GEPHE SUMMARY

Gephebase Gene

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

GepheID

GP00000738

Entry Status

Published

Main curator

Courtier

PHENOTYPIC CHANGE

Trait #1

Trait Category

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^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+Trait Category=^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

Ancestral State

Taxon A

Taxonomic Status

Interspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^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 Infraspecies?

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 Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

nvd

Synonyms

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

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)

UniProtKB Drosophila melanogaster

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

GenebankID or UniProtKB

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

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

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Additional References

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

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Additional References

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

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

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Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SeveralMutationsWithEffect