

GEPHE SUMMARY

opsin - (SWS1) (<a (sws1)^#gephebase-summary-title"="" +opsin+"-="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^opsin - (SWS1)^#gephebase-summary-title)		Gephebase Gene	GP00001694	GepheID
Published	Entry Status	Courtier		Main curator

PHENOTYPIC CHANGE

Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)		Trait Category		
Color vision (UV-shift) (<a +color+vision+(uv-shift)^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait=^Color vision (UV-shift)^#gephebase-summary-title)		Trait		
Other Vertebrates	Trait State in Taxon A			
Birds	Trait State in Taxon B			
Taxon A	Ancestral State			
Intergenic or Higher (<a +intergenic+or+higher+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intergenic or Higher^#gephebase-summary-title)		Taxonomic Status		
	Taxon A		Taxon B	
Vertebrata	Latin Name	Aves	Latin Name	
(<a +vertebrata+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Vertebrata^#gephebase-summary-title)	Common Name	(<a +aves+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Aves^#gephebase-summary-title)	Common Name	
vertebrates	Synonyms	birds	Synonyms	
vertebrates; Vertebrata Cuvier, 1812	Rank	avian; birds	Rank	
no rank	Lineage	class	Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata	Parent	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Saurischia; Theropoda; Coelurosauria	Parent	
Craniata () - (Rank: subphylum) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 89593)	NCBI Taxonomy ID	Coelurosauria () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 436492)	NCBI Taxonomy ID	
7742 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7742)	is Taxon A an Infrappecies?	8782 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 8782)	is Taxon B an Infrappecies?	
No		No		

GENOTYPIC CHANGE

OPN1SW	Generic Gene Name	P03999 (http://www.uniprot.org/uniprot/P03999)	UniProtKB Homo sapiens
BCP; BOP; CBT	Synonyms	ACV60158 (https://www.ncbi.nlm.nih.gov/nuccore/ACV60158)	GenebankID or UniProtKB
9606.ENSPP00000249389 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 9606.ENSPP00000249389)	String		
Belongs to the G-protein coupled receptor 1 family. Opsin subfamily.	Sequence Similarities		
GO:0038023 : signaling receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0038023)	GO - Molecular Function		
GO:0008020 : G protein-coupled photoreceptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008020)			
GO:0007165 : signal transduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007165)	GO - Biological Process		
GO:0007186 : G protein-coupled receptor signaling pathway			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007186>)
 GO:0001523 : retinoid metabolic process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0001523>)
 GO:0018298 : protein-chromophore linkage
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0018298>)
 GO:0007601 : visual perception (<https://www.ebi.ac.uk/QuickGO/term/GO:0007601>)
 GO:0071482 : cellular response to light stimulus
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0071482>)
 GO:0007602 : phototransduction (<https://www.ebi.ac.uk/QuickGO/term/GO:0007602>)
 GO - Cellular Component

GO:0005887 : integral component of plasma membrane
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)
 GO:0001750 : photoreceptor outer segment
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0001750>)
 GO:0097381 : photoreceptor disc membrane
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0097381>)

Presumptive Null

No ([https://www.gephebase.org/search-criteria?/and+Presumptive Null+No^#gephebase-summary-title](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](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](https://www.gephebase.org/search-criteria?/and+Aberration+Type+SNP^#gephebase-summary-title))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

V116L

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))

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Val	Leu	116

Main Reference

The molecular evolution of avian ultraviolet- and violet-sensitive visual pigments. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17556758>)

Authors

Carvalho LS; Cowing JA; Wilkie SE; Bowmaker JK; Hunt DM

Abstract

The shortwave-sensitive SWS1 class of vertebrate visual pigments range in lambda(max) from the violet (385-445 nm) to the ultraviolet (UV) (365-355 nm), with UV-sensitivity almost certainly ancestral. In birds, however, the UV-sensitive pigments present in a number of species have evolved secondarily from an avian violet-sensitive (VS) pigment. All avian VS pigments expressed in vitro to date encode Ser86 whereas Phe86 is present in all non-avian ultraviolet sensitive (UVS) pigments. In this paper, we show by site directed mutagenesis of avian VS pigments that Ser86 is required in an avian VS pigment to maintain violet-sensitivity and therefore underlies the evolution of avian VS pigments. The major mechanism for the evolution of avian UVS pigments from an ancestral avian VS pigment is undoubtedly a Ser90Cys substitution. However, Phe86, as found in the Blue-crowned trogon, will also short-wave shift the pigeon VS pigment into the UV whereas Ala86 and Cys86 which are also found in natural avian pigments do not generate short-wave shifts when substituted into the pigeon pigment. From available data on avian SWS1 pigments, it would appear that UVS pigments have evolved on at least 5 separate occasions and utilize 2 different mechanisms for the short-wave shift.

Additional References

The molecular evolution of avian ultraviolet- and violet-sensitive visual pigments. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17556758>)

RELATED GEPHE

Related Genes

10 (Green-sensitive opsin (RH2), Rhodopsin (RH1), opsin - rhodopsin (LWS), opsin - rhodopsin1 (RH1), opsin - (SWS2), opsin - (SWS2B), Rx1, opsin - rhodopsin (MWS=duplicate of LWS), opsin - rhodopsin1-A (RH1-A), opsin - rhodopsin1-B (RH1-B)) ([https://www.gephebase.org/search-criteria?/or+Taxon ID+7742^/and+Trait+Color vision/or+Taxon ID+8782^/and+Trait+Color vision/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID+7742^/and+Trait+Color+vision/or+Taxon+ID+8782^/and+Trait+Color+vision/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

14 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase+opsin - \(SWS1\)^/and+Taxon ID+7742^/or+Gene Gephebase+opsin - \(SWS1\)^/and+Taxon ID+8782^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase+opsin+(SWS1)^/and+Taxon+ID+7742^/or+Gene+Gephebase+opsin+(SWS1)^/and+Taxon+ID+8782^#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

