

## GEPHE SUMMARY

SLC45A2=MATP ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~SLC45A2=MATP^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~SLC45A2=MATP^#gephebase-summary-title</a> )	Gephebase Gene	GP00001063	GepheID
Published	Entry Status	Martin	Main curator

## PHENOTYPIC CHANGE

Morphology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=~Morphology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=~Morphology^#gephebase-summary-title</a> )	Trait Category		
Coloration (coat) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=~Coloration+coat^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=~Coloration+coat^#gephebase-summary-title</a> )	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 ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific^#gephebase-summary-title</a> )	Taxonomic Status		
	Taxon A	Taxon B	
Panthera tigris ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Panthera+tigris^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Panthera+tigris^#gephebase-summary-title</a> )	Latin Name	Panthera tigris ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Panthera+tigris^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Panthera+tigris^#gephebase-summary-title</a> )	Latin Name
tiger	Common Name	tiger	Common Name
tiger	Synonyms	tiger	Synonyms
species	Rank	species	Rank
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) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9688">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9688</a> )	Parent	Panthera () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9688">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9688</a> )	Parent
9694 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9694">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9694</a> )	NCBI Taxonomy ID	9694 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9694">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9694</a> )	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	Yes	is Taxon B an Intraspecies?
		Panthera tigris tigris - Bengal tiger (White tiger)	Taxon B Description

## GENOTYPIC CHANGE

SLC45A2	Generic Gene Name	Q9UMX9 ( <a href="http://www.uniprot.org/uniprot/Q9UMX9">http://www.uniprot.org/uniprot/Q9UMX9</a> )	UniProtKB Homo sapiens
1A1; AIM1; MATP; OCA4; SHEP5	Synonyms	XP_007097490 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/XP_007097490">https://www.ncbi.nlm.nih.gov/nuccore/XP_007097490</a> )	GenebankID or UniProtKB
9606.ENSPO0000296589 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000296589">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000296589</a> )	String		
Belongs to the glycoside-pentoside-hexuronide (GPH) cation symporter transporter (TC 2.A.2) family.	Sequence Similarities		
GO:0008506 : sucrose:proton symporter activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0008506">https://www.ebi.ac.uk/QuickGO/term/GO:0008506</a> )	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>)

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>) Presumptive Null  
 Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title>) Molecular Type  
 SNP (<https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title>) Aberration Type  
 Nonsynonymous SNP Coding Change  
 A477V Molecular Details of the Mutation  
 Association Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title>) Experimental Evidence

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

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

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 Authors

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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## RELATED GEPHE

1 (CORIN) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^9694^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title>) Related Genes  
 No matches found. Related Haplotypes

## EXTERNAL LINKS

## COMMENTS

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

