

GEPHE SUMMARY

Neverland (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~Neverland~#gephebase-summary-title)	Gephebase Gene	GP00000738	GepheID
	Entry Status	Courtier	Main curator
	Published		

PHENOTYPIC CHANGE

Trait #1	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology~#gephebase-summary-title)	Trait
Cholesterol metabolism (https://www.gephebase.org/search-criteria?/and+Trait=~Cholesterol metabolism~#gephebase-summary-title)	Trait State in Taxon A
can survive without 7-dehydroxylated sterols	Trait State in Taxon B
cannot survive without 7-dehydroxylated sterols	

Trait #2	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology~#gephebase-summary-title)	Trait
Ecological specialization (https://www.gephebase.org/search-criteria?/and+Trait=~Ecological specialization~#gephebase-summary-title)	Trait State in Taxon A
can survive on standard Drosophila fly food	Trait State in Taxon B
cannot survive without senita cactus or 7-dehydroxylated sterols	

Taxon A	Ancestral State
	Taxonomic Status
	Interspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Interspecific~#gephebase-summary-title)

Taxon A	Latin Name
Drosophila acanthoptera (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Drosophila acanthoptera~#gephebase-summary-title)	Common Name
-	Synonyms
-	Rank
species	Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Drosophila; nannoptera group	Parent
nannoptera group () - (Rank: species group) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 51165)	NCBI Taxonomy ID
51166 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 51166)	is Taxon A an Intraspecies?
No	

Taxon B	Latin Name
Drosophila pachea (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Drosophila pachea~#gephebase-summary-title)	Common Name
-	Synonyms
-	Rank
species	Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Drosophila; nannoptera group	Parent
nannoptera group () - (Rank: species group) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 51165)	NCBI Taxonomy ID
103846 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 103846)	is Taxon B an Intraspecies?
No	

GENOTYPIC CHANGE

Generic Gene Name

UniProtKB Drosophila melanogaster

nvd

Q1JUZ1 (<http://www.uniprot.org/uniprot/Q1JUZ1>)

Synonyms

GenebankID or UniProtKB

CG40050; Dmel\CG40050; Nvd; nvd-Dm; Dmel_CG40050

AFU25035 (<https://www.ncbi.nlm.nih.gov/nuccore/AFU25035>)

String

7227.FBpp0112384

(http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0112384)

Sequence Similarities

-

GO - Molecular Function

GO:0016491 : oxidoreductase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0016491>)

GO:0051537 : 2 iron, 2 sulfur cluster binding

(<https://www.ebi.ac.uk/QuickGO/term/GO:0051537>)

GO - Biological Process

GO:0035264 : multicellular organism growth

(<https://www.ebi.ac.uk/QuickGO/term/GO:0035264>)

GO:0045456 : ecdysteroid biosynthetic process

(<https://www.ebi.ac.uk/QuickGO/term/GO:0045456>)

GO:0002168 : instar larval development

(<https://www.ebi.ac.uk/QuickGO/term/GO:0002168>)

GO:0007552 : metamorphosis (<https://www.ebi.ac.uk/QuickGO/term/GO:0007552>)

GO - Cellular Component

GO:0016021 : integral component of membrane

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

Mutation #1

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

Four a.a. substitutions G250A L330I G376T E377G - each one decreases enzyme activity

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Gly	Ala	250

Main Reference

Mutations in the neverland gene turned Drosophila pachea into an obligate specialist species. (2012) (<https://pubmed.ncbi.nlm.nih.gov/23019649>)

Authors

Lang M; Murat S; Clark AG; Gouppil G; Blais C; Matzkin LM; Guittard E; Yoshiyama-Yanagawa T; Kataoka H; Niwa R; Lafont R; Dauphin-Villemant C; Orgogozo V

Abstract

Most living species exploit a limited range of resources. However, little is known about how tight associations build up during evolution between such specialist species and the hosts they use. We examined the dependence of Drosophila pachea on its single host, the senita cactus. Several amino acid changes in the Neverland oxygenase rendered D. pachea unable to transform cholesterol into 7-dehydrocholesterol (the first reaction in the steroid hormone biosynthetic pathway in insects) and thus made D. pachea dependent on the uncommon sterols of its host plant. The neverland mutations increase survival on the cactus's unusual sterols and are in a genomic region that faced recent positive selection. This study illustrates how relatively few genetic changes in a single gene may restrict the ecological niche of a species.

Additional References

Mutation #2

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

Four a.a. substitutions G250A L330I G376T E377G - each one decreases enzyme activity

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Leu	Ile	330
			Main Reference
Mutations in the neverland gene turned Drosophila pachea into an obligate specialist species. (2012) (https://pubmed.ncbi.nlm.nih.gov/23019649)			Authors
Lang M; Murat S; Clark AG; Gouppil G; Blais C; Matzkin LM; Guittard E; Yoshiyama-Yanagawa T; Kataoka H; Niwa R; Lafont R; Dauphin-Villemant C; Orgogozo V			Abstract
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Mutation #3				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
Four a.a. substitutions G250A L330I A376T E377G - each one decreases enzyme activity				Experimental Evidence
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title)				
	Taxon A	Taxon B	Position	
Codon	GCG	ACG	-	
Amino-acid	Ala	Thr	376	
			Main Reference	
Mutations in the neverland gene turned Drosophila pachea into an obligate specialist species. (2012) (https://pubmed.ncbi.nlm.nih.gov/23019649)			Authors	
Lang M; Murat S; Clark AG; Gouppil G; Blais C; Matzkin LM; Guittard E; Yoshiyama-Yanagawa T; Kataoka H; Niwa R; Lafont R; Dauphin-Villemant C; Orgogozo V			Abstract	
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Mutation #4				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
Four a.a. substitutions G250A L330I G376T E377G - each one decreases enzyme activity				Experimental Evidence
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title)				
	Taxon A	Taxon B	Position	
Codon	GAA	GGA	-	
Amino-acid	Glu	Gly	377	

Mutations in the neverland gene turned *Drosophila pachea* into an obligate specialist species. (2012) (<https://pubmed.ncbi.nlm.nih.gov/23019649>)

Lang M; Murat S; Clark AG; Gouppil G; Blais C; Matzkin LM; Guittard E; Yoshiyama-Yanagawa T; Kataoka H; Niwa R; Lafont R; Dauphin-Villemant C; Orgogozo V

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Main ReferenceAuthorsAbstractAdditional References

RELATED GEPHE

No matches found.

No matches found.

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EXTERNAL LINKS

COMMENTS

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