

GEPHE SUMMARY

	Gephebase Gene	GephelD
opsin - rhodopsin1 (RH1) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="opsin - rhodopsin1 (RH1)"#gephebase-summary-title)	GP00000780	Main curator
Published	Entry Status	Courtier

PHENOTYPIC CHANGE

	Trait Category	
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category="Physiology">#gephebase-summary-title)	Trait	
Color vision (blue shift) (https://www.gephebase.org/search-criteria?/and+Trait=^Color vision (blue shift)^#gephebase-summary-title)	Trait State in Taxon A	
littoral cottoid fishes; Lake Baikal	Trait State in Taxon B	
abyssal cottoid fishes; Lake Baikal	Ancestral State	
Data not curated	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
undetermined Cottoidei 'Lake Baikal' (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^undetermined Cottoidei 'Lake Baikal'#gephebase-summary-title)		undetermined Cottoidei 'Lake Baikal' (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^undetermined Cottoidei 'Lake Baikal'#gephebase-summary-title)
-	Common Name	Common Name
Baikalian cottoid fish	Synonyms	Synonyms
species	Rank	Rank
	Lineage	Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleosteomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphacea; Euperaria; Perciformes; Cottioidei; unclassified Cottoidei		cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleosteomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphacea; Euperaria; Perciformes; Cottioidei; unclassified Cottoidei
unclassified Cottoidei () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 183719)	Parent	Parent
36479 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 36479)	NCBI Taxonomy ID	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

RHO	Generic Gene Name	UniProtKB Homo sapiens
RP4; OPN2; CSNBAD1	Synonyms	GenebankID or UniProtKB
9606.ENSP00000296271 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000296271)	String	0
	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 (<https://www.gepheebase.org/search-criteria?/and+Presumptive+Null=%22No%22#gepheebase-summary-title>)

Molecular Type

Coding (<https://www.gepheebase.org/search-criteria?/and+Molecular+Type=%22Coding%22#gepheebase-summary-title>)

Aberration Type

SNP (<https://www.gepheebase.org/search-criteria?/and+Aberration+Type=%22SNP%22#gepheebase-summary-title>)

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

D83N; A292S

Experimental Evidence

Candidate Gene (<https://www.gepheebase.org/search-criteria?/and+Experimental+Evidence=%22Candidate+Gene%22#gepheebase-summary-title>)

Taxon A	Taxon B	Position
Codon	-	-
Amino-acid	Asp	Asn
		83

Main Reference

Spectral tuning and molecular evolution of rod visual pigments in the species flock of cottoid fish in Lake Baikal. (1996) (<https://pubmed.ncbi.nlm.nih.gov/8711901>)

Authors

Hunt DM; Fitzgibbon J; Slobodyanyuk SJ; Bowmaker JK

Abstract

Lake Baikal in Eastern Siberia is the deepest and one of the largest and most ancient lakes in the world. However, even in the deepest regions, oxygenation levels do not fall below 75-80% of the surface levels. This has enabled a remarkable flock of largely endemic teleost fish of the sub-order Cottoidei to colonize all depth habitats. We have previously shown that species that occupy progressively deeper habitats show a blue shift in the peak wavelength of absorbance (lambda max) of both their rod and cone visual pigments; for the rod

pigments, a number of stepwise shifts occur from about 516 nm in littoral species to about 484 nm in abyssal species. By sequencing the rod opsin gene from 11 species of Baikal cottoids that include representatives from all depth habitats, we have been able to identify four amino acid substitutions that would account for these shifts. The effect of each substitution on lambda max is approximately additive and each corresponds to a particular lineage of evolution.

Additional References

Mutation #2

No (https://www.gephebase.org/search-criteria/?and+Presumptive+Null=%No%gephebase-summary-title)	Presumptive Null
Coding (https://www.gephebase.org/search-criteria/?and+Molecular+Type=%Coding%gephebase-summary-title)	Molecular Type
SNP (https://www.gephebase.org/search-criteria/?and+Aberration+Type=%SNP%gephebase-summary-title)	Aberration Type
Nonsynonymous	SNP Coding Change
D83N; A292S	Molecular Details of the Mutation
Candidate Gene (https://www.gephebase.org/search-criteria/?and+Experimental+Evidence=%Candidate+Gene%gephebase-summary-title)	Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Ala	Ser	292

Spectral tuning and molecular evolution of rod visual pigments in the species flock of cottoid fish in Lake Baikal. (1996) (<https://pubmed.ncbi.nlm.nih.gov/8711901>)

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Authors

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Abstract

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Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

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