

GEPHE SUMMARY

<p>arginyl-transfer RNA synthetase (RARS) (https://www.gephebase.org/search-criteria?/and+Gene=Gephebase+^arginyl-transfer+RNA+synthetase+(RARS)^#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>GP00002620</p> <p>Courtier</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>Heat tolerance (https://www.gephebase.org/search-criteria?/and+Trait=^Heat+tolerance^#gephebase-summary-title)</p> <p>Anolis cristatellus - forest and lower heat tolerance</p> <p>Anolis cristatellus - urban and higher heat tolerance</p> <p>Taxon A</p> <p>Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#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>Latin Name</p> <p>Anolis cristatellus (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Anolis+cristatellus^#gephebase-summary-title)</p> <p>Common Name</p> <p>-</p> <p>Synonyms</p> <p>Ctenonotus cristatellus; Anolis cristatellus Dumelril & Bibron, 1837; MCZ 8306; MCZ:8306</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Lepidosauria; Squamata; Bifurcata; Unidentata; Episquamata; Toxicofera; Iguania; Dactyloidae; Anolis</p> <p>Parent</p> <p>Anolis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=28376)</p> <p>NCBI Taxonomy ID</p> <p>38889 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=38889)</p> <p>is Taxon A an Intraspecies?</p> <p>No</p>	<p>Taxon A</p> <p>Latin Name</p> <p>Anolis cristatellus (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Anolis+cristatellus^#gephebase-summary-title)</p> <p>Common Name</p> <p>-</p> <p>Synonyms</p> <p>Ctenonotus cristatellus; Anolis cristatellus Dumelril & Bibron, 1837; MCZ 8306; MCZ:8306</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Lepidosauria; Squamata; Bifurcata; Unidentata; Episquamata; Toxicofera; Iguania; Dactyloidae; Anolis</p> <p>Parent</p> <p>Anolis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=28376)</p> <p>NCBI Taxonomy ID</p> <p>38889 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=38889)</p> <p>is Taxon B an Intraspecies?</p> <p>No</p>
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GENOTYPIC CHANGE

<p>RARS2</p> <p>PCH6; ArgRS; RARSL; DALRD2; PRO1992</p> <p>9606.ENSP00000358549 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSP00000358549)</p> <p>Belongs to the class-I aminoacyl-tRNA synthetase family.</p> <p>GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)</p> <p>GO:0003723 : RNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003723)</p> <p>GO:0004814 : arginine-tRNA ligase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004814)</p> <p>GO:0032543 : mitochondrial translation</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p> <p>GO - Biological Process</p>	<p>UniProtKB Homo sapiens</p> <p>Q5T160 (http://www.uniprot.org/uniprot/Q5T160)</p> <p>GenebankID or UniProtKB</p> <p>()</p>
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(<https://www.ebi.ac.uk/QuickGO/term/GO:0032543>)
 GO:0006420 : arginyl-tRNA aminoacylation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0006420>)
 GO:0006418 : tRNA aminoacylation for protein translation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0006418>)

GO - Cellular Component

GO:0005739 : mitochondrion (<https://www.ebi.ac.uk/QuickGO/term/GO:0005739>)
 GO:0005759 : mitochondrial matrix (<https://www.ebi.ac.uk/QuickGO/term/GO:0005759>)

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

C>G threonine>serine at amino acid residue 558 of the RARS gene - adjacent to a predicted protein-binding region22 (AA556â€”557). There are four non-synonymous polymorphic sites within RARS. Only one shows a significant difference in allele frequency between forest and urban habitats across all populations.

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	ACN	AGN	-
Amino-acid	Thr	Ser	558

Main Reference

Parallel selection on thermal physiology facilitates repeated adaptation of city lizards to urban heat islands. (2020) (<https://pubmed.ncbi.nlm.nih.gov/32152530>)

Authors

Campbell-Staton SC; Winchell KM; Rochette NC; Fredette J; Maayan I; Schweizer RM; Catchen J

Abstract

Only recently have we begun to understand the ecological and evolutionary effects of urbanization on species, with studies revealing drastic impacts on community composition, gene flow, behaviour, morphology and physiology. However, our understanding of how adaptive evolution allows species to persist, and even thrive, in urban landscapes is still nascent. Here, we examine phenotypic, genomic and regulatory impacts of urbanization on a widespread lizard, the Puerto Rican crested anole (*Anolis cristatellus*). We find that urban lizards endure higher environmental temperatures and display greater heat tolerance than their forest counterparts. A single non-synonymous polymorphism within a protein synthesis gene (RARS) is associated with heat tolerance plasticity within urban heat islands and displays parallel signatures of selection in cities. Additionally, we identify groups of differentially expressed genes between habitats showing elevated genetic divergence in multiple urban-forest comparisons. These genes display evidence of adaptive regulatory evolution within cities and disproportionately cluster within regulatory modules associated with heat tolerance. This study provides evidence of temperature-mediated selection in urban heat islands with repeatable impacts on physiological evolution at multiple levels of biological hierarchy.

Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS