GEPHE SUMMARY

GEPHE SUMMARY			
	Gephebase Gene		GephelD
Agouti (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Agouti^#gephebase-summary-title)		GP00001974	Main curator
Published	Entry Status	Courtier	
PHENOTYPIC CHANGE			
	Trait Category		
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)	_		
Coloration (coat) (https://www.gephebase.org/search-criteria?/and+T	Trait rait=^Coloration		
(coat) [°] #gephebase-summary-title)	Trait State in Taxon A		
Peromyscus maniculatus - Nebraska Sand Hills - dark coat	Trait State in Taxon B		
Peromyscus maniculatus - Nebraska Sand Hills - light coat	Ancestral State		
Data not curated	Taxonomic Status		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonc Status=^Intraspecific^#gephebase-summary-title)	omic		
Taxon A		Taxon B	
	Latin Name		Latin Name
Peromyscus maniculatus		Peromyscus maniculatus	
(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyn	ns=^Peromyscus	(https://www.gephebase.org/search-criteria?/and+T	Faxon and Synonyms=^Peromyscus
	ns=^Peromyscus Common Name	•	Faxon and Synonyms=^Peromyscus Common Name
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	Generic Gene Name	
Asip		Q03288 (http://www.uniprot.org/uniprot/Q03288)
	Synonyms	
As; ASP; A <y>; ASIP; a</y>		ACV72059 (https://www.ncbi.nlm.nih.gov/nuccore/
	String	
10090.ENSMUSP0000029123		
(http://string-db.org/newstring_cgi/show_network_secti 10090.ENSMUSP00000029123)	ion.pl?identifier=	
	Sequence Similarities	
<u>-</u>		
	GO - Molecular Function	
GO:0031779 : melanocortin receptor binding		
(https://www.ebi.ac.uk/QuickGO/term/GO:0031779)		
GO:0031781 : type 3 melanocortin receptor binding		

UniProtKB Mus musculus

GenebankID or UniProtKB

e/ACV72059)

(https://www.ebi.ac.uk/QuickGO/term/GO:0031781) GO:0031782 : type 4 melanocortin receptor binding (https://www.ebi.ac.uk/QuickGO/term/GO:0031782) GO - Biological Process GO:0008343 : adult feeding behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0008343) GO:0006091 : generation of precursor metabolites and energy (https://www.ebi.ac.uk/QuickGO/term/GO:0006091) GO:0071514 : genetic imprinting (https://www.ebi.ac.uk/QuickGO/term/GO:0071514) GO:0009755 : hormone-mediated signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0009755) GO:0042438 : melanin biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0042438) GO:0032438 : melanosome organization (https://www.ebi.ac.uk/QuickGO/term/GO:0032438) GO:0032402 : melanosome transport (https://www.ebi.ac.uk/QuickGO/term/GO:0032402) GO: 0043473: pigmentation (https://www.ebi.ac.uk/QuickGO/term/GO: 0043473)GO:0048023 : positive regulation of melanin biosynthetic process (https://www.ebi.ac.uk/QuickGO/term/GO:0048023) GO:0040030 : regulation of molecular function, epigenetic (https://www.ebi.ac.uk/QuickGO/term/GO:0040030) GO - Cellular Component GO:0005576 : extracellular region (https://www.ebi.ac.uk/QuickGO/term/GO:0005576)

GO:0005623 : cell (https://www.ebi.ac.uk/QuickGO/term/GO:0005623)

Mutation #1
Presumptive Null
No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)
Molecular Type
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title)
Aberration Type
Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Unknown^#gephebase-summary-title) Molecular Details of the Mutation
several candidate mutations (SNPs and deletion of Ser in exon 2) associated with tail stripe coloration
Experimental Evidence
Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title)
Main Reference
Adaptive evolution of multiple traits through multiple mutations at a single gene. (2013) (https://pubmed.ncbi.nlm.nih.gov/23493712)
Authors
Linnen CR; Poh YP; Peterson BK; Barrett RD; Larson JG; Jensen JD; Hoekstra HE
Abstract
The identification of precise mutations is required for a complete understanding of the underlying molecular and evolutionary mechanisms driving adaptive phenotypic change. Using
plasticine models in the field, we show that the light coat color of deer mice that recently colonized the light-colored soil of the Nebraska Sand Hills provides a strong selective
advantage against visually hunting predators. Color variation in an admixed population suggests that this light Sand Hills phenotype is composed of multiple traits. We identified distinct
regions within the Agouti locus associated with each color trait and found that only haplotypes associated with light trait values have evidence of selection. Thus, local adaptation is the

result of independent selection on many mutations within a single locus, each with a specific effect on an adaptive phenotype, thereby minimizing pleiotropic consequences.

