

## GEPHE SUMMARY

		Gephebase Gene		GepheID
ndp (norrin) ( <a +ndp+(norrin)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+ndp+(norrin)+"#gephebase-summary-title</a> )			GP00002148	
	Entry Status		Santos	Main curator
Published				

## PHENOTYPIC CHANGE

		Trait Category	
Morphology ( <a +morphology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Morphology+"#gephebase-summary-title</a> )			
		Trait	
Coloration (plumage) ( <a +coloration+(plumage)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Coloration+(plumage)+"#gephebase-summary-title</a> )			
		Trait State in Taxon A	
All-black carrion crows			
		Trait State in Taxon B	
Grey-coated hooded crows			
		Ancestral State	
Taxon A			
		Taxonomic Status	
Intraspecific ( <a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific+"#gephebase-summary-title</a> )			

Taxon A	Latin Name	Taxon B	Latin Name
Corvus corone corone ( <a +corvus+corone+corone+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Corvus+corone+corone+"#gephebase-summary-title</a> )		Corvus cornix ( <a +corvus+cornix+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Corvus+cornix+"#gephebase-summary-title</a> )	
-	Common Name	hooded crow	Common Name
	Synonyms		Synonyms
Corvus corone corone Linnaeus, 1758		Corvus corone cornix; hooded crow; Nebelkraehe; hoodiecrow; Corvus cornix Linnaeus, 1758	
subspecies	Rank	species	Rank
	Lineage		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; Passeriformes; Corvoidea; Corvidae; Corvus; Corvus corone		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; Passeriformes; Corvoidea; Corvidae; Corvus	
	Parent		Parent
Corvus corone (carrion crow) - (Rank: species) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=30422">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=30422</a> )	NCBI Taxonomy ID	Corvus (crows) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=30420">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=30420</a> )	NCBI Taxonomy ID
181097 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=181097">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=181097</a> )		181096 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=181096">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=181096</a> )	
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

## GENOTYPIC CHANGE

		Generic Gene Name		UniProtKB Mus musculus
Ndp			P48744 ( <a href="http://www.uniprot.org/uniprot/P48744">http://www.uniprot.org/uniprot/P48744</a> )	
		Synonyms		GenebankID or UniProtKB
ND; Ndph			0	
		String		
10090.ENSMUSP00000046692 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=10090.ENSMUSP00000046692">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=10090.ENSMUSP00000046692</a> )				
		Sequence Similarities		
-				
		GO - Molecular Function		
GO:0042803 : protein homodimerization activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0042803">https://www.ebi.ac.uk/QuickGO/term/GO:0042803</a> )				
GO:0005125 : cytokine activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005125">https://www.ebi.ac.uk/QuickGO/term/GO:0005125</a> )				
GO:0005109 : frizzled binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005109">https://www.ebi.ac.uk/QuickGO/term/GO:0005109</a> )				
		GO - Biological Process		

GO:0045893 : positive regulation of transcription, DNA-templated  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0045893)  
 GO:0051091 : positive regulation of DNA-binding transcription factor activity  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0051091)  
 GO:0016055 : Wnt signaling pathway  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0016055)  
 GO:0001890 : placenta development  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0001890)  
 GO:0035426 : extracellular matrix-cell signaling  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0035426)  
 GO:0110135 : Norrin signaling pathway  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0110135)  
 GO:0061299 : retina vasculature morphogenesis in camera-type eye  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0061299)

GO - Cellular Component

GO:0062023 : collagen-containing extracellular matrix  
 (https://www.ebi.ac.uk/QuickGO/term/GO:0062023)  
 GO:0031012 : extracellular matrix (https://www.ebi.ac.uk/QuickGO/term/GO:0031012)  
 GO:0005615 : extracellular space (https://www.ebi.ac.uk/QuickGO/term/GO:0005615)  
 GO:0009986 : cell surface (https://www.ebi.ac.uk/QuickGO/term/GO:0009986)

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

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

2.25-kb LTR retrotransposon insertion reducing expression of the NDP gene and candidate gene LRP6 and a large LD haplotype in chr.18 also show a signal

Experimental Evidence

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

Main Reference

Epistatic mutations under divergent selection govern phenotypic variation in the crow hybrid zone. (2019) (https://pubmed.ncbi.nlm.nih.gov/30911146)

Authors

Knief U; Bossu CM; Saino N; Hansson B; Poelstra J; Vijay N; Weissensteiner M; Wolf JBW

Abstract

The evolution of genetic barriers opposing interspecific gene flow is key to the origin of new species. Drawing from information on over 400 admixed genomes sourced from replicate transects across the European hybrid zone between all-black carrion crows and grey-coated hooded crows, we decipher the interplay between phenotypic divergence and selection at the molecular level. Over 68% of plumage variation was explained by epistasis between the gene NDP and a ~2.8-megabase region on chromosome 18 with suppressed recombination. Both pigmentation loci showed evidence for divergent selection resisting introgression. This study reveals how few, large-effect loci can govern prezygotic isolation and shield phenotypic divergence from gene flow.

Additional References

Transcriptomics of colour patterning and coloration shifts in crows. (2015) (https://pubmed.ncbi.nlm.nih.gov/26302355)

Discovery and population genomics of structural variation in a songbird genus. (2020) (https://pubmed.ncbi.nlm.nih.gov/32636372)

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@TE ; genotypes described in "Discovery and population genomics of structural variation in a songbird genus"