

GEPHE SUMMARY

opsin - rhodopsin1 (RH1) (https://www.gephebase.org/search-criteria?/and+Gene)	Gephebase Gene	GP00000790	GepheID
Gephebase=^opsin - rhodopsin1 (RH1)^#gephebase-summary-title)			Main curator
Published	Entry Status	Courtier	

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title)	Trait Category
Color vision (blue-shift) (https://www.gephebase.org/search-criteria?/and+Trait=^Color vision (blue-shift)^#gephebase-summary-title)	Trait
Other fishes and tetrapods	Trait State in Taxon A
Latimeria	Trait State in Taxon B
Taxon A	Ancestral State
Intergeneric or Higher (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intergeneric or Higher^#gephebase-summary-title)	Taxonomic Status
Taxon A	Taxon B #1
Teleostei (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Teleostei^#gephebase-summary-title)	Latimeria menadoensis (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Latimeria menadoensis^#gephebase-summary-title)
teleost fishes	Menado coelacanth
teleost fishes	Menado coelacanth; king of the sea; Latimeria menadoensis Pouyaud, Wirjoatmodjo, Rachmatika, Tjakrawidjaja, Hadiaty & Hadie, 1999
infraclass	species
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Coelacanthimorpha; Coelacanthiformes; Coelacanthidae; Latimeria
Neopterygii () - (Rank: subclass) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 41665)	Latimeria () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7896)
NCBI Taxonomy ID 32443 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32443)	NCBI Taxonomy ID 106881 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 106881)
No	No

Taxon B #2	
Latimeria chalumnae	Latin Name
(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Latimeria chalumnae~#gephebase-summary-title)	
coelacanth	Common Name
coelacanth; Latimeria chalumnae Smith, 1939	Synonyms
species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Coelacanthimorpha; Coelacanthiformes; Coelacanthidae; Latimeria	Lineage
Latimeria () - (Rank: genus)	Parent
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7896)	
7897	NCBI Taxonomy ID

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Homo sapiens
RHO	P08100 (http://www.uniprot.org/uniprot/P08100)	
	Synonyms	GenebankID or UniProtKB
RP4; OPN2; CSNBAD1	AAD30520 (https://www.ncbi.nlm.nih.gov/nuccore/AAD30520)	
	String	
9606.ENSPO00000296271 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO00000296271)		
	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)		
Mutation #1		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 (<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

A292S; E122Q - both have an effect

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	Glu	Gln	122

Main Reference

Adaptive evolution of the African and Indonesian coelacanths to deep-sea environments. (2000) (<https://pubmed.ncbi.nlm.nih.gov/11164035>)

Authors

Yokoyama S; Tada T

Abstract

We have PCR amplified and sequenced the rhodopsin (RH1) and evolutionarily closely related RH2 genes of the Indonesian coelacanth, now referred to as Latimeria menadoensis. When the RH1 and RH2 coding sequences are constructed, expressed in cultured cells, and reconstituted with 11-cis-retinal, the resulting visual pigments have wavelengths of maximal absorption (lambda(max)) of 485 and 479 nm, respectively. These lambda(max) values are identical to those of the African coelacanth, Latimeria chalumnae, showing that the Indonesian coelacanths also detect a narrow range of color. Statistical analyses show that the adaptation of the coelacanths toward the deep-sea started as early as 200 million years ago.

Additional References

Mutation #2

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

A292S; E122Q - both have an effect

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	Ser	292

Main Reference

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Additional References

RELATED GEPHE

Related Genes

9 (Green-sensitive opsin (RH2), Rhodopsin (RH1), opsin - rhodopsin (LWS), opsin - (SWS1), opsin - (SWS2), opsin - (SWS2B), Rx1, opsin - rhodopsin1-A (RH1-A), opsin - rhodopsin1-B (RH1-B)) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=~32443~/and+Trait=Color+vision/or+Taxon+ID=~106881~/and+Trait=Color+vision/or+Taxon+ID=~7897~/and+Trait=Color+vision/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

4 ([https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~opsin-rhodopsin1\(RH1\)~/and+Taxon+ID=~32443~/or+Gene+Gephebase=~opsin-rhodopsin1\(RH1\)~/and+Taxon+ID=~106881~/or+Gene+Gephebase=~opsin-rhodopsin1\(RH1\)~/and+Taxon+ID=~7897~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~opsin-rhodopsin1(RH1)~/and+Taxon+ID=~32443~/or+Gene+Gephebase=~opsin-rhodopsin1(RH1)~/and+Taxon+ID=~106881~/or+Gene+Gephebase=~opsin-rhodopsin1(RH1)~/and+Taxon+ID=~7897~#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

@SeveralMutationsWithEffect - The two amino acid changes are found in both coelacanth species