

# ***Lhx4 Cas9-CKO Strategy***

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**Reviewer: Xiaojing Li**

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# Project Overview

**Project Name**

***Lhx4***

**Project type**

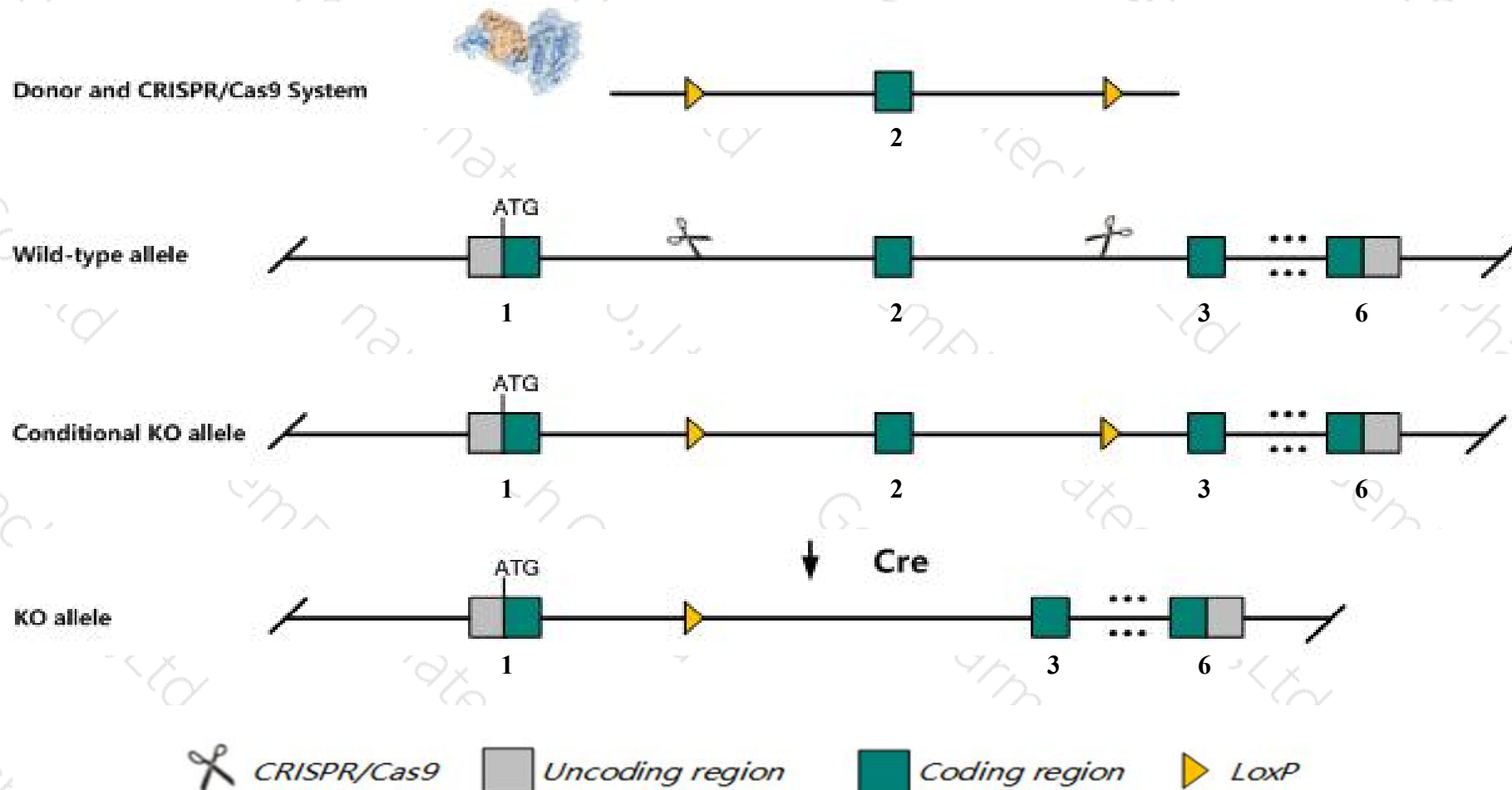
**Cas9-CKO**

**Strain background**

**C57BL/6JGpt**

# Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Lhx4* gene. The schematic diagram is as follows:



# Technical routes

- The *Lhx4* gene has 2 transcripts. According to the structure of *Lhx4* gene, exon2 of *Lhx4-201*(ENSMUST00000027740.13) transcript is recommended as the knockout region. The region contains 172bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Lhx4* gene. The brief process is as follows: gRNA was transcribed in vitro, donor was constructed. Cas9, gRNA and Donor were microinjected into the fertilized eggs of C57BL/6JGpt mice. Fertilized eggs were transplanted to obtain positive F0 mice which were confirmed by PCR and sequencing. A stable F1 generation mouse model was obtained by mating positive F0 generation mice with C57BL/6JGpt mice.
- The flox mice will be knocked out after mating with mice expressing Cre recombinase, resulting in the loss of function of the target gene in specific tissues and cell types.

# Notice

- According to the existing MGI data, mutations in this gene result in abnormal lung development and neonatal lethality.
- The *Lhx4* gene is located on the Chr1. 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.



