The Jackson Laboratory

B6.129S7(Cg)-*Polg*^{tm1Prol}/J

Stock No: **017341** | PolgA^{D257A}

Congenic, Targeted Mutation

Live mice available in varying quantities. Ask Customer Service for details.

PLACE ORDER

Email Download PDF Help

polymerase γ gene (*Polg*), rendering the expressed mutant protein devoid of polymerase proofreading function in mitochondria. These mitochondrial mutator mice may be useful for studying the accumulation of mtDNA mutations in apoptosis, impaired energy metabolism, aging, and age-related conditions/diseases.

Donating Investigator

Tomas A Prolla, University of Wisconsin-Madison

READ MORE +

GENETIC OVERVIEW

Genetic Background

Generation

N16p+N13
(2021-01-04 00:00:00)

Polg^{tm1Prol}

Allele Type	Gene Symbol	Gene Name
Targeted (Not Specified)	*Polg*	polymerase (DNA directed), gamma

VIEW GENETICS

RESEARCH APPLICATIONS

Research Tools
Apoptosis Research
Reproductive Biology Research
Neurobiology Research
Sensorineural Research
Cancer Research
Cell Biology Research
Cardiovascular Research

VIEW ALL RESEARCH APPLICATION

BASE PRICE

Starting at:

$255.00 Domestic price for female 4-week

281.05 Domestic price for breeder pair

VIEW PRICE LIST

Details

Detailed Description

The Polg^{D257A} mutant allele has a mitochondrial DNA polymerase editing amino acid substitution, D257Am in the N-terminal "proofreading" exonuclease domain II of the DNA polymerase γ gene (*Polg*). The expressed mutant protein, Polg-D257A, lacks the polymerase proofreading function/mismatch repair mechanism in mitochondria (although mtDNA replication is not significantly altered). As such, homozygous Polg^{D257A} mice exhibit ~2500-fold increased rate of mtDNA mutation compared to wild-type mice. The accumulation of mtDNA mutations leads to increased apoptosis (particularly in cells/tissues that are metabolically active or have rapid cellular turnover). Homozygous (Polg$^{D257A/D257A}$) mice grossly demonstrate a premature aging phenotype beginning at ~nine months of age with alopecia, graying hair, impaired mobility and kyphosis, and die prematurely by ~13-15 months of age with severe anemia.

Homozygous mice exhibit several age-related defects, including thymic involution, weight loss, testicular atrophy, and cardiac hypertrophy/dysfunction, as well as progressive loss of skeletal muscle (sarcopenia), bone mass, circulating red blood cells, hearing, and intestinal crypts.

The testicular atrophy manifests around five months of age concurrent with depletion of spermatogonia.

The cardiovascular phenotype includes macrocytic anemia with abnormal erythroid maturation and megaloblastic changes, as well as profound defects in lymphopoiesis (characteristics of human myelodysplastic syndromes).

The hearing loss is attributed to cochlear hair cell degeneration (presbycusis), with onset around nine months of age.

Histologically, increased apoptosis in Polg$^{D257A/D257A}$ tissues is observable by three months of age in the duodenum, liver, testes, and thymus.

Heterozygous mice (Polg$^{D257A/+}$) also have an increased mutation burden, but no gross observable age-related phenotype, fertility problems, or other abnormalities are reported.

When Polg^{D257A} mice are bred with Ins2^{Akita} mice (Stock No. 003548), the double mutant offspring may be useful in studying appetite and diabetes.

Development

Control Suggestions

Selected References

Genetics

Polg^{tm1Prol}

Disease/Phenotype

Disease Terms

Research Areas By Phenotype

Mammalian Phenotype Terms by Genotype

References

Technical Support

CONTACT TECHNICAL SUPPORT

Genotyping Protocols
Standard PCR:Polg Alternate 1
Genotyping resources and troubleshooting

Breeding Considerations

Both heterozygous and homozygous mice have progressive accumulation of mtDNA point mutations. Considering that paternal mitochondrial DNA is actively eliminated following fertilization in mice, one can minimize the (undesirable) accumulation of these mutations in the germline by breeding wildtype females or C57BL/6J inbred females (Stock No. 000664) with heterozygous males. The preferred method of generating homozygous mice with only a single generation of mutation burden would be to breed a heterozygous female (that originated from a wildtype/C57BL/6J female x heterozygous male cross) with a carrier male.

