

## GEPHE SUMMARY

	Gephebase Gene	GephelID
WntA ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> Gephebase="WntA">#gephebase-summary-title)	GP00001210	
	Entry Status	Main curator
Published	Courtier	

## PHENOTYPIC CHANGE

	Trait Category
Morphology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> Category="Morphology">#gephebase-summary-title)	
Coloration (wing, Mullerian mimicry) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> =^Coloration (wing, Mullerian mimicry)^#gephebase-summary-title)	Trait
Heliconius cydno galanthus - "Ac" melanic patch absent = white hourglass pattern present	Trait State in Taxon A
Heliconius pachinus "Ac" melanic patch present = yellow hourglass pattern absent	Trait State in Taxon B
	Ancestral State
Unknown	Taxonomic Status
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> Status="Intraspecific">#gephebase-summary-title)	

Taxon A	Latin Name	Taxon B	Latin Name
Heliconius cydno ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Heliconius+cydno">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Heliconius+cydno</a> #gephebase-summary-title)		Heliconius pachinus ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Heliconius+pachinus">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Heliconius+pachinus</a> #gephebase-summary-title)	
	Common Name		Common Name
-		-	
	Synonyms		Synonyms
Heliconius cydno Doubleday, 1847		Heliconius cydno pachinus; Heliconius pachinus Salvin, 1871	
species	Rank		Rank
	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; Obtectomera; Papilionoidea; Nymphalidae; Heliconiinae; Heliconiini; Heliconius		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; Obtectomera; Papilionoidea; Nymphalidae; Heliconiinae; Heliconiini; Heliconius	
	Parent		Parent
Heliconius () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33416">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33416</a> )		Heliconius () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33416">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33416</a> )	
NCBI Taxonomy ID		NCBI Taxonomy ID	
33424 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33424">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33424</a> )		33428 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33428">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=33428</a> )	
is Taxon A an Infraspecies?		is Taxon B an Infraspecies?	
Yes		Yes	
Taxon A Description		Taxon B Description	
Heliconius cydno galanthus - "Ac" melanic patch absent = white hourglass pattern present		Heliconius pachinus "Ac" melanic patch present = yellow hourglass pattern absent	

## GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Vanessa cardui
WntA	A0A077DF90 ( <a href="http://www.uniprot.org/uniprot/A0A077DF90">http://www.uniprot.org/uniprot/A0A077DF90</a> )	
	Synonyms	GenebankID or UniProtKB
-	JN944585 ( <a href="https://www.ncbi.nlm.nih.gov/nucleotide/JN944585">https://www.ncbi.nlm.nih.gov/nucleotide/JN944585</a> )	
	String	
-		
	Sequence Similarities	
Belongs to the Wnt family.		
	GO - Molecular Function	
GO:0005102 : signaling receptor binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005102">https://www.ebi.ac.uk/QuickGO/term/GO:0005102</a> )		
	GO - Biological Process	
GO:0007275 : multicellular organism development ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0007275">https://www.ebi.ac.uk/QuickGO/term/GO:0007275</a> )		
GO:0016055 : Wnt signaling pathway		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016055>)

GO - Cellular Component

GO:0005576 : extracellular region (<https://www.ebi.ac.uk/QuickGO/term/GO:0005576>)

Presumptive Null

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

Molecular Type

Cis-regulatory (<https://www.gephebase.org/search-criteria?/and+Molecular+Type=^Cis-regulatory^#gephebase-summary-title>)

Aberration Type

Unknown (<https://www.gephebase.org/search-criteria?/and+Aberration+Type=^Unknown^#gephebase-summary-title>)

Molecular Details of the Mutation

Complex cis-regulatory haplotype : 170 fixed differences were detected among comparisons of allopatric *H. c. galanthus* and *H. pachinus*

Experimental Evidence

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

Main Reference

Diversification of complex butterfly wing patterns by repeated regulatory evolution of a Wnt ligand. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22802635>)

Authors

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Abstract

Although animals display a rich variety of shapes and patterns, the genetic changes that explain how complex forms arise are still unclear. Here we take advantage of the extensive diversity of *Heliconius* butterflies to identify a gene that causes adaptive variation of black wing patterns within and between species. Linkage mapping in two species groups, gene-expression analysis in seven species, and pharmacological treatments all indicate that cis-regulatory evolution of the WntA ligand underpins discrete changes in color pattern features across the *Heliconius* genus. These results illustrate how the direct modulation of morphogen sources can generate a wide array of unique morphologies, thus providing a link between natural genetic variation, pattern formation, and adaptation.

Additional References

Ancient homology underlies adaptive mimetic diversity across butterflies. (2014) (<https://pubmed.ncbi.nlm.nih.gov/25198507>)

## RELATED GEPHE

Related Genes

2 (aristaless, Optix) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=^33424^/and+Trait=Coloration/or+Taxon+ID=^33428^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

1 (<https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=^WntA^/and+Taxon+ID=^33424^/or+Gene+Gephebase=^WntA^/and+Taxon+ID=^33428^#gephebase-summary-title>)

## EXTERNAL LINKS

## COMMENTS