acetylcholinesterase (Ace), para (kdr), nAChR, resistance to dieldrin) ([https://www.gephebase.org/search-criteria?/or+Taxon ID="+7041^/and+Trait=Xenobiotic resistance/or+Taxon ID="+1206597^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=))

Related Haplotypes

3 ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=))

## EXTERNAL LINKS

## COMMENTS