GEPHE SUMMARY

Gephebase Gene
opsin - rhodopsin (LWS) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^opsin - rhodopsin (LWS)^#gephebase-summary-title)

GepheID
GP00000777

Entry Status
Published

Main curator
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
Pundamilia pundamilia- blue-gray male color

Trait State in Taxon B
Pundamilia nyererei- yellow-red male color

Ancestral State
Data not curated

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Pundamilia pundamilia (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Pundamilia pundamilia^#gephebase-summary-title)

Common Name
-

Synonyms
Pundamilia pundamilia Seehausen & Bouton, 1998

Rank
species

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; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Pundamilia

Parent
Pundamilia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 195936)

NCBI Taxonomy ID
195937 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 195937)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Pundamilia pundamilia (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Pundamilia pundamilia^#gephebase-summary-title)

Common Name
-

Synonyms
Pundamilia pundamilia Seehausen & Bouton, 1998

Rank
species

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; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Haplochromini; Pundamilia

Parent
Pundamilia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 195936)

NCBI Taxonomy ID
195937 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 195937)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
OPN1LW

Synonyms
RCP

String
9606.ENSP00000358967 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 9606.ENSP00000358967)

Sequence Similarities
Belongs to the G-protein coupled receptor 1 family. Opsin subfamily.

GO - Molecular Function
GO:0008020 : G protein-coupled photoreceptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008020)
GO:0009881 : photoreceptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0009881)

GO - Biological Process
GO:0007165 : signal transduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007165)

UniProtKB Homo sapiens
P04000 (http://www.uniprot.org/uniprot/P04000)

GenebankID or UniProtKB
AAW34328 (https://www.ncbi.nlm.nih.gov/nuccore/AAW34328)

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:0032467 : positive regulation of cytokinesis
(https://www.ebi.ac.uk/QuickGO/term/GO:0032467)

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)

Mutation #1

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

Y219F; A233T; C277I (human LWS/MWS numbering system)

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	Tyr	Phe	219

Main Reference

Speciation through sensory drive in cichlid fish. (2008) (https://pubmed.ncbi.nlm.nih.gov/18833272)

Authors

Seehausen O; Terai Y; Magalhaes IS; Carleton KL; Mrosso HD; Miyagi R; van der Sluijs I; Schneider MV; Maan ME; Tachida H; Imai H; Okada N

Abstract

Theoretically, divergent selection on sensory systems can cause speciation through sensory drive. However, empirical evidence is rare and incomplete. Here we demonstrate sensory drive speciation within island populations of cichlid fish. We identify the ecological and molecular basis of divergent evolution in the cichlid visual system, demonstrate associated divergence in male colouration and female preferences, and show subsequent differentiation at neutral loci, indicating reproductive isolation. Evidence is replicated in several pairs of sympatric populations and species. Variation in the slope of the environmental gradients explains variation in the progress towards speciation: speciation occurs on all but the steepest gradients. This is the most complete demonstration so far of speciation through sensory drive without geographical isolation. Our results also provide a mechanistic explanation for the collapse of cichlid fish species diversity during the anthropogenic eutrophication of Lake Victoria.

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

Y219F; A233T; C277I (human LWS/MWS numbering system)

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	Thr	233

Main Reference

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Additional References

Mutation #3

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

Y219F; A233T; C277I (human LWS/MWS numbering system)

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	Cys	Ile	277

Main Reference

Speciation through sensory drive in cichlid fish. (2008) (https://pubmed.ncbi.nlm.nih.gov/18833272)

Authors

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Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SeveralMutationsWithEffect C277I is due to 2 nucleotide changes @TwoNucleotideChangesInSameCodon