

GEPHE SUMMARY

Pitx1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase= [^] Pitx1 [^] #gephebase-summary-title)	Gephebase Gene	GP00000885	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category= [^] Morphology [^] #gephebase-summary-title)	Trait Category		
Limb Identity (feathered feet) (https://www.gephebase.org/search-criteria?/and+Trait = [^] Limb Identity (feathered feet) [^] #gephebase-summary-title)	Trait		
Columba livia -scale-footed	Trait State in Taxon A		
Columba livia - Muffed Indian Fantail (feather-footed)	Trait State in Taxon B		
Taxon A	Ancestral State		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status= [^] Domesticated [^] #gephebase-summary-title)	Taxonomic Status		
	Taxon A		Taxon B
	Latin Name		Latin Name
Columba livia (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms= [^] Columba livia [^] #gephebase-summary-title)		Columba livia (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms= [^] Columba livia [^] #gephebase-summary-title)	
rock pigeon	Common Name	rock pigeon	Common Name
Columba livia domestica; rock pigeon; carrier pigeon; domestic pigeon; rock dove; Columba livia Gmelin, JF, 1789	Synonyms	Columba livia domestica; rock pigeon; carrier pigeon; domestic pigeon; rock dove; Columba livia Gmelin, JF, 1789	Synonyms
species	Rank	species	Rank
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; Columbiformes; Columbidae; Columba	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; Columbiformes; Columbidae; Columba	Lineage
Columba () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8931)	Parent	Columba () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8931)	Parent
8932 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8932)	NCBI Taxonomy ID	8932 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8932)	NCBI Taxonomy ID
No	is Taxon A an Infrasppecies?	Yes	is Taxon B an Infrasppecies?
			Taxon B Description
			Columba livia - Muffed Indian Fantail (feather-footed)

GENOTYPIC CHANGE

PITX1	Generic Gene Name	P56673 (http://www.uniprot.org/uniprot/P56673)	UniProtKB Gallus gallus
PTX1	Synonyms	XP_005503528 (https://www.ncbi.nlm.nih.gov/nuccore/XP_005503528)	GenebankID or UniProtKB
-	String		
Belongs to the paired homeobox family. Bicoid subfamily.	Sequence Similarities		
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)	GO - Molecular Function		
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)			
GO:0001077 : proximal promoter DNA-binding transcription activator activity, RNA			

polymerase II-specific (<https://www.ebi.ac.uk/QuickGO/term/GO:0001077>)
GO:0000978 : RNA polymerase II proximal promoter sequence-specific DNA binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000978>)
GO:0001085 : RNA polymerase II transcription factor binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:0001085>)

GO - Biological Process

GO:0009653 : anatomical structure morphogenesis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009653>)
GO:0007275 : multicellular organism development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007275>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>)

Molecular Type

Cis-regulatory (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title>)

Aberration Type

Deletion (<https://www.gephebase.org/search-criteria?/and+Aberration Type=^Deletion^#gephebase-summary-title>)

Deletion Size

10-100 kb

Molecular Details of the Mutation

44kb deletion

Experimental Evidence

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

Main Reference

Molecular shifts in limb identity underlie development of feathered feet in two domestic avian species. (2016) (<https://pubmed.ncbi.nlm.nih.gov/26977633>)

Authors

Domyan ET; Kronenberg Z; Infante CR; Vickrey AI; Stringham SA; Bruders R; Guernsey MW; Park S; Payne J; Beckstead RB; Kardon G; Menke DB; Yandell M; Shapiro MD

Abstract

Birds display remarkable diversity in the distribution and morphology of scales and feathers on their feet, yet the genetic and developmental mechanisms governing this diversity remain unknown. Domestic pigeons have striking variation in foot feathering within a single species, providing a tractable model to investigate the molecular basis of skin appendage differences. We found that feathered feet in pigeons result from a partial transformation from hindlimb to forelimb identity mediated by cis-regulatory changes in the genes encoding the hindlimb-specific transcription factor Pitx1 and forelimb-specific transcription factor Tbx5. We also found that ectopic expression of Tbx5 is associated with foot feathers in chickens, suggesting similar molecular pathways underlie phenotypic convergence between these two species. These results show how changes in expression of regional patterning genes can generate localized changes in organ fate and morphology, and provide viable molecular mechanisms for diversity in hindlimb scale and feather distribution.

Additional References

RELATED GEPHE

1 (Tbx5) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^8932^/and+Trait=Limb Identity/and+groupHaplotypes=true#gephebase-summary-title>)

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

ChIP-seq differential activity signal in deleted region