Hnf1a Cas9-KO Strategy

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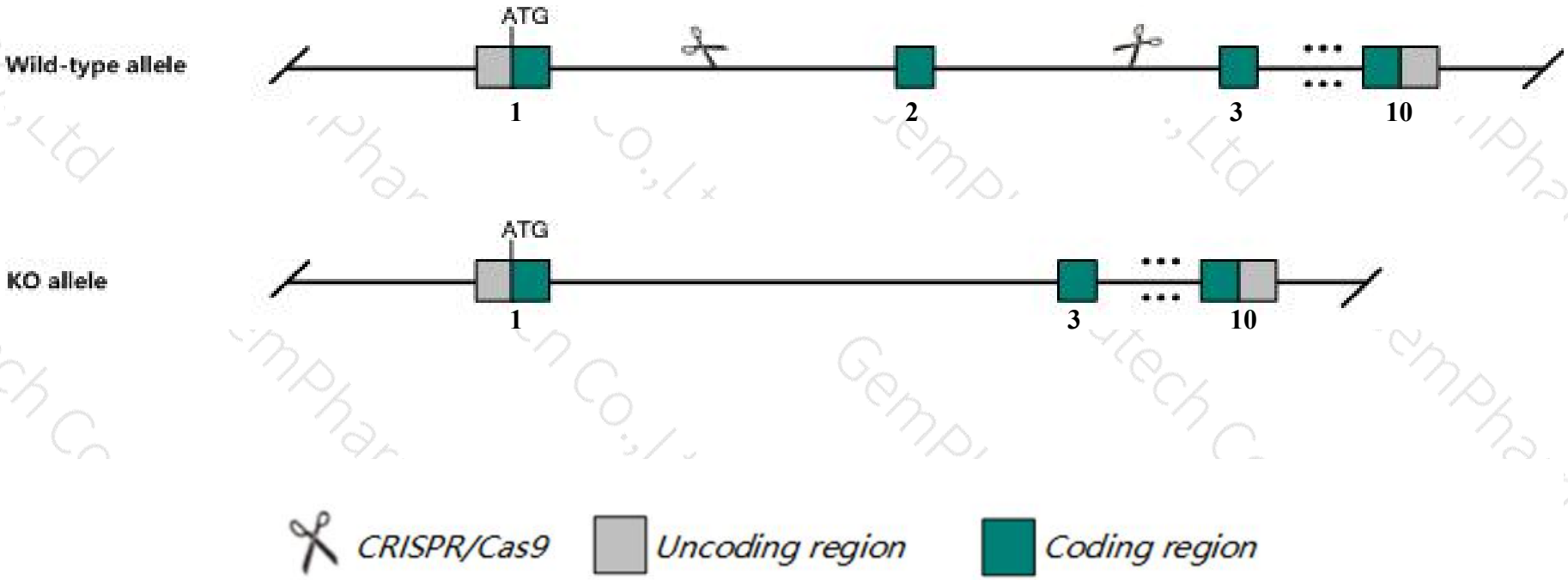
Design Date:2019-8-12

Project Overview

Project Name	***Hnf1a***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Hnf1a* gene. The schematic diagram is as follows:



Technical routes

➢ The *Hnf1a* gene has 4 transcripts. According to the structure of *Hnf1a* gene, exon2 of *Hnf1a-201* (ENSMUST00000031535.11) transcript is recommended as the knockout region.The region contains 200bp coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Hnf1a* gene. The brief process is as follows: CRISPR/Cas9 system

Notice

- According to the existing MGI data,Most homozygous null mutants die at 3-6 weeks from progressive wasting syndrome, liver and renal dysfunction and type II diabetes. Mutants have little or no phenylalanine hydroxylase, albumin, alpha 1-antitrypsin and secreted insulin.
- Transcript *Hnf1a*-203&204 may not be affected.
- The knockout region is near to the N-terminal of *Hnf1aos1* gene,this strategy may influence the regulatory function of the N-terminal of *Hnf1aos1* gene.
- The *Hnf1a* gene is located on the Chr5. If the knockout mice are crossed with other mice strains to obtain double gene positive homozygous mouse offspring, please avoid the two genes on the same chromosome.
- This Strategy is designed based on genetic information in existing databases.Due to the complexity of biological processes, all risk of the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

Gene information（NCBI）

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Hnf1a HNF1 homeobox A [Mus musculus (house mouse)]

