GEPHE SUMMARY

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

GepheID
GP00001033

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

Trait State in Taxon A
Oncorhynchus mykiss

Trait State in Taxon B
other fishes

Ancestral State
Data not curated

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

Taxon A

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

Common Name
rainbow trout

Synonyms
Oncorhynchus nerka mykiss; Parasalmo mykiss; Salmo mykiss; rainbow trout; Oncorhynchus mykiss (Walbaum, 1792); Salmo mykiss Walbaum, 1792; Onchorhynchus mykiss

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleosteomorpha; Protacanthopterygii; Salmoniformes; Salmonidae; Salmoninae; Oncorhynchus

Parent
Oncorhynchus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 8016)

NCBI Taxonomy ID
8022 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 8022)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
teleost fishes

Synonyms
teleost fishes

Rank
infraclass

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii

Parent
Neopterygii () - (Rank: subclass) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 41665)

NCBI Taxonomy ID
32443 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32443)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
sdy

Synonyms
sdY

String
-

Sequence Similarities
-

GO - Molecular Function
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)
GO:0044212 : transcription regulatory region DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0044212)

GO - Biological Process
-

GO - Cellular Component

UniProtKB Oncorhynchus mykiss
I7GVT3 (http://www.uniprot.org/uniprot/I7GVT3)

GenebankID or UniProtKB
AFV34055 (https://www.ncbi.nlm.nih.gov/nuccore/AFV34055)

-

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

Novel gene evolution by modification of the irf9 gene; unrelated to sex determination

Experimental Evidence

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

Main Reference

An immune-related gene evolved into the master sex-determining gene in rainbow trout, Oncorhynchus mykiss. (2012) (https://pubmed.ncbi.nlm.nih.gov/22727696)

Authors

Yano A; Guyomard R; Nicol B; Jouanno E; Quillet E; Klopp C; Cabau C; Bouchez O; Fostier A; Guiguen Y

Abstract

Since the discovery of Sry in mammals [1, 2], few other master sex-determining genes have been identified in vertebrates [3-7]. To date, all of these genes have been characterized as well-known factors in the sex differentiation pathway, suggesting that the same subset of genes have been repeatedly and independently selected throughout evolution as master sex determinants [8, 9]. Here, we characterized in rainbow trout an unknown gene expressed only in the testis, with a predominant expression during testicular differentiation. This gene is a male-specific genomic sequence that is colocalized along with the sex-determining locus. This gene, named sdY for sexually dimorphic on the YÂ chromosome, encodes a protein that displays similarity to the C-terminal domain of interferon regulatory factor 9. The targeted inactivation of sdY in males using zinc-finger nuclease induces ovarian differentiation, and the overexpression of sdY in females using additive transgenesis induces testicular differentiation. Together, these results demonstrate that sdY is a novel vertebrate master sex-determining gene not related to any known sex-differentiating gene. These findings highlight an unexpected evolutionary plasticity in vertebrate sex determination through the demonstration that master sex determinants can arise from the de novo evolution of genes that have not been previously implicated in sex differentiation.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS