

GEPHE SUMMARY

Prdm9 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^Prdm9^#gephebase-summary-title)		Gephebase Gene	GP00000922	GepheID
Published		Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Trait #1	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=^Physiology^#gephebase-summary-title)	Trait
Hybrid incompatibility (F1 male sterility) (https://www.gephebase.org/search-criteria?/and+Trait=^Hybrid incompatibility (F1 male sterility)^#gephebase-summary-title)	Trait State in Taxon A
Mus musculus musculus	Trait State in Taxon B
Mus musculus domesticus	

Trait #2	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=^Physiology^#gephebase-summary-title)	Trait
Recombination rate (use of recombination hotspots) (https://www.gephebase.org/search-criteria?/and+Trait=^Recombination rate (use of recombination hotspots)^#gephebase-summary-title)	Trait State in Taxon A
-	Trait State in Taxon B
-	

Data not curated		Ancestral State		
Intraspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Intraspecific^#gephebase-summary-title)		Taxonomic Status		
Taxon A		Taxon B		
Mus musculus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Mus musculus^#gephebase-summary-title)	Latin Name	Mus musculus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Mus musculus^#gephebase-summary-title)	Latin Name	
house mouse	Common Name	house mouse	Common Name	
house mouse; mouse; Mus musculus Linnaeus, 1758; mice C57BL/6xCBA/CaJ hybrid	Synonyms	house mouse; mouse; Mus musculus Linnaeus, 1758; mice C57BL/6xCBA/CaJ hybrid	Synonyms	
species	Rank	species	Rank	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus	Lineage	
Mus () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 862507)	Parent	Mus () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 862507)	Parent	
10090 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 10090)	NCBI Taxonomy ID	10090 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 10090)	NCBI Taxonomy ID	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?		
No		Yes		
		Taxon B Description		
		Mus musculus domesticus - western European house mouse - taxid 10092		

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Mus musculus
Prdm9	Q96EQ9 (http://www.uniprot.org/uniprot/Q96EQ9)	
	Synonyms	GenebankID or UniProtKB
Hst1; Meisetz	BAO48048 (https://www.ncbi.nlm.nih.gov/nuccore/BAO48048)	
	String	
10090.ENSMUSP00000131871 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=10090.ENSMUSP00000131871)		
	Sequence Similarities	
Belongs to the class V-like SAM-binding methyltransferase superfamily.		
	GO - Molecular Function	
GO:0000977 : RNA polymerase II regulatory region sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0000977)		
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)		
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)		
GO:0044212 : transcription regulatory region DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0044212)		
GO:0031490 : chromatin DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0031490)		
GO:0042800 : histone methyltransferase activity (H3-K4 specific) (https://www.ebi.ac.uk/QuickGO/term/GO:0042800)		
GO:0018024 : histone-lysine N-methyltransferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0018024)		
GO:0010844 : recombination hotspot binding (https://www.ebi.ac.uk/QuickGO/term/GO:0010844)		
	GO - Biological Process	
GO:0045944 : positive regulation of transcription by RNA polymerase II (https://www.ebi.ac.uk/QuickGO/term/GO:0045944)		
GO:0007283 : spermatogenesis (https://www.ebi.ac.uk/QuickGO/term/GO:0007283)		
GO:0016584 : nucleosome positioning (https://www.ebi.ac.uk/QuickGO/term/GO:0016584)		
GO:0034968 : histone lysine methylation (https://www.ebi.ac.uk/QuickGO/term/GO:0034968)		
GO:0016571 : histone methylation (https://www.ebi.ac.uk/QuickGO/term/GO:0016571)		
GO:0006311 : meiotic gene conversion (https://www.ebi.ac.uk/QuickGO/term/GO:0006311)		
GO:0060903 : positive regulation of meiosis I (https://www.ebi.ac.uk/QuickGO/term/GO:0060903)		
GO:0010845 : positive regulation of reciprocal meiotic recombination (https://www.ebi.ac.uk/QuickGO/term/GO:0010845)		
	GO - Cellular Component	
GO:0005654 : nucleoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005654)		
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)		
GO:0005694 : chromosome (https://www.ebi.ac.uk/QuickGO/term/GO:0005694)		
		Presumptive Null
Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Unknown~#gephebase-summary-title)		
		Molecular Type
Unknown (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Unknown~#gephebase-summary-title)		
		Aberration Type
Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Unknown~#gephebase-summary-title)		
		Molecular Details of the Mutation
possible dosage difference (number of gene copies) interacting with an allele that affects post-transcriptional stability		
		Experimental Evidence
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping~#gephebase-summary-title)		
		Main Reference
A mouse speciation gene encodes a meiotic histone H3 methyltransferase. (2009) (https://pubmed.ncbi.nlm.nih.gov/19074312)		
		Authors
Mihola O; Trachtulec Z; Vlcek C; Schimenti JC; Forejt J		
		Abstract
Speciation genes restrict gene flow between the incipient species and related taxa. Three decades ago, we mapped a mammalian speciation gene, hybrid sterility 1 (Hst1), in the intersubspecific hybrids of house mouse. Here, we identify this gene as Prdm9, encoding a histone H3 lysine 4 trimethyltransferase. We rescued infertility in male hybrids with bacterial artificial chromosomes carrying Prdm9 from a strain with the “fertility” Hst1(f) allele. Sterile hybrids display down-regulated microrchidia 2B (Morc2b) and fail to compartmentalize gammaH2AX into the pachynema sex (XY) body. These defects, seen also in Prdm9-null mutants, are rescued by the Prdm9 transgene. Identification of a vertebrate hybrid sterility gene reveals a role for epigenetics in speciation and opens a window to a hybrid sterility gene network.		
		Additional References
PRDM9 is a major determinant of meiotic recombination hotspots in humans and mice. (2010) (https://pubmed.ncbi.nlm.nih.gov/20044539)		
Interallelic and intergenic incompatibilities of the Prdm9 (Hst1) gene in mouse hybrid sterility. (2012) (https://pubmed.ncbi.nlm.nih.gov/23133405)		

RELATED GEPHE

	Related Genes
No matches found.	

No matches found.

EXTERNAL LINKS

COMMENTS