Gene ID: 21405, updated on 20-Mar-2019

Summary

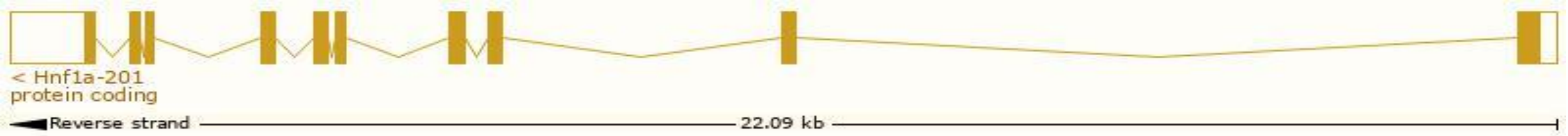
Official Symbol	Hnf1a provided by MGI
Official Full Name	HNF1 homeobox A provided by MGI
Primary source	MGI:MGI:98504
See related	Ensembl:ENSMUSG00000029556
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	AI323641, HNF1, HNF1-alpha, HNF1[a], Hnf-1, Hnf1alpha, LFB1, Tcf-1, Tcf1
Summary	This gene encodes a hepatic transcription factor. The encoded protein is not a member of the T-cell factor family, and is distinct from T-cell specific transcription factor 7 which has also been referred to by the symbol Tcf1. [provided by RefSeq, Jul 2008]
Expression	Biased expression in small intestine adult (RPKM 18.4), duodenum adult (RPKM 16.8) and 10 other tissues See more
Orthologs	human all

Transcript information（Ensembl）

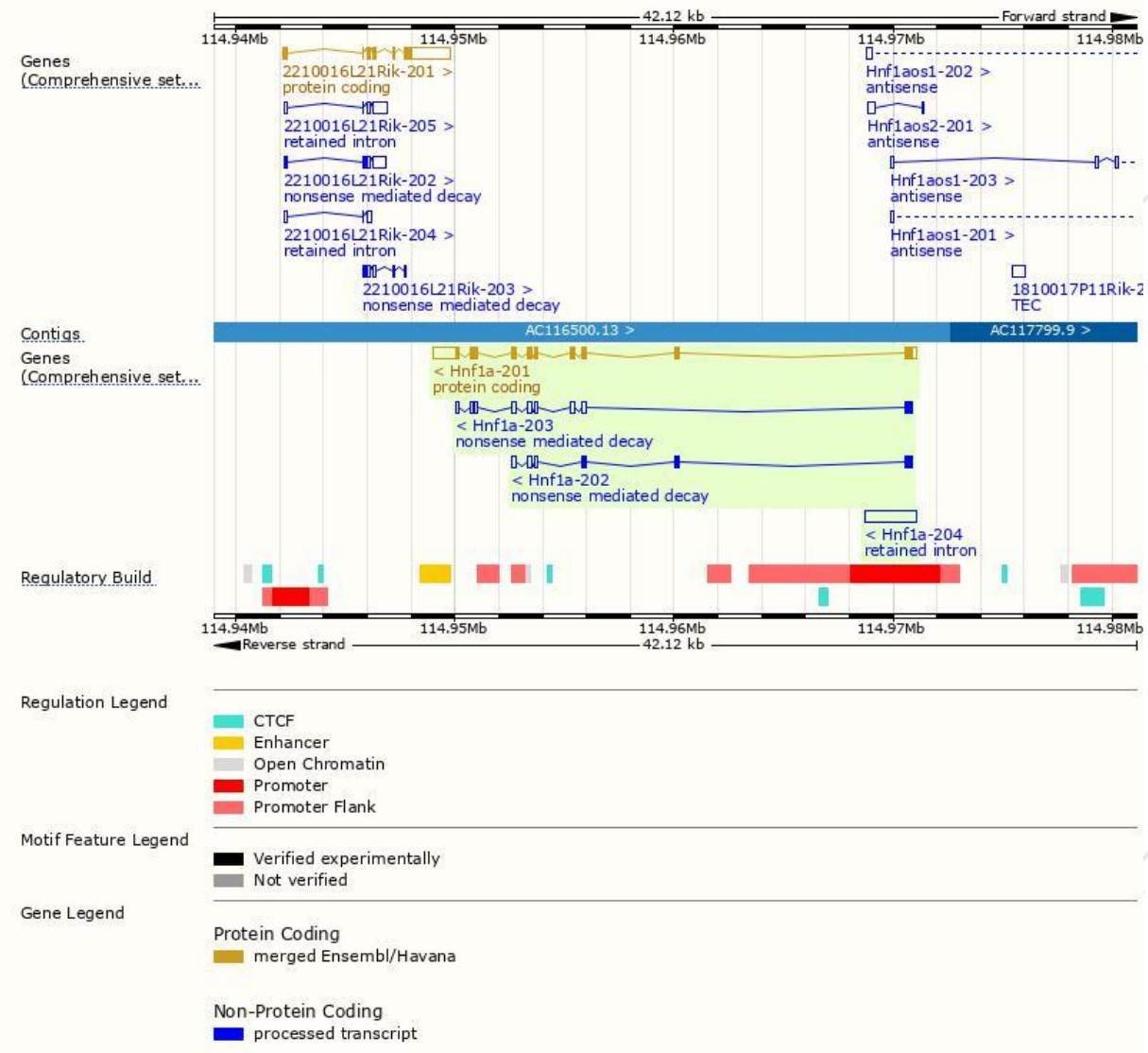
The gene has 4 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Hnf1a-201	ENSMUST00000031535.11	3191	628aa	Protein coding	CCDS19577	P22361	TSL:1 GENCODE basic APPRIS P1
Hnf1a-203	ENSMUST00000176911.7	1687	119aa	Nonsense mediated decay	-	H3BKV2	TSL:5
Hnf1a-202	ENSMUST00000176550.1	1256	247aa	Nonsense mediated decay	-	H3BL72	TSL:5
Hnf1a-204	ENSMUST00000184027.1	2390	No protein	Retained intron	-	-	TSL:NA

