

GEPHE SUMMARY

Gephebase Gene		GepheID
opsin - rhodopsin1 (RH1) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="opsin - rhodopsin1 (RH1)"#gephebase-summary-title)		GP00000784
Entry Status		Main curator
Published		

PHENOTYPIC CHANGE

Trait Category			
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category="Physiology"#gephebase-summary-title)			
Trait			
Color vision (blue-shift) (<a color"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="Color vision (blue-shift)"#gephebase-summary-title)			
Trait State in Taxon A			
Amniote ancestor			
Trait State in Taxon B			
lizards; chameleon			
Ancestral State			
Taxon A			
Taxonomic Status			
Intergeneric or Higher (https://www.gephebase.org/search-criteria?/and+Taxonomic Status="Intergeneric or Higher"#gephebase-summary-title)			
Taxon A		Taxon B	
Latin Name		Latin Name	
Amniota (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Amniota"#gephebase-summary-title)		Squamata (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Squamata"#gephebase-summary-title)	
Common Name		Common Name	
amniotes		squamates	
Synonyms		Synonyms	
amniotes		squamates	
Rank		Rank	
no rank		order	
Lineage		Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Lepidosauria	
Parent		Parent	
Tetrapoda (tetrapods) - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32523)		Lepidosauria (lepidosaurs) - (Rank: superorder) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8504)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
32524 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32524)		8509 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8509)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
No		No	

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Homo sapiens
RHO		P08100 (http://www.uniprot.org/uniprot/P08100)
Synonyms		GenebankID or UniProtKB
RP4; OPN2; CSNBAD1		AAD42779 (https://www.ncbi.nlm.nih.gov/nuccore/AAD42779)
String		
9606.ENSPP00000296271 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPP00000296271)		
Sequence Similarities		
Belongs to the G-protein coupled receptor 1 family. Opsin subfamily.		
GO - Molecular Function		
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)		
GO:0004930 : G protein-coupled receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004930)		
GO:0008020 : G protein-coupled photoreceptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008020)		
GO:0005502 : 11-cis retinal binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005502)		
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:0006468 : protein phosphorylation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006468>)
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:0016038 : absorption of visible light
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016038>)
GO:0045494 : photoreceptor cell maintenance
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045494>)
GO:0007603 : phototransduction, visible light
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007603>)
GO:0022400 : regulation of rhodopsin mediated signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0022400>)
GO:0060041 : retina development in camera-type eye
(<https://www.ebi.ac.uk/QuickGO/term/GO:0060041>)
GO:0016056 : rhodopsin mediated signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016056>)

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:0000139 : Golgi membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0000139>)
GO:0005887 : integral component of plasma membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)
GO:0005794 : Golgi apparatus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005794>)
GO:0005911 : cell-cell junction (<https://www.ebi.ac.uk/QuickGO/term/GO:0005911>)
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>)
GO:0060170 : ciliary membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0060170>)
GO:0030660 : Golgi-associated vesicle membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0030660>)
GO:0001917 : photoreceptor inner segment
(<https://www.ebi.ac.uk/QuickGO/term/GO:0001917>)
GO:0060342 : photoreceptor inner segment membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0060342>)
GO:0042622 : photoreceptor outer segment membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042622>)

	Presumptive Null
No (<a +no^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Presumptive Null=">https://www.gephebase.org/search-criteria?/and+Presumptive Null="+No^#gephebase-summary-title)	
	Molecular Type
Coding (<a +coding^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Molecular Type=">https://www.gephebase.org/search-criteria?/and+Molecular Type="+Coding^#gephebase-summary-title)	
	Aberration Type
SNP (<a +snp^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Aberration Type=">https://www.gephebase.org/search-criteria?/and+Aberration Type="+SNP^#gephebase-summary-title)	
	SNP Coding Change
Nonsynonymous	
	Molecular Details of the Mutation
D83N	
	Experimental Evidence
Candidate Gene (<a +candidate="" gene^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Experimental Evidence=">https://www.gephebase.org/search-criteria?/and+Experimental Evidence="+Candidate Gene^#gephebase-summary-title)	

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

	Main Reference
Adaptive evolution of color vision of the Comoran coelacanth (<i>Latimeria chalumnae</i>). (1999) (https://pubmed.ncbi.nlm.nih.gov/10339578)	
	Authors
Yokoyama S; Zhang H; Radlwimmer FB; Blow NS	
	Abstract
The coelacanth, a “living fossil,” lives near the coast of the Comoros archipelago in the Indian Ocean. Living at a depth of about 200 m, the Comoran coelacanth receives only a narrow range of light, at about 480 nm. To detect the entire range of “color” at this depth, the coelacanth appears to use only two closely related paralogous RH1 and RH2 visual pigments with the optimum light sensitivities (lambda _{damax}) at 478 nm and 485 nm, respectively. The lambda _{damax} values are shifted about 20 nm toward blue compared with those of the corresponding orthologous pigments. Mutagenesis experiments show that each of these coadapted changes is fully explained by two amino acid replacements.	
	Additional References
Elucidation of phenotypic adaptations: Molecular analyses of dim-light vision proteins in vertebrates. (2008) (https://pubmed.ncbi.nlm.nih.gov/18768804)	

RELATED GEPHE

Related Genes

3 (opsin - (SWS1), opsin - rhodopsin (LWS), opsin - rhodopsin (MWS=duplicate of LWS)) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^32524^/and+Trait=Color vision/or+Taxon ID=^8509^/and+Trait=Color vision/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

7 ([https://www.gephebase.org/search-criteria?/or+Gene Gephabase=^opsin - rhodopsin1 \(RH1\)^/and+Taxon ID=^32524^/or+Gene Gephabase=^opsin - rhodopsin1 \(RH1\)^/and+Taxon ID=^8509^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephabase=^opsin - rhodopsin1 (RH1)^/and+Taxon ID=^32524^/or+Gene Gephabase=^opsin - rhodopsin1 (RH1)^/and+Taxon ID=^8509^#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

Phylogenetic position of the change remains ambivalent