GEPHE SUMMARY

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

GepheID
GP00000556

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
Digestion (anaerobic enzymatic activity) (https://www.gephebase.org/search-criteria?/and+Trait=^Digestion (anaerobic enzymatic activity)^#gephebase-summary-title)

Trait State in Taxon A
Other birds

Trait State in Taxon B
Opisthocomus hoazin

Ancestral State
Taxon A

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

Taxon A

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

Common Name
birds

Synonyms
avian; birds

Rank
class

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Saurischia; Theropoda; Coelurosauria

Parent
Coelurosauria () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 436492)

NCBI Taxonomy ID
8782 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 8782)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
-

Synonyms
Opisthocomus hoazin hoazin; hoatzin; Opisthocomus hoazin (Statius Mueller, 1776)

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Saurischia; Theropoda; Coelurosauria; Aves; Neognathae; Opisthocomiformes; Opisthocomidae; Opisthocomus

Parent
Opisthocomus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 30418)

NCBI Taxonomy ID
30419 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 30419)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
LYZ1

Synonyms
-

String
-

Sequence Similarities
Belongs to the glycosyl hydrolase 22 family.

GO - Molecular Function
GO:0003796 : lysozyme activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003796)

GO - Biological Process
GO:0050829 : defense response to Gram-negative bacterium (https://www.ebi.ac.uk/QuickGO/term/GO:0050829)
GO:0050830 : defense response to Gram-positive bacterium (https://www.ebi.ac.uk/QuickGO/term/GO:0050830)
GO:0019835 : cytolysis (https://www.ebi.ac.uk/QuickGO/term/GO:0019835)
GO:0007586 : digestion (https://www.ebi.ac.uk/QuickGO/term/GO:0007586)

UniProtKB Bos taurus
P04421 (http://www.uniprot.org/uniprot/P04421)

GenebankID or UniProtKB
AAA73935 (https://www.ncbi.nlm.nih.gov/nuccore/AAA73935)

GO:0008152 : metabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0008152)
GO - Cellular Component

-

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

R14E

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	Arg	Glu	14

Main Reference

Molecular adaptation of a leaf-eating bird: stomach lysozyme of the hoatzin. (1994) (https://pubmed.ncbi.nlm.nih.gov/7815930)

Authors

Kornegay JR; Schilling JW; Wilson AC

Abstract

This report describes a lysozyme expressed at high levels in the stomach of the hoatzin, the only known foregut-fermenting bird. Evolutionary comparison places it among the calcium-binding lysozymes rather than among the conventional types. Conventional lysozymes were recruited as digestive enzymes twice in the evolution of mammalian foregut fermenters, and these independently recruited lysozymes share convergent structural changes attributed to selective pressures in the stomach. Biochemical convergence and parallel amino acid replacements are observed in the hoatzin stomach lysozyme even though it has a different genetic origin from the mammalian examples and has undergone more than 300 million years of independent evolution.

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

V21E

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	Val	Glu	21

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

N75D

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	Asn	Asp	75

Main Reference

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Additional References

Mutation #4

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

D87N

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	Asp	Asn	87

Main Reference

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Additional References

Mutation #5

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

R126K

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	Arg	Lys	126

Main Reference

Molecular adaptation of a leaf-eating bird: stomach lysozyme of the hoatzin. (1994) (https://pubmed.ncbi.nlm.nih.gov/7815930)

Authors

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Abstract

This report describes a lysozyme expressed at high levels in the stomach of the hoatzin, the only known foregut-fermenting bird. Evolutionary comparison places it among the calcium-binding lysozymes rather than among the conventional types. Conventional lysozymes were recruited as digestive enzymes twice in the evolution of mammalian foregut fermenters, and these independently recruited lysozymes share convergent structural changes attributed to selective pressures in the stomach. Biochemical convergence and parallel amino acid replacements are observed in the hoatzin stomach lysozyme even though it has a different genetic origin from the mammalian examples and has undergone more than 300 million years of independent evolution.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@SeveralMutationsWithEffect