

GEPHE SUMMARY

<p>Fads2 (<a +fads2+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+Fads2+"#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00002053</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)</p> <p>Fatty acid metabolism (fatty acid desaturation) (<a (fatty="" +fatty="" acid="" desaturation)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=" metabolism="">https://www.gephebase.org/search-criteria?/and+Trait="+Fatty acid metabolism (fatty acid desaturation)+"#gephebase-summary-title)</p> <p>Low physiological ability to survive in freshwater DHA free diets</p> <p>High physiological ability to survive in freshwater DHA free diets</p> <p>Taxon A</p> <p>Interspecific (<a +interspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Interspecific+"#gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>
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<p>Pungitius pungitius (<a +pungitius+pungitius+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="+Pungitius+pungitius+"#gephebase-summary-title)</p> <p>ninespine stickleback</p> <p>Gasterosteus pungitius; ninespine stickleback; Gasterosteus pungitius Linnaeus, 1758; Pungitius pungitius (Linnaeus, 1758)</p> <p>species</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleostomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae; Eupercaria; Perciformes; Cottioidei; Gasterosteales; Gasterosteidae; Pungitius</p> <p>Pungitius () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=134919)</p> <p>134920 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=134920)</p> <p>No</p>	<p>Taxon A</p> <p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Rank</p> <p>Lineage</p> <p>Parent</p> <p>NCBI Taxonomy ID</p> <p>is Taxon A an Intraspecies?</p>
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<p>Pungitius tymensis (<a +pungitius+tymensis+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="+Pungitius+tymensis+"#gephebase-summary-title)</p> <p>Sakhalin stickleback</p> <p>Gasterosteus tymensis; Sakhalin stickleback; Gasterosteus tymensis Nikolskii, 1889; Pungitius tymensis (Nikolskii, 1889)</p> <p>species</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleostomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae; Eupercaria; Perciformes; Cottioidei; Gasterosteales; Gasterosteidae; Pungitius</p> <p>Pungitius () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1480064)</p> <p>1480064 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1480064)</p> <p>No</p>	<p>Taxon B #1</p> <p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Rank</p> <p>Lineage</p> <p>Parent</p> <p>NCBI Taxonomy ID</p> <p>is Taxon B an Intraspecies?</p>
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<p>Pungitius kaibarae (<a +pungitius+kaibarae+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="+Pungitius+kaibarae+"#gephebase-summary-title)</p> <p>-</p> <p>Amur stickleback; Pygosteus kaibarae; Pungitius kaibarae (Tanaka, 1915); Pygosteus kaibarae Tanaka, 1915</p> <p>species</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupeocephala; Euteleostomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae;</p>	<p>Taxon B #2</p> <p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Rank</p> <p>Lineage</p>
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Eupercaria; Perciformes; Cottioidei; Gasterosteales; Gasterosteidae; Pungitius

Parent

Pungitius () - (Rank: genus)

(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=134919>)

NCBI Taxonomy ID

300318

(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=300318>)

is Taxon B an Intraspecies?

No

GENOTYPIC CHANGE

<p>fads2</p> <p>Fadsd6; DRD5/D6; wu:fb64c04; wu:fb69e08; zgc:112502; fadsd6</p> <p>7955.ENS DARP0000022396 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7955.ENS DARP0000022396)</p> <p>Belongs to the fatty acid desaturase type 1 family.</p> <p>GO:0016213 : linoleoyl-CoA desaturase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016213)</p> <p>GO:0006636 : unsaturated fatty acid biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0006636)</p> <p>GO:0001889 : liver development (https://www.ebi.ac.uk/QuickGO/term/GO:0001889)</p> <p>GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021)</p> <p>GO:0005789 : endoplasmic reticulum membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005789)</p> <p>No (https://www.gephebase.org/search-criteria?/and+Presumptive Null="No"#gephebase-summary-title)</p> <p>Gene Amplification (<a amplification"#gephebase-summary-title"="" gene="" href="https://www.gephebase.org/search-criteria?/and+Molecular Type=">https://www.gephebase.org/search-criteria?/and+Molecular Type="Gene Amplification"#gephebase-summary-title)</p> <p>Insertion (https://www.gephebase.org/search-criteria?/and+Aberration Type="Insertion"#gephebase-summary-title)</p> <p>1-10 kb</p> <p>higher number of copies of Fads2.</p> <p>Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence="Candidate Gene"#gephebase-summary-title)</p> <p>A key metabolic gene for recurrent freshwater colonization and radiation in fishes. (2019) (https://pubmed.ncbi.nlm.nih.gov/31147520)</p> <p>Ishikawa A; Kabeya N; Ikeya K; Kakioka R; Cech JN; Osada N; Leal MC; Inoue J; Kume M; Toyoda A; Tezuka A; Nagano AJ; Yamasaki YY; Suzuki Y; Kokita T; Takahashi H; Lucek K; Marques D; Takehana Y; Naruse K; Mori S; Monroig O; Ladd N; Schubert CJ; Matthews B; Peichel CL; Seehausen O; Yoshizaki G; Kitano J</p> <p>Colonization of new ecological niches has triggered large adaptive radiations. Although some lineages have made use of such opportunities, not all do so. The factors causing this variation among lineages are largely unknown. Here, we show that deficiency in docosahexaenoic acid (DHA), an essential 18:3 fatty acid, can constrain freshwater colonization by marine fishes. Our genomic analyses revealed multiple independent duplications of the fatty acid desaturase gene <i>Fads2</i> in stickleback lineages that subsequently colonized and radiated in freshwater habitats, but not in close relatives that failed to colonize. Transgenic manipulation of <i>Fads2</i> in marine stickleback increased their ability to synthesize DHA and survive on DHA-deficient diets. Multiple freshwater ray-finned fishes also show a convergent increase in <i>Fads2</i> copies, indicating its key role in freshwater colonization.</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p> <p>GO - Biological Process</p> <p>GO - Cellular Component</p>	<p>Q9DEX7 (http://www.uniprot.org/uniprot/Q9DEX7)</p> <p>()</p>	<p>UniProtKB Danio rerio</p> <p>GenebankID or UniProtKB</p> <p>Presumptive Null</p> <p>Molecular Type</p> <p>Aberration Type</p> <p>Insertion Size</p> <p>Molecular Details of the Mutation</p> <p>Experimental Evidence</p> <p>Main Reference</p> <p>Authors</p> <p>Abstract</p>
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Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

Both *P. tymensis* and *P. kaibarae* are entirely freshwater species. *Pungitius sinensis*, which inhabits both freshwater and brackish environments; has *Fads2* copy numbers intermediate between those of *P. pungitius* and freshwater nine-spined sticklebacks