

GEPHE SUMMARY

<p>RNASE4 [likely pseudo-replicate of other RNASE4 entry by introgression] https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~RNASE4 [likely pseudo-replicate of other RNASE4 entry by introgression]~#gephebase-summary-title</p> <p>Published</p>	<p>Gephebase Gene</p> <p>GP00001506</p> <p>Prigent</p> <p>Entry Status</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (#https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology~#gephebase-summary-title)</p> <p>High-altitude adaptation (enhanced angiogenesis) (https://www.gephebase.org/search-criteria?/and+Trait=~High-altitude adaptation (enhanced angiogenesis)~#gephebase-summary-title)</p> <p>Snub-nosed monkey of lowland regions (R. brelichi)</p> <p>Snub-nosed monkey of high-altitude habitats (R. roxellana)</p> <p>Taxon A</p> <p>Interspecific (#https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Interspecific~#gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon B</p> <p>Rhinopithecus roxellana #https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Rhinopithecus roxellana~#gephebase-summary-title</p> <p>golden snub-nosed monkey</p> <p>Pygathrix roxellana; golden snub-nosed monkey; Rhinopithecus roxellana (Milne-Edwards, 1870); Rhinopithecus roxellanae</p> <p>species</p> <p>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; Catarrhini; Cercopithecoidea; Cercopithecidae; Colobinae; Rhinopithecus</p> <p>Rhinopithecus () - (Rank: genus) https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=542827</p> <p>224329 https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=224329</p> <p>No</p>	<p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Rank</p> <p>Lineage</p> <p>Parent</p>	<p>Latin Name</p> <p>Common Name</p> <p>Synonyms</p> <p>Rank</p> <p>Lineage</p> <p>Parent</p>
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GENOTYPIC CHANGE

<p>RNASE4</p> <p>RAB1; RNS4</p> <p>9606.ENSPO0000381081 http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000381081</p> <p>Belongs to the pancreatic ribonuclease family.</p> <p>GO:0003676 : nucleic acid binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003676) GO:0004522 : ribonuclease A activity https://www.ebi.ac.uk/QuickGO/term/GO:0004522)</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>UniProtKB Homo sapiens</p> <p>P34096 (http://www.uniprot.org/uniprot/P34096)</p> <p>GenebankID or UniProtKB</p> <p>XM_010377080.1 (https://www.ncbi.nlm.nih.gov/nucleotide/XM_010377080.1)</p>
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GO:0004540 : ribonuclease activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0004540>)

GO - Biological Process

GO:0006379 : mRNA cleavage (<https://www.ebi.ac.uk/QuickGO/term/GO:0006379>)

GO - Cellular Component

GO:0005576 : extracellular region (<https://www.ebi.ac.uk/QuickGO/term/GO:0005576>)

Mutation #1

Presumptive Null

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

Molecular Type

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

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

p.Asn89Lys & p.Thr128Ile

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Asn	Lys	89

Main Reference

Genomic analysis of snub-nosed monkeys (*Rhinopithecus*) identifies genes and processes related to high-altitude adaptation. (2016) (<https://pubmed.ncbi.nlm.nih.gov/27399969>)

Authors

Yu L; Wang GD; Ruan J; Chen YB; Yang CP; Cao X; Wu H; Liu YH; Du ZL; Wang XP; Yang J; Cheng SC; Zhong L; Wang L; Wang X; Hu JY; Fang L; Bai B; Wang KL; Yuan N; Wu SF; Li BG; Zhang JG; Yang YQ; Zhang CL; Long YC; Li HS; Yang JY; Irwin DM; Ryder OA; Li Y; Wu CI; Zhang YP

Abstract

The snub-nosed monkey genus *Rhinopithecus* includes five closely related species distributed across altitudinal gradients from 800 to 4,500 m. *Rhinopithecus bieti*, *Rhinopithecus roxellana*, and *Rhinopithecus strykeri* inhabit high-altitude habitats, whereas *Rhinopithecus brelichi* and *Rhinopithecus avunculus* inhabit lowland regions. We report the de novo whole-genome sequence of *R. bieti* and genomic sequences for the four other species. Eight shared substitutions were found in six genes related to lung function, DNA repair, and angiogenesis in the high-altitude snub-nosed monkeys. Functional assays showed that the high-altitude variant of CDT1 (Ala537Val) renders cells more resistant to UV irradiation, and the high-altitude variants of RNASE4 (Asn89Lys and Thr128Ile) confer enhanced ability to induce endothelial tube formation in vitro. Genomic scans in the *R. bieti* and *R. roxellana* populations identified signatures of selection between and within populations at genes involved in functions relevant to high-altitude adaptation. These results provide valuable insights into the adaptation to high altitude in the snub-nosed monkeys.

Additional References

Mutation #2

Presumptive Null

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

Molecular Type

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

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

p.Asn89Lys & p.Thr128Ile

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Thr	Ile	128

Main Reference

Genomic analysis of snub-nosed monkeys (*Rhinopithecus*) identifies genes and processes related to high-altitude adaptation. (2016) (<https://pubmed.ncbi.nlm.nih.gov/27399969>)

Authors

Yu L; Wang GD; Ruan J; Chen YB; Yang CP; Cao X; Wu H; Liu YH; Du ZL; Wang XP; Yang J; Cheng SC; Zhong L; Wang L; Wang X; Hu JY; Fang L; Bai B; Wang KL; Yuan N; Wu SF; Li BG; Zhang JG; Yang YQ; Zhang CL; Long YC; Li HS; Yang JY; Irwin DM; Ryder OA; Li Y; Wu CI; Zhang YP

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Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

@Introgression. Common substitution observed in high-altitude snub-nosed monkeys, identified as evolving under positive selection along the lineage containing *R. bieti* and *R. strykeri* and the lineage leading to *R. roxellana*. RNASE4 has been reported to induce angiogenesis. Variant RNASE4 (Asn89Lys and Thr128Ile) showed higher activity in inducing tube formation in human umbilical vein endothelial cell (HUVEC) cultures in Matrigel than reference RNASE4.