

GEPHE SUMMARY

	Gephebase Gene	
ndp (norrin) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^ndp+(norrin)^#gephebase-summary-title)		GP00002251
	Entry Status	Martin
Published		GepheID Main curator

PHENOTYPIC CHANGE

	Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Morphology^#gephebase-summary-title)	
	Trait
Coloration (plumage) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration+(plumage)^#gephebase-summary-title)	
	Trait State in Taxon A
Domestic pigeon with bar plumage	
	Trait State in Taxon B
Checker and T-checker melanistic patterns ; observed in feral populations ; co-dominant	
	Ancestral State
Taxon A	
	Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title)	

	Taxon A
	Latin Name
Columba livia (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Columba+livia^#gephebase-summary-title)	
	Common Name
rock pigeon	
	Synonyms
Columba livia domestica; rock pigeon; carrier pigeon; domestic pigeon; rock dove; Columba livia Gmelin, JF, 1789	
	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; Columbiformes; Columbidae; Columba	
	Parent
Columba () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8931)	
	NCBI Taxonomy ID
8932 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8932)	
	is Taxon A an Intraspecies?
No	

	Taxon B #1
	Latin Name
Columba livia (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Columba+livia^#gephebase-summary-title)	
	Common Name
rock pigeon	
	Synonyms
Columba livia domestica; rock pigeon; carrier pigeon; domestic pigeon; rock dove; Columba livia Gmelin, JF, 1789	
	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; Columbiformes; Columbidae; Columba	
	Parent
Columba () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8931)	
	NCBI Taxonomy ID
8932 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8932)	
	is Taxon B an Intraspecies?
No	

	Taxon B #2
	Latin Name
Columba guinea (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Columba+guinea^#gephebase-summary-title)	
	Common Name
speckled pigeon	
	Synonyms
speckled pigeon	
	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; Columbiformes; Columbidae; Columba	
	Parent
Columba () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=8931)	

135627

(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=135627)

is Taxon B an Intraspecies?

No

GENOTYPIC CHANGE

<p>Ndp</p> <p>ND; Ndph</p> <p>10090.ENSMUSP00000046692 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=10090.ENSMUSP00000046692)</p> <p>-</p> <p>GO:0042803 : protein homodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0042803)</p> <p>GO:0005125 : cytokine activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005125)</p> <p>GO:0005109 : frizzled binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005109)</p> <p>GO:0045893 : positive regulation of transcription, DNA-templated (https://www.ebi.ac.uk/QuickGO/term/GO:0045893)</p> <p>GO:0051091 : positive regulation of DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0051091)</p> <p>GO:0016055 : Wnt signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0016055)</p> <p>GO:0001890 : placenta development (https://www.ebi.ac.uk/QuickGO/term/GO:0001890)</p> <p>GO:0035426 : extracellular matrix-cell signaling (https://www.ebi.ac.uk/QuickGO/term/GO:0035426)</p> <p>GO:0110135 : Norrin signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0110135)</p> <p>GO:0061299 : retina vasculature morphogenesis in camera-type eye (https://www.ebi.ac.uk/QuickGO/term/GO:0061299)</p> <p>GO:0062023 : collagen-containing extracellular matrix (https://www.ebi.ac.uk/QuickGO/term/GO:0062023)</p> <p>GO:0031012 : extracellular matrix (https://www.ebi.ac.uk/QuickGO/term/GO:0031012)</p> <p>GO:0005615 : extracellular space (https://www.ebi.ac.uk/QuickGO/term/GO:0005615)</p> <p>GO:0009986 : cell surface (https://www.ebi.ac.uk/QuickGO/term/GO:0009986)</p> <p>Yes (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Yes^#gephebase-summary-title)</p> <p>Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title)</p> <p>Insertion (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Insertion^#gephebase-summary-title)</p> <p>10-100 kb</p> <p>CNV driven by tandem repeats with one (bar) two (checker) or four (T-checker) copies per chromosome between approximative positions 1790000 and 1805600</p> <p>Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title)</p> <p>Introgression of regulatory alleles and a missense coding mutation drive plumage pattern diversity in the rock pigeon. (2018) (https://pubmed.ncbi.nlm.nih.gov/30014848)</p> <p>Vickrey AI; Bruders R; Kronenberg Z; Mackey E; Bohlender RJ; Maclary ET; Maynez R; Osborne EJ; Johnson KP; Huff CD; Yandell M; Shapiro MD</p> <p>Birds and other vertebrates display stunning variation in pigmentation patterning, yet the genes controlling this diversity remain largely unknown. Rock pigeons (<i>Columba livia</i>) are fundamentally one of four color pattern phenotypes, in decreasing order of melanism: T-check, checker, bar (ancestral), or barless. Using whole-genome scans, we identified NDP as a candidate gene for this variation. Allele-specific expression differences in NDP indicate cis-regulatory divergence between ancestral and melanistic alleles. Sequence comparisons suggest that derived alleles originated in the speckled pigeon (<i>Columba guinea</i>), providing a striking example of introgression. In contrast, barless rock pigeons have an increased incidence of vision defects and, like human families with hereditary blindness, carry start-codon mutations in NDP. In summary, we find that both coding and regulatory variation in the same gene drives wing pattern diversity, and post-domestication introgression supplied potentially advantageous melanistic alleles to feral populations of this ubiquitous urban bird.</p> <p>Â© 2018, Vickrey et al.</p>	<p>Generic Gene Name</p> <p>P48744 (http://www.uniprot.org/uniprot/P48744)</p> <p>Synonyms</p> <p>Ø</p> <p>String</p> <p>Sequence Similarities</p> <p>-</p> <p>GO - Molecular Function</p> <p>GO - Biological Process</p> <p>GO - Cellular Component</p>	<p>UniProtKB Mus musculus</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> <p>Additional References</p>
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RELATED GEPHE

6 (MC1R, Mlana, slc2a11b, SLC45A2=MATP, SOX10, tyrosinase-related protein 1 (TYRP1)) (<https://www.gephebase.org/search-criteria?/or+Taxon>)

Related Genes

ID=⁸⁹³²/and+Trait=Coloration/or+Taxon ID=¹³⁵⁶²⁷/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 ([https://www.gpbase.org/search-criteria?/or+Gene+Gpbase=^{ndp}\(^{norrin}\)/and+Taxon ID=⁸⁹³²/or+Gene+Gpbase=^{ndp}\(^{norrin}\)/and+Taxon ID=⁸⁹³²/or+Gene+Gpbase=^{ndp}\(^{norrin}\)/and+Taxon ID=¹³⁵⁶²⁷#gepbase-summary-title](https://www.gpbase.org/search-criteria?/or+Gene+Gpbase=^{ndp}(^{norrin})/and+Taxon ID=⁸⁹³²/or+Gene+Gpbase=^{ndp}(^{norrin})/and+Taxon ID=⁸⁹³²/or+Gene+Gpbase=^{ndp}(^{norrin})/and+Taxon ID=¹³⁵⁶²⁷#gepbase-summary-title))

EXTERNAL LINKS

COMMENTS

@Parallelism @AllelicSeries @Introgression @CNV ; introgressed from C. guinea and is common in feral populations