GEPHE SUMMARY

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

GepheID
GP00002148

Entry Status
Published

Main curator
Santos

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
All-black carrion crows

Trait State in Taxon B
Grey-coated hooded crows

Ancestral State
Taxon A

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

Taxon A

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

Common Name
-

Synonyms
Corvus corone corone Linnaeus, 1758

Rank
subspecies

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

Parent
Corvus corone (carrion crow) - (Rank: species) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 30422)

NCBI Taxonomy ID
181097 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 181097)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
hooded crow

Synonyms
Corvus corone cornix; hooded crow; Nebelkraehe; hoodiecrow; Corvus cornix Linnaeus, 1758

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; Passeriformes; Corvoidea; Corvidae; Corvus

Parent
Corvus (crows) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 30420)

NCBI Taxonomy ID
181096 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 181096)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
Ndp

Synonyms
ND; Ndph

String
10090.ENSMUSP00000046692 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 10090.ENSMUSP00000046692)

Sequence Similarities
-

GO - Molecular Function
GO:0042803 : protein homodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0042803)
GO:0005125 : cytokine activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005125)
GO:0005109 : frizzled binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005109)

GO - Biological Process

UniProtKB Mus musculus
P48744 (http://www.uniprot.org/uniprot/P48744)

GenebankID or UniProtKB
()

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"