GEPHE SUMMARY

Gephebase Gene

KCNH4 - uncertain (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^KCNH4 - uncertain^#gephebase-summary-title)

GepheID

GP00000510

Entry Status

Published

Main curator

Martin

PHENOTYPIC CHANGE

Trait Category

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait

Freshwater adaptation (https://www.gephebase.org/search-criteria?/and+Trait=^Freshwater adaptation^#gephebase-summary-title)

Trait State in Taxon A

Gasterosteus aculeatus - marine

Trait State in Taxon B

Gasterosteus aculeatus - freshwater

Ancestral State

Taxon A

Taxonomic Status

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

Taxon A

Latin Name

Gasterosteus aculeatus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Gasterosteus aculeatus^#gephebase-summary-title)

Common Name

three-spined stickleback

Synonyms

three-spined stickleback; three spined stickleback; Gasterosteus aculeatus Linnaeus, 1758

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; Eupercaria; Perciformes; Cottioidei; Gasterosteales; Gasterosteidae; Gasterosteus

Parent

Gasterosteus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 69292)

NCBI Taxonomy ID

69293 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 69293)

is Taxon A an Infraspecies?

Yes

Taxon A Description

Gasterosteus aculeatus - marine

Taxon B

Latin Name

Gasterosteus aculeatus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Gasterosteus aculeatus^#gephebase-summary-title)

Common Name

three-spined stickleback

Synonyms

three-spined stickleback; three spined stickleback; Gasterosteus aculeatus Linnaeus, 1758

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; Eupercaria; Perciformes; Cottioidei; Gasterosteales; Gasterosteidae; Gasterosteus

Parent

Gasterosteus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 69292)

NCBI Taxonomy ID

69293 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 69293)

is Taxon B an Infraspecies?

Yes

Taxon B Description

Gasterosteus aculeatus - freshwater

GENOTYPIC CHANGE

Generic Gene Name

KCNH4

Synonyms

BEC2; ELK1; Kv12.3

String

9606.ENSP00000264661 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000264661)

Sequence Similarities

Belongs to the potassium channel family. H (Eag) (TC 1.A.1.20) subfamily. Kv12.3/KCNH4 sub-subfamily.

GO - Molecular Function

GO:0000155 : phosphorelay sensor kinase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0000155)

UniProtKB Homo sapiens

Q9UQ05 (http://www.uniprot.org/uniprot/Q9UQ05)

GenebankID or UniProtKB

()

GO:0005249 : voltage-gated potassium channel activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0005249)

GO - Biological Process

GO:0006813 : potassium ion transport
(https://www.ebi.ac.uk/QuickGO/term/GO:0006813)
GO:0042391 : regulation of membrane potential
(https://www.ebi.ac.uk/QuickGO/term/GO:0042391)
GO:0071805 : potassium ion transmembrane transport
(https://www.ebi.ac.uk/QuickGO/term/GO:0071805)
GO:0034765 : regulation of ion transmembrane transport
(https://www.ebi.ac.uk/QuickGO/term/GO:0034765)

GO - Cellular Component

GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
GO:0005887 : integral component of plasma membrane
(https://www.ebi.ac.uk/QuickGO/term/GO:0005887)
GO:0008076 : voltage-gated potassium channel complex
(https://www.ebi.ac.uk/QuickGO/term/GO:0008076)

Presumptive Null

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)

Molecular Type

Unknown (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Unknown^#gephebase-summary-title)

Aberration Type

Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Unknown^#gephebase-summary-title)

Molecular Details of the Mutation

Large Inversion resulting in alternative transcripts

Experimental Evidence

Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title)

Main Reference

The genomic basis of adaptive evolution in threespine sticklebacks. (2012) (https://pubmed.ncbi.nlm.nih.gov/22481358)

Authors

Jones FC; Grabherr MG; Chan YF; Russell P; Mauceli E; Johnson J; Swofford R; Pirun M; Zody MC; White S; Birney E; Searle S; Schmutz J; Grimwood J; Dickson MC; Myers RM; Miller CT; Summers BR; Knecht AK; Brady SD; Zhang H; Pollen AA; Howes T; Amemiya C; ; Baldwin J; Bloom T; Jaffe DB; Nicol R; Wilkinson J; Lander ES; Di Palma F; Lindblad-Toh K; Kingsley DM

Abstract

Marine stickleback fish have colonized and adapted to thousands of streams and lakes formed since the last ice age, providing an exceptional opportunity to characterize genomic mechanisms underlying repeated ecological adaptation in nature. Here we develop a high-quality reference genome assembly for threespine sticklebacks. By sequencing the genomes of twenty additional individuals from a global set of marine and freshwater populations, we identify a genome-wide set of loci that are consistently associated with marine-freshwater divergence. Our results indicate that reuse of globally shared standing genetic variation, including chromosomal inversions, has an important role in repeated evolution of distinct marine and freshwater sticklebacks, and in the maintenance of divergent ecotypes during early stages of reproductive isolation. Both coding and regulatory changes occur in the set of loci underlying marine-freshwater evolution, but regulatory changes appear to predominate in this well known example of repeated adaptive evolution in nature.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS