

GEPHE SUMMARY

<p>pepsinogen A1 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~pepsinogen+A1~#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00001924</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology~#gephebase-summary-title)</p> <p>Digestion (absence of stomach) (https://www.gephebase.org/search-criteria?/and+Trait=~Digestion (absence of stomach)~#gephebase-summary-title)</p> <p>presence of stomach and gastric acid production</p> <p>loss of stomach and no gastric acid production</p> <p>Taxon A</p> <p>Intergeneric or Higher (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intergeneric or Higher~#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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Taxon A	Latin Name
Oreochromis niloticus (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Oreochromis niloticus~#gephebase-summary-title)	
Common Name	
Nile tilapia	
Synonyms	
Oreochromis nilotica; Tilapia nilotica; Nile tilapia; Oreochromis niloticus (Linnaeus, 1758)	
Rank	
species	
Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala; Euteleostomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae; Ovalentaria; Cichlomorphae; Cichliformes; Cichlidae; African cichlids; Pseudocrenilabrinae; Oreochromini; Oreochromis	
Parent	
Oreochromis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8139)	
NCBI Taxonomy ID	
8128 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8128)	
is Taxon A an Intraspecies?	
No	

Taxon B #1	Latin Name
Oryzias latipes (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Oryzias latipes~#gephebase-summary-title)	
Common Name	
Japanese medaka	
Synonyms	
Poecilia latipes; Japanese medaka; Japanese rice fish; medaka; Oryzias latipes (Temminck & Schlegel, 1846); Poecilia latipes Temminck & Schlegel, 1846; Orizias latipes	
Rank	
species	
Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala; Euteleostomorpha; Neoteleostei; Eurypterygia; Ctenosquamata; Acanthomorphata; Euacanthomorphacea; Percomorphaceae; Ovalentaria; Atherinomorphae; Beloniformes; Adrianichthyoidei; Adrianichthyidae; Oryziinae; Oryzias	
Parent	
Oryzias () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8089)	
NCBI Taxonomy ID	
8090 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8090)	
is Taxon B an Intraspecies?	
No	

Taxon B #2	Latin Name
Xiphophorus maculatus (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Xiphophorus maculatus~#gephebase-summary-title)	
Common Name	
southern platyfish	
Synonyms	
Platypoecilus maculatus; southern platyfish; Platypoecilus maculatus Guenther, 1866; Xiphophorus maculatus (Guenther, 1866)	
Rank	
species	
Lineage	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Actinopterygii; Actinopteri; Neopterygii; Teleostei; Osteoglossocephalai; Clupecocephala; Euteleostomorpha; Neoteleostei; Eurypterygia;	

Ctenosquamata; Acanthomorpha; Euaacanthomorpha; Percomorphaeae;
 Ovalentaria; Atherinomorphae; Cyprinodontiformes; Cyprinodontoidei; Poeciliidae;
 Poeciliinae; Xiphophorus

Parent

Xiphophorus () - (Rank: genus)

(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8082>)

NCBI Taxonomy ID

8083

(<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8083>)

is Taxon B an Infrapopulation?

No

GENOTYPIC CHANGE

PGA4	Generic Gene Name	P0DJD7 (http://www.uniprot.org/uniprot/P0DJD7)	UniProtKB Homo sapiens
-	Synonyms	0	GenebankID or UniProtKB
9606.ENSPO0000367391 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000367391)	String		
Belongs to the peptidase A1 family.	Sequence Similarities		
GO:0004190 : aspartic-type endopeptidase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004190)	GO - Molecular Function		
GO:0006508 : proteolysis (https://www.ebi.ac.uk/QuickGO/term/GO:0006508)	GO - Biological Process		
GO:0044267 : cellular protein metabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0044267)			
GO:0007586 : digestion (https://www.ebi.ac.uk/QuickGO/term/GO:0007586)			
GO:0030163 : protein catabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0030163)			
GO:0070062 : extracellular exosome (https://www.ebi.ac.uk/QuickGO/term/GO:0070062)	GO - Cellular Component		
GO:0097486 : multivesicular body lumen (https://www.ebi.ac.uk/QuickGO/term/GO:0097486)			
Yes (https://www.gephebase.org/search-criteria?/and+Presumptive+Null+Yes+Gephebase-summary-title)			Presumptive Null
Gene Loss (https://www.gephebase.org/search-criteria?/and+Molecular+Type+Gene+Loss+Gephebase-summary-title)			Molecular Type
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration+Type+Deletion+Gephebase-summary-title)			Aberration Type
-			Deletion Size
Absence of the gene in the genome sequence - high synteny			Molecular Details of the Mutation
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental+Evidence+Candidate+Gene+Gephebase-summary-title)			Experimental Evidence
Recurrent gene loss correlates with the evolution of stomach phenotypes in gnathostome history. (2014) (https://pubmed.ncbi.nlm.nih.gov/24307675)			Main Reference
Castro LF; Gonçálves O; Mazan S; Tay BH; Venkatesh B; Wilson JM			Authors
The stomach, a hallmark of gnathostome evolution, represents a unique anatomical innovation characterized by the presence of acid- and pepsin-secreting glands. However, the occurrence of these glands in gnathostome species is not universal; in the nineteenth century the French zoologist Cuvier first noted that some teleosts lacked a stomach. Strikingly, Holocephali (chimaeras), dipnoids (lungfish) and monotremes (egg-laying mammals) also lack acid secretion and a gastric cellular phenotype. Here, we test the hypothesis that loss of the gastric phenotype is correlated with the loss of key gastric genes. We investigated species from all the main gnathostome lineages and show the specific contribution of gene loss to the widespread distribution of the agastric condition. We establish that the stomach loss correlates with the persistent and complete absence of the gastric function gene kit-H(+)/K(+)-ATPase (Atp4A and Atp4B) and pepsinogens (Pga, Pgc, Cym)--in the analysed species. We also find that in gastric species the pepsinogen gene complement varies significantly (e.g. two to four in teleosts and tens in some mammals) with multiple events of pseudogenization identified in various lineages. We propose that relaxation of purifying selection in pepsinogen genes and possibly proton pump genes in response to dietary changes led to the numerous independent events of stomach loss in gnathostome history. Significantly, the absence of the gastric genes predicts that reinvention of the stomach in agastric lineages would be highly improbable, in line with Dollo's principle.			Abstract
			Additional References

RELATED GEPHE

4 (ATP4A, ATP4B, pepsinogen A2, pepsinogen A3) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID+8128+and+Trait=Digestion/or+Taxon+ID+8090+and+Trait=Digestion/or+Taxon+ID+8083+and+Trait=Digestion+and+groupHaplotypes=true#Gephebase-summary-title>)

Related Genes

Related Haplotypes

2 ([#gpbase-summary-title">https://www.gpbase.org/search-criteria?/or+Gene+Gpbase="+pepsinogen+A1"/and+Taxon+ID="+8128"/or+Gene+Gpbase="+pepsinogen+A1"/and+Taxon+ID="+8090"/or+Gene+Gpbase="+pepsinogen+A1"/and+Taxon+ID="+8083">#gpbase-summary-title](https://www.gpbase.org/search-criteria?/or+Gene+Gpbase=))

EXTERNAL LINKS

COMMENTS

There are three pepsinogen A genes in teleost fishes - their nomenclature and phylogenetic relationships are different from Mammals pepsinogen genes