

GEPHE SUMMARY

SLC45A2=MATP (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^SLC45A2=MATP^#gephebase-summary-title)	Gephebase Gene	GP00001063	GephelD
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category="Morphology">#gephebase-summary-title)	Trait Category		
Coloration (coat) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (coat)^#gephebase-summary-title)	Trait		
Panthera tigris	Trait State in Taxon A		
Panthera tigris tigris - Bengal tiger (White tiger)	Trait State in Taxon B		
Taxon A	Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status="Intraspecific">#gephebase-summary-title)	Taxonomic Status		
Panthera tigris (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Panthera+tigris^#gephebase-summary-title)	Taxon A	Latin Name	Taxon B
tiger	Common Name	Panthera tigris (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Panthera+tigris^#gephebase-summary-title)	Latin Name
tiger	Synonyms	tiger	Common Name
species	Rank	tiger	Synonyms
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Laurasiatheria; Carnivora; Feliformia; Felidae; Pantherinae; Panthera	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Laurasiatheria; Carnivora; Feliformia; Felidae; Pantherinae; Panthera	Lineage
Panthera () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9688)	Parent	Panthera () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9688)	Parent
9694 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9694)	NCBI Taxonomy ID	9694 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9694)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
		Panthera tigris tigris - Bengal tiger (White tiger)	Taxon B Description

GENOTYPIC CHANGE

SLC45A2	Generic Gene Name	UniProtKB Homo sapiens
1A1; AIM1; MATP; OCA4; SHEP5	Synonyms	GenebankID or UniProtKB
9606.ENSP00000296589 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000296589)	String	XP_007097490 (https://www.ncbi.nlm.nih.gov/nuccore/XP_007097490)
Belongs to the glycoside-pentoside-hexuronide (GPH) cation symporter transporter (TC 2.A.2) family.	Sequence Similarities	
GO:0008506 : sucrose:proton symporter activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008506)	GO - Molecular Function	
GO:0042438 : melanin biosynthetic process	GO - Biological Process	

(<https://www.ebi.ac.uk/QuickGO/term/GO:0042438>)
 GO:0048066 : developmental pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048066>)
 GO:0007601 : visual perception (<https://www.ebi.ac.uk/QuickGO/term/GO:0007601>)
 GO:0050896 : response to stimulus (<https://www.ebi.ac.uk/QuickGO/term/GO:0050896>)
 GO:0015770 : sucrose transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0015770>)

GO - Cellular Component

GO:0016021 : integral component of membrane
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)
 GO:0033162 : melanosome membrane
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0033162>)

Presumptive Null

No ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=%27No%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive%20Null=%27No%27#gephebase-summary-title))

Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=%27Coding%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular%20Type=%27Coding%27#gephebase-summary-title))

Aberration Type

SNP ([https://www.gephebase.org/search-criteria?/and+Aberration Type=%27SNP%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration%20Type=%27SNP%27#gephebase-summary-title))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

A477V

Experimental Evidence

Association Mapping ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%27Association Mapping%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental%20Evidence=%27Association%20Mapping%27#gephebase-summary-title))

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Ala	Val	477

Main Reference

The genetic basis of white tigers. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23707431>)

Authors

Xu X; Dong GX; Hu XS; Miao L; Zhang XL; Zhang DL; Yang HD; Zhang TY; Zou ZT; Zhang TT; Zhuang Y; Bhak J; Cho YS; Dai WT; Jiang TJ; Xie C; Li R; Luo SJ

Abstract

The white tiger, an elusive Bengal tiger (*Panthera tigris tigris*) variant with white fur and dark stripes, has fascinated humans for centuries ever since its discovery in the jungles of India. Many white tigers in captivity are inbred in order to maintain this autosomal recessive trait and consequently suffer some health problems, leading to the controversial speculation that the white tiger mutation is perhaps a genetic defect. However, the genetic basis of this phenotype remains unknown. Here, we conducted genome-wide association mapping with restriction-site-associated DNA sequencing (RAD-seq) in a pedigree of 16 captive tigers segregating at the putative white locus, followed by whole-genome sequencing (WGS) of the three parents. Validation in 130 unrelated tigers identified the causative mutation to be an amino acid change (A477V) in the transporter protein SLC45A2. Three-dimensional homology modeling suggests that the substitution may partially block the transporter channel cavity and thus affect melanogenesis. We demonstrate the feasibility of combining RAD-seq and WGS to rapidly map exotic variants in nonmodel organisms. Our results identify the basis of the longstanding white tiger mystery as the same gene underlying color variation in human, horse, and chicken and highlight its significance as part of the species' natural polymorphism that is viable in the wild.

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Additional References

RELATED GEPHE

1 (CORIN) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=%279694%27/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon%20ID=%279694%27/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

Related Genes

EXTERNAL LINKS

COMMENTS

@Parallelism <https://omia.org/OMIA000213/74535/>