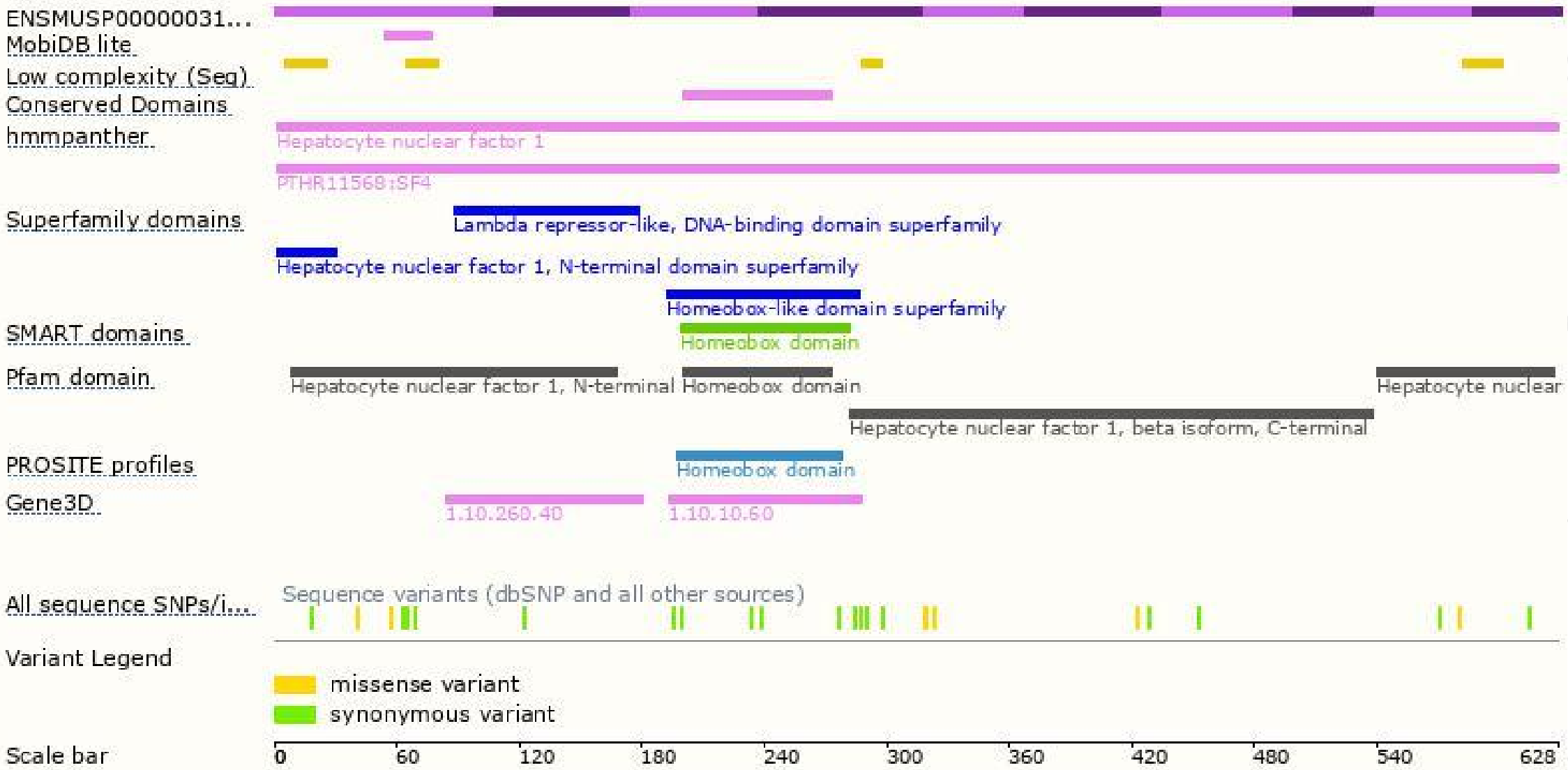
The strategy is based on the design of *Hnf1a-201* transcript,The transcription is shown below