For the live colony at The Jackson Laboratory, we maintain a primary colony by breeding C57BL/6J females with heterozygous males - from which [i] some offspring are used for the next generation of primary colony breeding (C57BL/6J female x heterozygous male) and [ii] some heterozygous offspring are bred together as a secondary colony. Heterozygous mice from the primary colony are made available for distribution. The homozygous offspring from the secondary colony are made available for distribution. No additional breeding from the secondary colony is performed. Researchers interested in the availability of heterozygous offspring from the secondary colony may inquire with JAX Mice & Services Customer Support.

Additional Breeding and Husbandry Support

Mating System

C57BL/6J (000664) x Heterozygote
Heterozygote x Heterozygote

Citation

When using the PolgA^{D257A} mouse strain in a publication, please cite the originating article(s) and include JAX stock #017341 in your Materials and Methods section.

Animal Health Reports

Facility Barrier Level Descriptions

AX12 (Maximum)

Pricing & Availability

Available

Live mice available in varying quantities. Ask Customer Service for details.

Domestic | **International**

Pricing effective for USA, Canada and Mexico shipping destinations

LIVE MOUSE

AGE	SEX	GENOTYPE	PRICE
4 weeks	Female	Heterozygous for Polg^{tm1Prol}	$255.00
	Male	Heterozygous for Polg^{tm1Prol}	$255.00
4 weeks	Female	Homozygous for Polg^{tm1Prol}	$255.00
	Male	Homozygous for Polg^{tm1Prol}	$255.00
4 weeks	Female	Wildtype for Polg^{tm1Prol}	$78.51
	Male	Wildtype for Polg^{tm1Prol}	$78.51
5 weeks	Female	Heterozygous for Polg^{tm1Prol}	$255.00

	SEX		
		Heterozygous for Polg^{tm1Prol}	$255.00
5 weeks	Female	Homozygous for Polg^{tm1Prol}	$255.00
	Male	Homozygous for Polg^{tm1Prol}	$255.00
5 weeks	Female	Wildtype for Polg^{tm1Prol}	$78.51
	Male	Wildtype for Polg^{tm1Prol}	$78.51
6 weeks	Female	Heterozygous for Polg^{tm1Prol}	$255.00
	Male	Heterozygous for Polg^{tm1Prol}	$255.00
6 weeks	Female	Homozygous for Polg^{tm1Prol}	$255.00
	Male	Homozygous for Polg^{tm1Prol}	$255.00
6 weeks	Female	Wildtype for Polg^{tm1Prol}	$78.51
	Male	Wildtype for Polg^{tm1Prol}	$78.51
7 weeks	Female	Heterozygous for Polg^{tm1Prol}	$255.00
	Male	Heterozygous for Polg^{tm1Prol}	$255.00
7 weeks	Female	Homozygous for Polg^{tm1Prol}	$255.00
	Male	Homozygous for Polg^{tm1Prol}	$255.00
7 weeks	Female	Wildtype for Polg^{tm1Prol}	$78.51
	Male	Wildtype for Polg^{tm1Prol}	$78.51
8 weeks	Female	Heterozygous for Polg^{tm1Prol}	$255.00
	Male	Heterozygous for Polg^{tm1Prol}	$255.00
8 weeks	Female	Homozygous for Polg^{tm1Prol}	$255.00
	Male	Homozygous for Polg^{tm1Prol}	$255.00
8 weeks	Female	Wildtype for Polg^{tm1Prol}	$78.51
	Male	Wildtype for Polg^{tm1Prol}	$78.51
9 weeks	Female	Heterozygous for Polg^{tm1Prol}	$255.00
	Male	Heterozygous for Polg^{tm1Prol}	$255.00
9 weeks	Female	Homozygous for Polg^{tm1Prol}	$255.00
	Male	Homozygous for Polg^{tm1Prol}	$255.00
9 weeks	Female	Wildtype for Polg^{tm1Prol}	$78.51
	Male	Wildtype for Polg^{tm1Prol}	$78.51
10 weeks	Female	Heterozygous for Polg^{tm1Prol}	$255.00
	Male	Heterozygous for Polg^{tm1Prol}	$255.00
10 weeks	Female	Homozygous for Polg^{tm1Prol}	$255.00
	Male	Homozygous for Polg^{tm1Prol}	$255.00
10 weeks	Female	Wildtype for Polg^{tm1Prol}	$78.51
	Male	Wildtype for Polg^{tm1Prol}	$78.51
11 weeks	Female	Heterozygous for Polg^{tm1Prol}	$255.00
		Homozygous for Polg^{tm1Prol}	

