

GEPHE SUMMARY

<p>ABCB1 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^ABCB1^#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00002466</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=^Physiology^#gephebase-summary-title)</p>	<p>Trait Category</p>		
<p>Xenobiotic resistance (insecticide; Bt Cry3Aa toxin) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance (insecticide; Bt Cry3Aa toxin)^#gephebase-summary-title)</p>	<p>Trait</p>		
<p>Chrysomela tremula - Bt susceptible</p>	<p>Trait State in Taxon A</p>		
<p>Chrysomela tremula -Bt resistant</p>	<p>Trait State in Taxon B</p>		
<p>Taxon A</p>	<p>Ancestral State</p>		
<p>Intraspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Intraspecific^#gephebase-summary-title)</p>	<p>Taxonomic Status</p>		
<p>Taxon A</p>		<p>Taxon B</p>	
<p>Chrysomela tremula (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Chrysomela tremula^#gephebase-summary-title)</p>	<p>Latin Name</p>	<p>Chrysomela tremula (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Chrysomela tremula^#gephebase-summary-title)</p>	<p>Latin Name</p>
<p>-</p>	<p>Common Name</p>	<p>-</p>	<p>Common Name</p>
<p>Chrysomela tremulae; Chrysomela tremula Fabricius, 1787</p>	<p>Synonyms</p>	<p>Chrysomela tremulae; Chrysomela tremula Fabricius, 1787</p>	<p>Synonyms</p>
<p>species</p>	<p>Rank</p>	<p>species</p>	<p>Rank</p>
<p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Coleoptera; Polyphaga; Cucujiformia; Chrysomeloidea; Chrysomelidae; Chrysomelinae; Chrysomelini; Chrysomela</p>	<p>Lineage</p>	<p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Coleoptera; Polyphaga; Cucujiformia; Chrysomeloidea; Chrysomelidae; Chrysomelinae; Chrysomelini; Chrysomela</p>	<p>Lineage</p>
<p>Chrysomela () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 41127)</p>	<p>Parent</p>	<p>Chrysomela () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 41127)</p>	<p>Parent</p>
<p>63687 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 63687)</p>	<p>NCBI Taxonomy ID</p>	<p>63687 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 63687)</p>	<p>NCBI Taxonomy ID</p>
<p>No</p>	<p>is Taxon A an Intraspecies?</p>	<p>No</p>	<p>is Taxon B an Intraspecies?</p>

GENOTYPIC CHANGE

<p>ABCB1</p>	<p>Generic Gene Name</p>	<p>P08183 (http://www.uniprot.org/uniprot/P08183)</p>	<p>UniProtKB Homo sapiens</p>
<p>MDR1; CLCS; P-GP; PGY1; ABC20; CD243; GP170</p>	<p>Synonyms</p>	<p>()</p>	<p>GenebankID or UniProtKB</p>
<p>9606.ENSP00000478255 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000478255)</p>	<p>String</p>		
<p>Belongs to the ABC transporter superfamily. ABCB family. Multidrug resistance exporter (TC 3.A.1.201) subfamily.</p>	<p>Sequence Similarities</p>		
<p>GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)</p> <p>GO:0042626 : ATPase activity, coupled to transmembrane movement of substances (https://www.ebi.ac.uk/QuickGO/term/GO:0042626)</p> <p>GO:0090554 : phosphatidylcholine-translocating ATPase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0090554)</p>	<p>GO - Molecular Function</p>		

GO:0005215 : transporter activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0005215>)
GO:0099038 : ceramide-translocating ATPase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0099038>)
GO:0090555 : phosphatidylethanolamine-translocating ATPase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0090555>)

GO - Biological Process

GO:0045332 : phospholipid translocation (<https://www.ebi.ac.uk/QuickGO/term/GO:0045332>)
GO:0055085 : transmembrane transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0055085>)
GO:0042493 : response to drug (<https://www.ebi.ac.uk/QuickGO/term/GO:0042493>)
GO:0000086 : G2/M transition of mitotic cell cycle (<https://www.ebi.ac.uk/QuickGO/term/GO:0000086>)
GO:0099040 : ceramide translocation (<https://www.ebi.ac.uk/QuickGO/term/GO:0099040>)
GO:1901529 : positive regulation of anion channel activity (<https://www.ebi.ac.uk/QuickGO/term/GO:1901529>)
GO:2001225 : regulation of chloride transport (<https://www.ebi.ac.uk/QuickGO/term/GO:2001225>)
GO:0047484 : regulation of response to osmotic stress (<https://www.ebi.ac.uk/QuickGO/term/GO:0047484>)
GO:0072089 : stem cell proliferation (<https://www.ebi.ac.uk/QuickGO/term/GO:0072089>)

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:0016324 : apical plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0016324>)
GO:0016020 : membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0016020>)
GO:0070062 : extracellular exosome (<https://www.ebi.ac.uk/QuickGO/term/GO:0070062>)
GO:0009986 : cell surface (<https://www.ebi.ac.uk/QuickGO/term/GO:0009986>)

Presumptive Null

Yes ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Yes^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null+=^Yes^#gephebase-summary-title))

Molecular Type

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

Aberration Type

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

Deletion Size

1-9 bp

Molecular Details of the Mutation

a four-base-pair deletion at position 1561 introducing a frame shift with a premature stop codon leading to loss of the Tpm1 transporter motif as well as the complete second transmembrane domain

Experimental Evidence

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

Main Reference

A P-Glycoprotein Is Linked to Resistance to the Bacillus thuringiensis Cry3Aa Toxin in a Leaf Beetle. (2016) (<https://pubmed.ncbi.nlm.nih.gov/27929397>)

Authors

Pauchet Y; Bretschneider A; Augustin S; Heckel DG

Abstract

Chrysomela tremula is a polyvoltine oligophagous leaf beetle responsible for massive attacks on poplar trees. This beetle is an important model for understanding mechanisms of resistance to *Bacillus thuringiensis* (Bt) insecticidal toxins, because a resistant *C. tremula* strain has been found that can survive and reproduce on transgenic poplar trees expressing high levels of the Cry3Aa Bt toxin. Resistance to Cry3Aa in this strain is recessive and is controlled by a single autosomal locus. We used a larval midgut transcriptome for *C. tremula* to search for candidate resistance genes. We discovered a mutation in an ABC protein, member of the B subfamily homologous to P-glycoprotein, which is genetically linked to Cry3Aa resistance in *C. tremula*. Cultured insect cells heterologously expressing this ABC protein swell and lyse when incubated with Cry3Aa toxin. In light of previous findings in Lepidoptera implicating A subfamily ABC proteins as receptors for Cry2A toxins and C subfamily proteins as receptors for Cry1A and Cry1C toxins, this result suggests that ABC proteins may be targets of insecticidal three-domain Bt toxins in Coleoptera as well.

Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