Linking a mutation to survival in wild mice. (2019) (https://pubmed.ncbi.nlm.nih.gov/30705186)

Mutation #2	
	Presumptive Null
No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)	
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title)	Molecular Type
Cistegulatory (https://www.gephebase.org/search-citena:/and+molecular rype= Cistegulatory #gephebase-summary-title/	Aberration Type
SNP (https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title)	
	Molecular Details of the Mutation
several candidate SNPs associated with dorso-ventral boundary of coloration	E
Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title)	Experimental Evidence
	Main Reference
Adaptive evolution of multiple traits through multiple mutations at a single gene. (2013) (https://pubmed.ncbi.nlm.nih.gov/23493712)	
	Authors
Linnen CR; Poh YP; Peterson BK; Barrett RD; Larson JG; Jensen JD; Hoekstra HE	
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Linking a mutation to survival in wild mice. (2019) (https://pubmed.ncbi.nlm.nih.gov/30705186)

Additional References

Additional References

Mutation #3	
	Presumptive Null
No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)	
	Molecular Type
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title)	
	Aberration Type
SNP (https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title)	Molecular Details of the Mutation
several candidate SNPs associated with dorsal brightness	Molecular Details of the Mutation
several candidate DIAE's associated with doisal Digithess	Experimental Evidence
Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-tit	
· · · · · · · · · · · · · · · · · · ·	Main Reference
Adaptive evolution of multiple traits through multiple mutations at a single gene. (2013) (https://pubmed.ncbi.nlm.nih.gov/23493712)	
	Authors
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advantage against visually hunting predators. Color variation in an admixed population suggests that this light Sand Hills phenotype is composed of multiple traits. We identified distinct

Linking a mutation to survival in wild mice. (2019) (https://pubmed.ncbi.nlm.nih.gov/30705186)

Mutation #4	
Presumptive Null	
No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)	
Molecular Type Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title)	
Aberration Type	
SNP (https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title) Molecular Details of the Mutation	
one candidate SNP associated with dorsal hue	
Experimental Evidence	
Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title) Main Reference	
Adaptive evolution of multiple traits through multiple mutations at a single gene. (2013) (https://pubmed.ncbi.nlm.nih.gov/23493712)	
Authors Linnen CR; Poh YP; Peterson BK; Barrett RD; Larson JG; Jensen JD; Hoekstra HE	
Linnen CR; Pon TP; Peterson DR; Darrett RD; Larson JO; Jensen JD; Hoekstra HE Abstract	
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Linking a mutation to survival in wild mice. (2019) (https://pubmed.ncbi.nlm.nih.gov/30705186)

Mutation #5 Presumptive Nul	.11
No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)	Ш
Molecular Type	e
Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title)	
Aberration Type	e
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Deletion^#gephebase-summary-title) Deletion Size	
1-9 bp	.e
Molecular Details of the Mutation	'n
Deletion in exon 2 leading to a Ser deletion causes causes lighter coat colour via changes in protein binding properties ; as demonstrated by transgenic mice with either Peromyscus alleles (Barrett et al. 2019)	
Experimental Evidence	:e
Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title)	
Main Reference	e
Adaptive evolution of multiple traits through multiple mutations at a single gene. (2013) (https://pubmed.ncbi.nlm.nih.gov/23493712) Authors	
Linnen CR; Poh YP; Peterson BK; Barrett RD; Larson JG; Jensen JD; Hoekstra HE	S
Abstract	ct
The identification of precise mutations is required for a complete understanding of the underlying molecular and evolutionary mechanisms driving adaptive phenotypic change. Using plasticine models in the field, we show that the light coat color of deer mice that recently colonized the light-colored soil of the Nebraska Sand Hills provides a strong selective	
advantage against visually bunting productors. Color variation in an admived population suggests that this light Sand Hills phoneture is compared of multiple traits. We identified distinct	

advantage against visually hunting predators. Color variation in an admixed population suggests that this light Sand Hills phenotype is composed of multiple traits. We identified distinct regions within the Agouti locus associated with each color trait and found that only haplotypes associated with light trait values have evidence of selection. Thus, local adaptation is the result of independent selection on many mutations within a single locus, each with a specific effect on an adaptive phenotype, thereby minimizing pleiotropic consequences.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

2 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^Agouti^/and+Taxon ID=^10042^/or+Gene Gephebase=^Agouti^/and+Taxon ID=^10042^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS