

GEPHE SUMMARY

	Gephebase Gene		GepheID
SPR (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^SPR^#gephebase-summary-title)		GP00002119	
	Entry Status	Santos	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Morphology (https://www.gephebase.org/search-criteria?/and+TraitCategory=^Morphology^#gephebase-summary-title)		Trait	
Coloration (ventral scales) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (ventral scales)^#gephebase-summary-title)		Trait State in Taxon A	
Presence of ventral orange pigmentation		Trait State in Taxon B	
Absence of orange: individuals have either yellow or mosaic pigmentation (a mixture of orange and white)		Ancestral State	
Unknown		Taxonomic Status	
Intraspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Intraspecific^#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Podarcis muralis (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Podarcis muralis^#gephebase-summary-title)		Podarcis muralis (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Podarcis muralis^#gephebase-summary-title)	
	Common Name		Common Name
Common wall lizard		Common wall lizard	
	Synonyms		Synonyms
Lacerrta muralis; Common wall lizard; Mauereidechse; Lacerrta muralis Dumeril & Bibron, 1893; Podarcis muralis (Dumeril & Bibron, 1839)		Lacerrta muralis; Common wall lizard; Mauereidechse; Lacerrta muralis Dumeril & Bibron, 1893; Podarcis muralis (Dumeril & Bibron, 1839)	
	Rank		Rank
species		species	
	Lineage		Lineage
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; Laterata; Lacertibaenia; Lacertidae; Lacertinae; Podarcis		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; Laterata; Lacertibaenia; Lacertidae; Lacertinae; Podarcis	
	Parent		Parent
Podarcis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 42163)		Podarcis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 42163)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
64176 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 64176)		64176 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 64176)	
	is Taxon A an Infrasppecies?		is Taxon B an Infrasppecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Mus musculus
Spr		Q64105 (http://www.uniprot.org/uniprot/Q64105)	
	Synonyms		GenebankID or UniProtKB
-		114604456 (https://www.ncbi.nlm.nih.gov/nuccore/114604456)	
	String		
10090.ENSMUSP00000048111 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=10090.ENSMUSP00000048111)			
	Sequence Similarities		
Belongs to the sepiapterin reductase family.			
	GO - Molecular Function		
GO:0042803 : protein homodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0042803)			
GO:0004757 : sepiapterin reductase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004757)			
	GO - Biological Process		

GO:0010033 : response to organic substance
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010033>)
GO:0042417 : dopamine metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042417>)
GO:0040014 : regulation of multicellular organism growth
(<https://www.ebi.ac.uk/QuickGO/term/GO:0040014>)
GO:0042415 : norepinephrine metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042415>)
GO:0006729 : tetrahydrobiopterin biosynthetic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006729>)
GO:0048667 : cell morphogenesis involved in neuron differentiation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048667>)
GO:0006558 : L-phenylalanine metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006558>)
GO:0006809 : nitric oxide biosynthetic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006809>)
GO:0019889 : pteridine metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0019889>)
GO:0042428 : serotonin metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042428>)
GO:0046146 : tetrahydrobiopterin metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0046146>)
GO:0050882 : voluntary musculoskeletal movement
(<https://www.ebi.ac.uk/QuickGO/term/GO:0050882>)

GO - Cellular Component

GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)
GO:0005654 : nucleoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005654>)
GO:0005739 : mitochondrion (<https://www.ebi.ac.uk/QuickGO/term/GO:0005739>)

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title)	Presumptive Null
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Cis-regulatory~#gephebase-summary-title)	Molecular Type
Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Unknown~#gephebase-summary-title)	Aberration Type
-	Molecular Details of the Mutation
-	Experimental Evidence
Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Association Mapping~#gephebase-summary-title)	Main Reference

Regulatory changes in pterin and carotenoid genes underlie balanced color polymorphisms in the wall lizard. (2019) (<https://pubmed.ncbi.nlm.nih.gov/30819892>)

Authors
Andrade P; Pinho C; PÃ©rez I de Lanuza G; Afonso S; Brejcha J; Rubin CJ; Wallerman O; Pereira P; Sabatino SJ; Bellati A; Pellitteri-Rosa D; Bosakova Z; Bunikis I; Carretero MA; Feiner N; Marsik P; PaupÃ©rio F; Salvi D; Soler L; While GM; Uller T; Font E; Andersson L; Carneiro M

Abstract
Reptiles use pterin and carotenoid pigments to produce yellow, orange, and red colors. These conspicuous colors serve a diversity of signaling functions, but their molecular basis remains unresolved. Here, we show that the genomes of sympatric color morphs of the European common wall lizard (*Podarcis muralis*), which differ in orange and yellow pigmentation and in their ecology and behavior, are virtually undifferentiated. Genetic differences are restricted to two small regulatory regions near genes associated with pterin [sepiapterin reductase (SPR)] and carotenoid [beta-carotene oxygenase 2 (BCO2)] metabolism, demonstrating that a core gene in the housekeeping pathway of pterin biosynthesis has been coopted for bright coloration in reptiles and indicating that these loci exert pleiotropic effects on other aspects of physiology. Pigmentation differences are explained by extremely divergent alleles, and haplotype analysis revealed abundant transspecific allele sharing with other lacertids exhibiting color polymorphisms. The evolution of these conspicuous color ornaments is the result of ancient genetic variation and cross-species hybridization.

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Additional References

RELATED GEPHE

1 (BCO2 = beta-carotene oxygenase 2) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~64176~/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS

