GEPHE SUMMARY

Gephebase Gene

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

GepheID

GP00002335

Entry Status

Published

Main curator

Martin

PHENOTYPIC CHANGE

Trait Category

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

Trait

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

Trait State in Taxon A

WT

Trait State in Taxon B

melanic

Ancestral State

Taxon A

Taxonomic Status

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

Taxon A

Latin Name

Sciurus niger (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Sciurus niger^#gephebase-summary-title)

Common Name

fox squirrel

Synonyms

fox squirrel; eastern fox squirrel

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Glires; Rodentia; Sciuromorpha; Sciuridae; Sciurinae; Sciurini; Sciurus

Parent

Sciurus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 10001)

NCBI Taxonomy ID

34861 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 34861)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

Sciurus niger (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Sciurus niger^#gephebase-summary-title)

Common Name

fox squirrel

Synonyms

fox squirrel; eastern fox squirrel

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Glires; Rodentia; Sciuromorpha; Sciuridae; Sciurinae; Sciurini; Sciurus

Parent

Sciurus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 10001)

NCBI Taxonomy ID

34861 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 34861)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

-

Synonyms

-

String

-

Sequence Similarities

-

GO - Molecular Function

-

GO - Biological Process

-

GO - Cellular Component

-

UniProtKB

()

GenebankID or UniProtKB

Mus musculus Q03288 (https://www.ncbi.nlm.nih.gov/nuccore/Q03288)

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

Gly121Cys

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Gly	Cys	121

Main Reference

Multiple origins of melanism in two species of North American tree squirrel (Sciurus). (2019) (https://pubmed.ncbi.nlm.nih.gov/31296164)

Authors

McRobie HR; Moncrief ND; Mundy NI

Abstract

While our understanding of the genetic basis of convergent evolution has improved there are still many uncertainties. Here we investigate the repeated evolution of dark colouration (melanism) in eastern fox squirrels (Sciurus niger; hereafter "fox squirrels") and eastern gray squirrels (S. carolinensis; hereafter "gray squirrels").

We show that convergent evolution of melanism has arisen by independent genetic mechanisms in two populations of the fox squirrel. In a western population, melanism is associated with a 24â€‰bp deletion in the melanocortin-1-receptor gene (MC1RÎ”24 allele), whereas in a south-eastern population, melanism is associated with a point substitution in the agouti signalling protein gene causing a Gly121Cys mutation. The MC1Râ^†24 allele is also associated with melanism in gray squirrels, and, remarkably, all the MC1Râ^†24 haplotypes are identical in the two species. Evolutionary analyses show that the MC1Râ^†24 haplotype is more closely related to other MC1R haplotypes in the fox squirrel than in the gray squirrel. Modelling supports the possibility of gene flow between the two species.

The presence of the MC1Râ^†24 allele and melanism in gray squirrels is likely due to introgression from fox squirrels, although we cannot completely rule out alternative hypotheses including introgression from gray squirrels to fox squirrels, or an ancestral polymorphism. Convergent melanism in these two species of tree squirrels has evolved by at least two and probably three different evolutionary routes.

Additional References

RELATED GEPHE

Related Genes

1 (MC1R) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^34861^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS