GEPHE SUMMARY

Gephebase Gene
MX1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^MX1^#gephebase-summary-title)

GepheID
GP00002249

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

Trait State in Taxon A
Sensitivity to myxovirus

Trait State in Taxon B
Resistance to myxovirus

Ancestral State
Taxon A

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

Taxon A

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

Common Name
chicken

Synonyms
Gallus gallus domesticus; chicken; bantam; chickens

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; Galloanserae; Galliformes; Phasianidae; Phasianinae; Gallus

Parent
Gallus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9030)

NCBI Taxonomy ID
9031 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9031)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
chicken

Synonyms
Gallus gallus domesticus; chicken; bantam; chickens

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; Galloanserae; Galliformes; Phasianidae; Phasianinae; Gallus

Parent
Gallus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9030)

NCBI Taxonomy ID
9031 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9031)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
MX1

Synonyms
MX; MxA; IFI78; IFI-78K; lncMX1-215

String
9606.ENSP00000381601 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000381601)

Sequence Similarities
Belongs to the TRAFAC class dynamin-like GTPase superfamily. Dynamin/Fzo/YdjA family.

GO - Molecular Function
GO:0042802 : identical protein binding (https://www.ebi.ac.uk/QuickGO/term/GO:0042802)
GO:0005525 : GTP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005525)
GO:0003924 : GTPase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003924)
GO:0008017 : microtubule binding (https://www.ebi.ac.uk/QuickGO/term/GO:0008017)

UniProtKB Homo sapiens
P20591 (http://www.uniprot.org/uniprot/P20591)

GenebankID or UniProtKB
()

GO - Biological Process

GO:0006952 : defense response (https://www.ebi.ac.uk/QuickGO/term/GO:0006952)
GO:0045087 : innate immune response (https://www.ebi.ac.uk/QuickGO/term/GO:0045087)
GO:0007165 : signal transduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007165)
GO:0009615 : response to virus (https://www.ebi.ac.uk/QuickGO/term/GO:0009615)
GO:0051607 : defense response to virus (https://www.ebi.ac.uk/QuickGO/term/GO:0051607)
GO:0006915 : apoptotic process (https://www.ebi.ac.uk/QuickGO/term/GO:0006915)
GO:0031623 : receptor internalization (https://www.ebi.ac.uk/QuickGO/term/GO:0031623)
GO:0060337 : type I interferon signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0060337)
GO:0045071 : negative regulation of viral genome replication (https://www.ebi.ac.uk/QuickGO/term/GO:0045071)
GO:0061025 : membrane fusion (https://www.ebi.ac.uk/QuickGO/term/GO:0061025)
GO:0000266 : mitochondrial fission (https://www.ebi.ac.uk/QuickGO/term/GO:0000266)
GO:0048285 : organelle fission (https://www.ebi.ac.uk/QuickGO/term/GO:0048285)
GO:0098884 : postsynaptic neurotransmitter receptor internalization (https://www.ebi.ac.uk/QuickGO/term/GO:0098884)
GO:0050803 : regulation of synapse structure or activity (https://www.ebi.ac.uk/QuickGO/term/GO:0050803)
GO:0034340 : response to type I interferon (https://www.ebi.ac.uk/QuickGO/term/GO:0034340)
GO:0016185 : synaptic vesicle budding from presynaptic endocytic zone membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016185)

GO - Cellular Component

GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)
GO:0005829 : cytosol (https://www.ebi.ac.uk/QuickGO/term/GO:0005829)
GO:0016020 : membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016020)
GO:0031966 : mitochondrial membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0031966)
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)
GO:0031410 : cytoplasmic vesicle (https://www.ebi.ac.uk/QuickGO/term/GO:0031410)
GO:0030424 : axon (https://www.ebi.ac.uk/QuickGO/term/GO:0030424)
GO:0043197 : dendritic spine (https://www.ebi.ac.uk/QuickGO/term/GO:0043197)
GO:0045211 : postsynaptic membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0045211)
GO:0045202 : synapse (https://www.ebi.ac.uk/QuickGO/term/GO:0045202)
GO:0014069 : postsynaptic density (https://www.ebi.ac.uk/QuickGO/term/GO:0014069)
GO:0031965 : nuclear membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0031965)
GO:0005789 : endoplasmic reticulum membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005789)
GO:0048471 : perinuclear region of cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0048471)
GO:0015630 : microtubule cytoskeleton (https://www.ebi.ac.uk/QuickGO/term/GO:0015630)
GO:0098793 : presynapse (https://www.ebi.ac.uk/QuickGO/term/GO:0098793)
GO:0044327 : dendritic spine head (https://www.ebi.ac.uk/QuickGO/term/GO:0044327)
GO:0098844 : postsynaptic endocytic zone membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0098844)

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

c.1892G>A p.S631N

Experimental Evidence

-

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Ser	Asp	361

Main Reference

Polymorphisms and the differential antiviral activity of the chicken Mx gene. (2002) (https://pubmed.ncbi.nlm.nih.gov/11932243)

Authors

Ko JH; Jin HK; Asano A; Takada A; Ninomiya A; Kida H; Hokiyama H; Ohara M; Tsuzuki M; Nishibori M; Mizutani M; Watanabe T

Abstract

The nucleotide sequence of chicken Mx cDNA was reported earlier using the White Leghorn breed in Germany, but it showed no enhanced resistance to viruses. In this study, the nucleotide sequences of chicken Mx cDNA were determined in many breeds. A total of 25 nucleotide substitutions, of which 14 were deduced to cause amino acid exchanges, were detected, suggesting

that the chicken Mx gene is very polymorphic. Transfected cell clones expressing chicken Mx mRNA were established after the Mx cDNA was constructed with an expression vector and introduced into mouse 3T3 cells, and the Mx genes from some breeds were demonstrated to confer positive antiviral responses to influenza virus and vesicular stomatitis virus. On the basis of the comparison among the antiviral activities associated with many Mx variations, a specific amino acid substitution at position 631 (Ser to Asn) was considered to determine the antivirally positive or negative Mx gene. Thus, a single amino acid substitution influences the antiviral activity of Mx in domesticated chickens.

Additional References

RELATED GEPHE

Related Genes

2 (BTN1A1, Tva) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^9031^/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

https://omia.org/OMIA001534/9031/