

GEPHE SUMMARY

CYP6AB3 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~CYP6AB3~#gephebase-summary-title)	Gephebase Gene	GP00000204	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Trait Category	
Physiology (#https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology)	
Trait	
Xenobiotic resistance (imperatorin) (#https://www.gephebase.org/search-criteria?/and+Trait=~Xenobiotic+resistance+(imperatorin)#gephebase-summary-title)	
Trait State in Taxon A	
Depressaria pastinacella	
Trait State in Taxon B	
Depressaria pastinacella	
Ancestral State	
Data not curated	
Taxonomic Status	
Intraspecific (#https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific)	
Taxon A	Taxon B
Latin Name	Latin Name
Depressaria pastinacella (#https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Depressaria+pastinacella)	Depressaria pastinacella (#https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Depressaria+pastinacella)
Common Name	Common Name
-	-
Synonyms	Synonyms
-	-
Rank	Rank
species	species
Lineage	Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Gelechioidea; Elachistidae; Depressariinae; Depressaria	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Gelechioidea; Elachistidae; Depressariinae; Depressaria
Parent	Parent
Depressaria () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=58003)	Depressaria () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=58003)
NCBI Taxonomy ID	NCBI Taxonomy ID
58004 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=58004)	58004 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=58004)
is Taxon A an Intraspecies?	is Taxon B an Intraspecies?
No	No

GENOTYPIC CHANGE

Generic Gene Name	UniProtKB Depressaria pastinacella
CYP6AB3	Q7YZS3 (http://www.uniprot.org/uniprot/Q7YZS3)
Synonyms	GenebankID or UniProtKB
-	AY295773 (https://www.ncbi.nlm.nih.gov/nucore/AY295773)
String	
-	
Sequence Similarities	
Belongs to the cytochrome P450 family.	
GO - Molecular Function	
GO:0020037 : heme binding (https://www.ebi.ac.uk/QuickGO/term/GO:0020037)	
GO:0005506 : iron ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005506)	
GO:0004497 : monooxygenase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004497)	
GO:0016705 : oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen (https://www.ebi.ac.uk/QuickGO/term/GO:0016705)	
GO - Biological Process	
-	

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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

Ala92Val (and potentially 4 other a.a. substitutions)

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	Ala	Val	92

Main Reference

Allelic variation in the *Depressaria pastinacella* CYP6AB3 protein enhances metabolism of plant allelochemicals by altering a proximal surface residue and potential interactions with cytochrome P450 reductase. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17244619>)

Authors

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Abstract

CYP6AB3v1, a cytochrome P450 monooxygenase in *Depressaria pastinacella* (parsnip webworm), is highly specialized for metabolizing imperatorin, a toxic furanocoumarin in the apiaceous host plants of this insect. Cloning and heterologous expression of CYP6AB3v2, an allelic variant identified in *D. pastinacella*, reveals that it metabolizes imperatorin at a rate (V_{max}) of 10.02 pmol/min/pmol of cytochrome P450 monooxygenase (P450)) significantly higher than CYP6AB3v1 (V_{max}) of 2.41 pmol/min/pmol) when supplemented with even low levels of cytochrome P450 reductase. Comparisons of the NADPH consumption rates for these variants indicate that CYP6AB3v2 utilizes this electron source at a faster rate than does CYP6AB3v1. Molecular modeling of the five amino acid differences between these variants and their potential interactions with P450 reductase suggests that replacement of Val(92) on the proximal face of CYP6AB3v1 with Ala(92) in CYP6AB3v2 affects interactions with P450 reductase so as to enhance its catalytic activity. Allelic variation at this locus potentially allows *D. pastinacella* to adapt to both intraspecific and interspecific variation in imperatorin concentrations in its host plants.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS