

**BKS.Cg-Dock7<sup>m</sup> +/- Lepr<sup>db</sup>/J**

Stock No: 000642

 Congenic, Spontaneous Mutation

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## Also Known As: BKS db

This strain is used to model phases I to III of diabetes type II and obesity. Mice homozygous for the diabetes spontaneous mutation (*Lepr<sup>db</sup>*) manifest morbid obesity, chronic hyperglycemia, pancreatic beta cell atrophy and become hypoinsulinemic. Obesity starts at 3 to 4 weeks of age. Elevated plasma insulin begins at 10 to 14 days and elevated blood sugar at 4 to 8 weeks. Homozygous mice are polyphagic, polydipsic, and polyuric. The severity of disease on BKS background leads to uncontrolled rise in blood sugar, severe depletion of insulin-producing beta-cells of the pancreatic islets, peripheral neuropathy, myocardial disease and death by 10 months of age. Exogenous insulin fails to control blood glucose levels and gluconeogenic enzyme activity increases. Wound healing is delayed, and metabolic efficiency is increased.

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## GENETIC OVERVIEW

### Genetic Background

000662 C57BLKS/J

### Generation

[Contact Technical Support](#)  
(2018-07-27 00:00:00)

*Dock7<sup>m</sup>*

**Allele Type**

**Gene Symbol**

**Gene Name**

Spontaneous

*Dock7*

dedicator of cytokinesis 7

*Lepr<sup>db</sup>*

**Allele Type**

**Gene Symbol**

**Gene Name**

Spontaneous

*Lepr*

leptin receptor

V I E W G E N E T I C S

## RESEARCH APPLICATIONS

Diabetes and Obesity Research  
Internal/Organ Research  
Dermatology Research  
Immunology, Inflammation and Autoimmunity Research  
Reproductive Biology Research  
Mouse/Human Gene Homologs  
Metabolism Research  
Endocrine Deficiency Research

V I E W A L L R E S E A R C H A P P L I C A T I O N S

## BASE PRICE

Starting at:

\$99.79 Domestic price for female 4-week

V I E W P R I C E L I S T

### Details

#### Important Note

This strain is maintained with *Dock7<sup>m</sup>* and *Lepr<sup>db</sup>* in repulsion. Although these genes are tightly linked, there is a small possibility of recombination. The heterozygotes we distribute are presumed to be non-recombinant, but are untested.

#### Detailed Description

Mice homozygous for the diabetes spontaneous mutation (*Lepr<sup>db</sup>*) become identifiably obese around three to four weeks of

age. Elevations of plasma insulin begin at 10 to 14 days of age and of blood sugar at four to eight weeks. Homozygous mutant mice are polyphagic, polydipsic, and polyuric. The course of the disease is markedly influenced by genetic background. A number of features are observed on the C57BLKS background, including an uncontrolled rise in blood sugar, severe depletion of the insulin-producing beta-cells of the pancreatic islets, and death by 10 months of age. Exogenous insulin fails to control blood glucose levels and gluconeogenic enzyme activity increases. Peripheral neuropathy and myocardial disease are seen in C57BLKS-*Lepr<sup>db</sup>* homozygotes. Wound healing is delayed, and metabolic efficiency is increased. Female homozygotes exhibit decreased uterine and ovarian weights, decreased ovarian hormone production and hypercytopenia in follicular granulosa and endometrial epithelial tissue layers (Garris *et al.*, 2004, Garris *et al.*, 2004).

Although normal in body weight, blood glucose, and plasma insulin, heterozygotes (*Lepr<sup>db</sup>/+*) also have increased metabolic efficiency and can survive a prolonged fast longer than controls. Experiments involving destruction of the ventromedial nucleus of the hypothalamus suggest that *Lepr<sup>db</sup>* may cause a defect in the hypothalamus. Steroid sulfotransferase enzymes, aberrantly expressed in diabetic mice, interact with the *Lepr<sup>db</sup>* mutation as modifiers of gender differences in obesity-induced diabetes susceptibility. Because of the sterility of *Lepr<sup>db</sup>* homozygotes, the misty (*Dock7<sup>m</sup>*) mutation has been incorporated into stocks for maintenance of the diabetes mutation. The repulsion double heterozygote (*Dock7<sup>m</sup>/+ Lepr<sup>db</sup>/+*) facilitates identification of heterozygotes for breeding, while the coupling double heterozygote, (*Dock7<sup>m</sup> Lepr<sup>db</sup>/+*) allows identification of homozygotes before the phenotype becomes severe.

The recessive misty mutation causes a mild dilution of coat color and on certain backgrounds a white tail tip often accompanied by a belly spot. Melanocytes from *Dock7<sup>m</sup>/Dock7<sup>m</sup>* mice have a highly dendritic shape, show deficient proliferation in culture and have much more melanin content. Fewer melanoblasts are found in primary cultures from *Dock7<sup>m</sup>/Dock7<sup>m</sup>* mice than from wildtype controls. Between two and five weeks of age, *Dock7<sup>m</sup>/Dock7<sup>m</sup>* mice are smaller than controls. At 35 days of age they are shorter, weigh 15% less on average, and have less inguinal adipose mass than controls. Misty homozygotes completely lack brown fat. Although platelet count, serotonin content and ATP content are normal, *Dock7<sup>m</sup>/Dock7<sup>m</sup>* homozygotes have an increased bleed time and reduced platelet ADP levels. (Woolley 1941 and 1945; Truett *et al.* 1998; Sviderskaya *et al.* 1998.)

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### + Control Suggestions

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### + Selected References

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## - Genetics

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### + *Dock7<sup>m</sup>*

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### + *Lepr<sup>db</sup>*

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## - Disease/Phenotype

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### + Disease Terms

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### + Research Areas By Phenotype

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### + Mammalian Phenotype Terms by Genotype

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### + Phenotype Information

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Technical Support

CONTACT TECHNICAL SUPPORT

Genotyping Protocols

Restriction Enzyme Digest:[Lepr](#)

Pyrosequencing:[Lepr](#)

End Point Analysis:[Lepr](#)

Standard PCR:[Dock7](#)

Standard PCR:[Dock7](#)

End Point Analysis:[Dock7-Probe](#)

QPCR:[Dock7 qPCR](#)

QPCR:[Dock7 qPCR](#)

[Genotyping resources and troubleshooting](#)

Dietary Information

LabDiet® 5K52 formulation (6% fat)

Breeding Considerations

[This strain is a good breeder.](#)

Since both males and females homozygous for *Lepr<sup>db</sup>* are sterile, the closely linked coat color mutation, *m*, has been incorporated into stocks for maintenance of the *db* mutation. Breeding is performed by mating repulsion double heterozygotes, *Dock7<sup>m</sup> +/+ Lepr<sup>db</sup>*, which presumably yield 1/4 diabetics (black, obese at weaning) for studies, 1/2 wild-type repulsion double heterozygotes (black, lean) for further breeding, and 1/4 misty mice (grey, lean) that can be discarded. The risk of recombination between the *Dock7<sup>m</sup>* and *Lepr<sup>db</sup>* loci is only about 2%, recognizable in pups as young as 3 days old by absence of pigment in paws and tip of tail. Dietary restrictions can prolong life and carbohydrate-free, protein-enriched defined diets can diminish the significantly the severity of the disease.

Wean-aged mice may show signs of barbering that include whisker picking. Affected mice typically regrow whiskers within two weeks after weaning.

[Additional Breeding and Husbandry Support](#)

Appearance

*Lepr<sup>db</sup>*: black, fat

Related Genotype: *a/a + Lepr<sup>db</sup> /+ Lepr<sup>db</sup>*

*Dock7<sup>m</sup> Lepr<sup>db</sup>*: black, lean

Related Genotype: *a/a Dock7<sup>m</sup> +/+ Lepr<sup>db</sup>*

*Dock7<sup>m</sup>*: misty (grey), lean

Related Genotype: *a/a Dock7<sup>m</sup> +/Dock7<sup>m</sup> +*

Citation

When using the BKS.Cg-*Dock7<sup>m</sup> +/+ Lepr<sup>db</sup> /J* mouse strain in a publication, please [cite the originating article\(s\)](#) and include JAX stock #000642 in your Materials and Methods section.

Animal Health Reports

[Facility Barrier Level Descriptions](#)

 [AX8 \(Standard\)](#)

 [MP13 \(Maximum\)](#)

- AX5 (Standard)
- RB11 (Maximum)

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#### Live Mouse

AGE	SEX	GENOTYPE	PRICE
4 weeks	Female	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$99.79
	Male	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$100.03
4 weeks	Female	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$99.79
	Male	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$100.03
4 weeks	Female	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$132.12
	Male	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$141.40
5 weeks	Female	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$104.32
	Male	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$104.57
5 weeks	Female	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$104.32
	Male	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$104.57
5 weeks	Female	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$136.43
	Male	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$145.94
6 weeks	Female	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$108.90
	Male	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$109.17
6 weeks	Female	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$108.90
	Male	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$109.17
6 weeks	Female	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$140.81
	Male	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$150.50
7 weeks	Female	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$113.45
	Male	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$113.72
7 weeks	Female	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$113.45
	Male	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$117.34
7 weeks	Female	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$145.24

	SEX	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$154.94
8 weeks	Female	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$113.45
	Male	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$117.34
8 weeks	Female	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$117.91
	Male	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$118.19
8 weeks	Female	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$145.24
	Male	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$154.94
9 weeks	Female	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$121.59
	Male	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$121.87
9 weeks	Female	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$121.59
	Male	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$121.87
9 weeks	Female	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$149.50
	Male	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$159.68
10 weeks	Female	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$126.18
	Male	Heterozygous for Dock7 <sup>m</sup> Heterozygous for Lepr <sup>db</sup>	\$126.48
10 weeks	Female	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$126.18
	Male	Homozygous for Dock7 <sup>m</sup> , Wildtype for Lepr <sup>db</sup>	\$126.48
10 weeks	Female	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$153.87
	Male	Wildtype for Dock7 <sup>m</sup> , Homozygous for Lepr <sup>db</sup>	\$164.18

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