

	Gephebase Gene	GepheID
TRIM5alpha-CypA chimeric gene (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+^TRIM5alpha-CypA+chimeric+gene+^#gephebase-summary-title)	GP00001136	Main curator
Published	Entry Status: Courtier	

Physiology (#gephebase-summary-title)		Trait Category	
Pathogen resistance (retroviruses) (https://www.gephebase.org/search-criteria?/and+Trait=~Pathogen resistance (retroviruses)^#gephebase-summary-title)		Trait	
Other New World Monkeys (no HIV-1 restriction activity)		Trait State in Taxon A	
Aotus spp. (HIV-1 restriction activity)		Trait State in Taxon B	
Data not curated		Ancestral State	
Intergeneric or Higher (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=~Intergeneric or Higher^#gephebase-summary-title)		Taxonomic Status	
Taxon A		Taxon B	
Platyrrhini (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Platyrrhini^#gephebase-summary-title)	Latin Name	Aotus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Aotus^#gephebase-summary-title)	Latin Name
New World monkeys	Common Name	night monkeys	Common Name
monkey; monkeys; New World monkeys	Synonyms	night monkeys; Aotus Illiger, 1811	Synonyms
parvorder	Rank	genus	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Simiiformes	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Simiiformes; Platyrrhini; Aotidae	Lineage
Simiiformes () - (Rank: infraorder) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 314293)	Parent	Aotidae () - (Rank: family) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 376918)	Parent
9479 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9479)	NCBI Taxonomy ID	9504 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9504)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

TRIM5	Generic Gene Name	Q9C035 (http://www.uniprot.org/uniprot/Q9C035)	UniProtKB Homo sapiens
RNF88; TRIM5alpha	Synonyms	AAT73777 (https://www.ncbi.nlm.nih.gov/nuccore/AAT73777)	GenebankID or UniProtKB
9606.ENSP00000369373 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSP00000369373)	String		
	Sequence Similarities		
Belongs to the TRIM/RBCC family.			
	GO - Molecular Function		
GO:0042802 : identical protein binding (https://www.ebi.ac.uk/QuickGO/term/GO:0042802)			
GO:0042803 : protein homodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0042803)			
GO:0008270 : zinc ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0008270)			
GO:0019901 : protein kinase binding (https://www.ebi.ac.uk/QuickGO/term/GO:0019901)			
GO:0030674 : protein binding, bridging			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0030674>)
GO:0008329 : signaling pattern recognition receptor activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008329>)
GO:0004842 : ubiquitin-protein transferase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0004842>)

GO - Biological Process

GO:0045087 : innate immune response
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045087>)
GO:0043410 : positive regulation of MAPK cascade
(<https://www.ebi.ac.uk/QuickGO/term/GO:0043410>)
GO:0051092 : positive regulation of NF-kappaB transcription factor activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0051092>)
GO:0051607 : defense response to virus
(<https://www.ebi.ac.uk/QuickGO/term/GO:0051607>)
GO:0043123 : positive regulation of I-kappaB kinase/NF-kappaB signaling
(<https://www.ebi.ac.uk/QuickGO/term/GO:0043123>)
GO:0032880 : regulation of protein localization
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032880>)
GO:0060333 : interferon-gamma-mediated signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0060333>)
GO:0016032 : viral process (<https://www.ebi.ac.uk/QuickGO/term/GO:0016032>)
GO:0051091 : positive regulation of DNA-binding transcription factor activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0051091>)
GO:0002218 : activation of innate immune response
(<https://www.ebi.ac.uk/QuickGO/term/GO:0002218>)
GO:0006914 : autophagy (<https://www.ebi.ac.uk/QuickGO/term/GO:0006914>)
GO:0046597 : negative regulation of viral entry into host cell
(<https://www.ebi.ac.uk/QuickGO/term/GO:0046597>)
GO:1902187 : negative regulation of viral release from host cell
(<https://www.ebi.ac.uk/QuickGO/term/GO:1902187>)
GO:0070534 : protein K63-linked ubiquitination
(<https://www.ebi.ac.uk/QuickGO/term/GO:0070534>)
GO:0070206 : protein trimerization (<https://www.ebi.ac.uk/QuickGO/term/GO:0070206>)
GO:0031664 : regulation of lipopolysaccharide-mediated signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0031664>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)
GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)
GO:0000932 : P-body (<https://www.ebi.ac.uk/QuickGO/term/GO:0000932>)

	Presumptive Null
No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title)	
	Molecular Type
Other (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Other~#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
LINE-mediated retrotransposition of the CyclophilinA gene between exons 7 and 8 of TRIM5alpha	
	Experimental Evidence
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene~#gephebase-summary-title)	
	Main Reference
Cyclophilin A retrotransposition into TRIM5 explains owl monkey resistance to HIV-1. (2004) (https://pubmed.ncbi.nlm.nih.gov/15243629)	
	Authors
Sayah DM; Sokolskaja E; Berthoux L; Luban J	
	Abstract
In Old World primates, TRIM5-alpha confers a potent block to human immunodeficiency virus type 1 (HIV-1) infection that acts after virus entry into cells. Cyclophilin A (CypA) binding to viral capsid protects HIV-1 from a similar activity in human cells. Among New World primates, only owl monkeys exhibit post-entry restriction of HIV-1 (ref. 1). Paradoxically, the barrier to HIV-1 in owl monkey cells is released by capsid mutants or drugs that disrupt capsid interaction with CypA. Here we show that knockdown of owl monkey CypA by RNA interference (RNAi) correlates with suppression of anti-HIV-1 activity. However, reintroduction of CypA protein to RNAi-treated cells did not restore antiviral activity. A search for additional RNAi targets unearthed TRIMCyp, an RNAi-responsive messenger RNA encoding a TRIM5-CypA fusion protein. TRIMCyp accounts for post-entry restriction of HIV-1 in owl monkeys and blocks HIV-1 infection when transferred to otherwise infectable human or rat cells. It seems that TRIMCyp arose after the divergence of New and Old World primates when a LINE-1 retrotransposon catalysed the insertion of a CypA complementary DNA into the TRIM5 locus. This is the first vertebrate example of a chimaeric gene generated by this mechanism of exon shuffling.	
	Additional References
A Trim5-cyclophilin A fusion protein found in owl monkey kidney cells can restrict HIV-1. (2004) (https://pubmed.ncbi.nlm.nih.gov/15326303)	

RELATED GEPHE

	Related Genes
1 (Mitochondrial antiviral signaling (MAVS)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~9479~/and+Trait=Pathogen resistance/or+Taxon ID=~9504~/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title)	
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS

@TE @ChimericGene