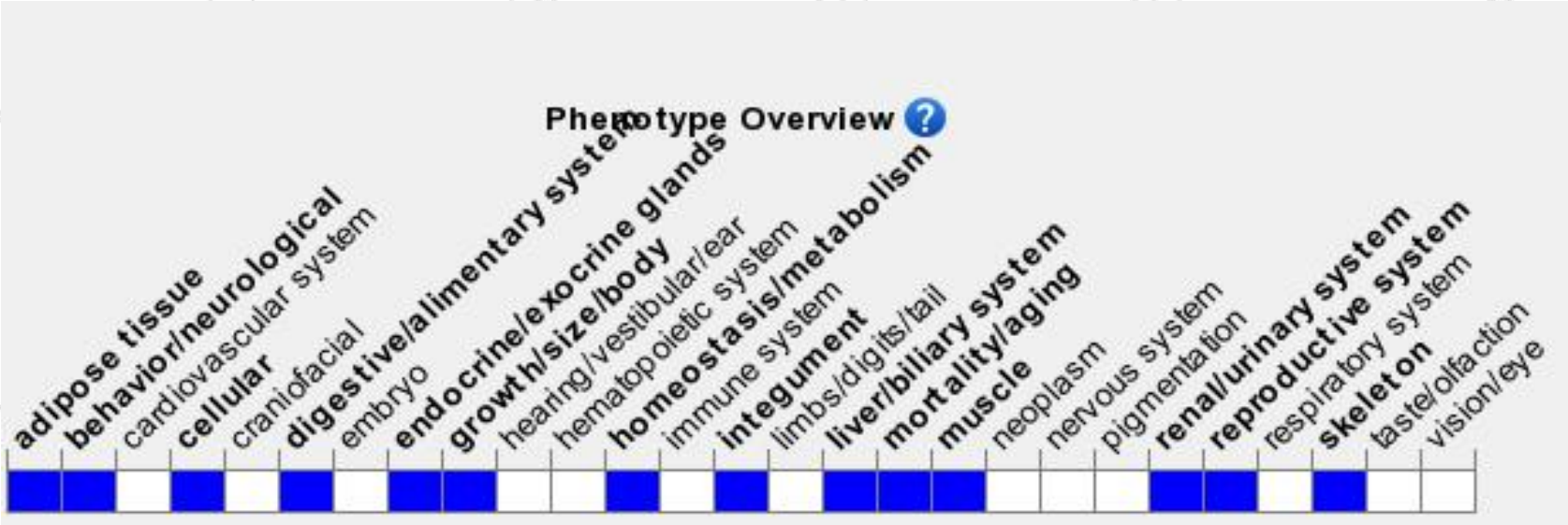
Genomic location distribution



Protein domain



Mouse phenotype description(MGI)



Phenotypes affected by the gene are marked in blue.Data quoted from MGI database(http://www.informatics.jax.org/).

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If you have any questions, you are welcome to inquire.

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