	SEX		
	Male	Heterozygous for Polg^{tm1Prol}	$255.00
11 weeks	Female	Homozygous for Polg^{tm1Prol}	$255.00
	Male	Homozygous for Polg^{tm1Prol}	$255.00
11 weeks	Female	Wildtype for Polg^{tm1Prol}	$78.51
	Male	Wildtype for Polg^{tm1Prol}	$78.51
12 weeks	Female	Heterozygous for Polg^{tm1Prol}	$255.00
	Male	Heterozygous for Polg^{tm1Prol}	$255.00
12 weeks	Female	Homozygous for Polg^{tm1Prol}	$255.00
	Male	Homozygous for Polg^{tm1Prol}	$255.00
12 weeks	Female	Wildtype for Polg^{tm1Prol}	$78.51
	Male	Wildtype for Polg^{tm1Prol}	$78.51

BREEDER PAIR

SEX	GENOTYPE	PRICE
Female	Heterozygous for Polg^{tm1Prol}	$510.00
Male	Heterozygous for Polg^{tm1Prol}	
Female	C57BL/6J (000664)	$281.05
Male	Heterozygous for Polg^{tm1Prol}	

RELATED PRODUCTS AND SERVICES

Frozen Mouse Embryo	B6.129S7(Cg)-Polg<tm1Prol>/J	$2595.00

PAYMENT TERMS AND CONDITIONS

Terms are granted by individual review and stated on the customer invoice(s) and account statement. These transactions are payable in U.S. currency within the granted terms. Payment for services, products, shipping containers, and shipping costs that are rendered are expected within the payment terms indicated on the invoice or stated by contract. Invoices and account balances in arrears of stated terms may result in The Jackson Laboratory pursuing collection activities including but not limited to outside agencies and court filings.

THE JACKSON LABORATORY'S GENOTYPE PROMISE

The Jackson Laboratory has rigorous genetic quality control and mutant gene genotyping programs to ensure the genetic background of JAX® Mice strains as well as the genotypes of strains with identified molecular mutations. JAX® Mice strains are only made available to researchers after meeting our standards. However, the phenotype of each strain may not be fully characterized and/or captured in the strain data sheets. **Therefore, we cannot guarantee a strain's phenotype will meet all expectations.** To ensure that JAX® Mice will meet the needs of individual research projects or when requesting a strain that is new to your research, we suggest ordering and performing tests on a small number of mice to determine suitability for your particular project. We do not guarantee breeding performance and therefore suggest that investigators order more than one breeding pair to avoid delays in their research.

Terms Of Use

TERMS OF USE

General Terms and Conditions

QUESTIONS ABOUT TERMS OF USE

ADDITIONAL USE RESTRICTIONS APPLY

Use of MICE by companies or for-profit entities requires a license prior to shipping.

LICENSING INFORMATION

Phone: 207-288-6470
Email: TechTran@jax.org

Related Strains

All

By Allele

By Gene

By Collection