# Gene information (NCBI)

## Lhx4 LIM homeobox protein 4 [Mus musculus (house mouse)]

Gene ID: 16872, updated on 13-Mar-2020

### Summary

**Official Symbol** Lhx4 provided by [MGI](#)

**Official Full Name** LIM homeobox protein 4 provided by [MGI](#)

**Primary source** [MGI:MGI:101776](#)

**See related** [Ensembl:ENSMUSG00000026468](#)

**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** A330062J17Rik, Gsh-4, Gsh4

**Expression** Low expression observed in reference dataset [See more](#)

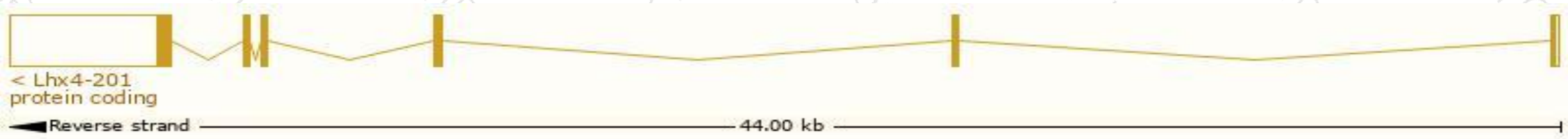
**Orthologs** [human](#) [all](#)

# Transcript information (Ensembl)

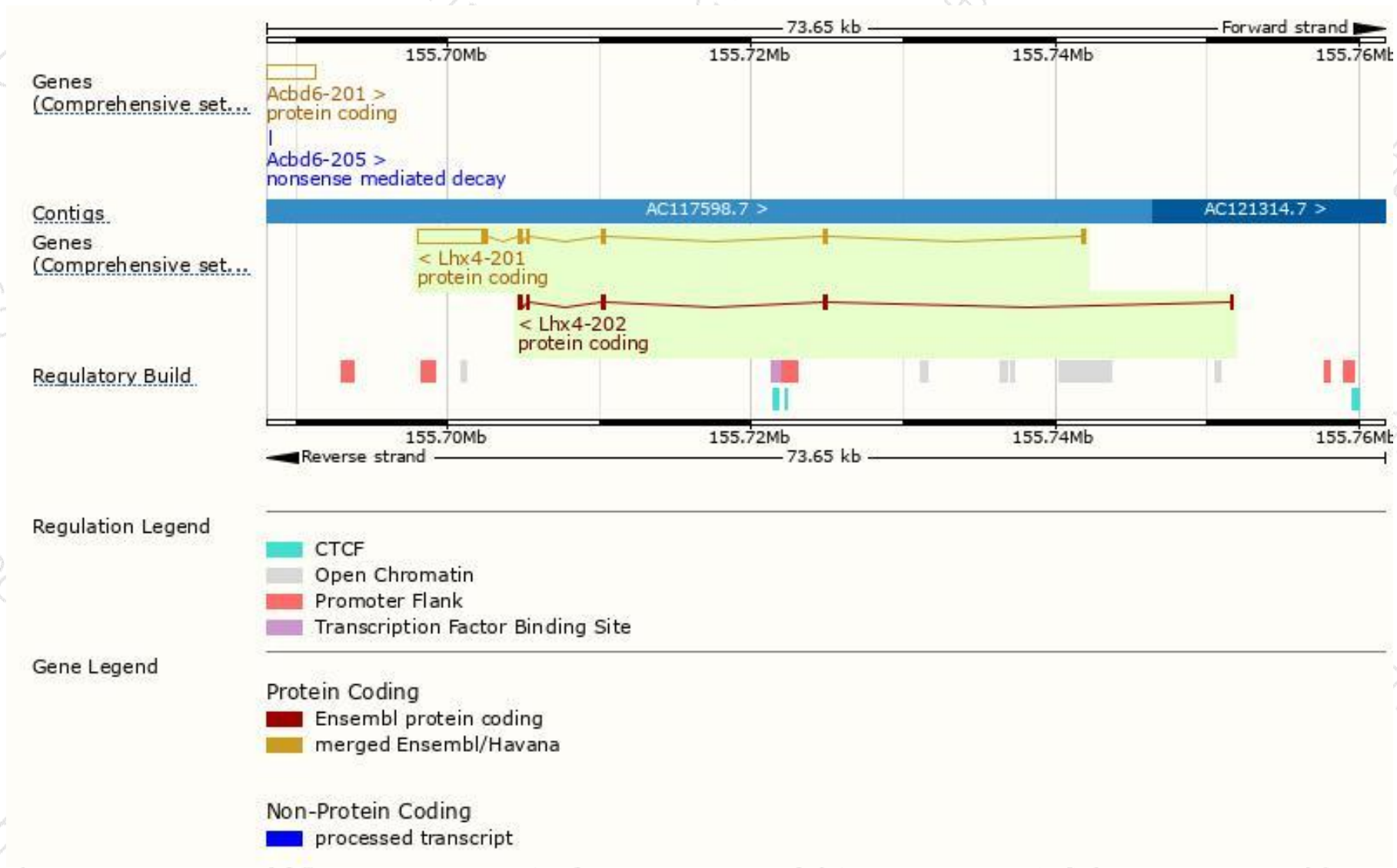
The gene has 2 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Lhx4-201	<a href="#">ENSMUST00000027740.13</a>	5514	<a href="#">390aa</a>	Protein coding	<a href="#">CCDS48399</a>	<a href="#">P53776</a>	TSL:1 GENCODE basic APPRIS is a system to annotate alternatively spliced transcripts based on a range of computational methods to identify the most functionally important transcript(s) of a gene. APPRIS P1
Lhx4-202	<a href="#">ENSMUST00000195275.1</a>	928	<a href="#">223aa</a>	Protein coding	-	<a href="#">A0A0A6YWR5</a>	CDS 3' incomplete TSL:5

The strategy is based on the design of *Lhx4-201* transcript,the transcription is shown below:



# Genomic location distribution





# Protein domain

ENSMUSP00000027...

[PDB-ENSP mappings](#)

[MobiDB lite](#)

[Low complexity \(Seg\)](#)

[Superfamily](#)

[SMART](#)

[Pfam](#)

[PROSITE profiles](#)

[PROSITE patterns](#)

[PANTHER](#)

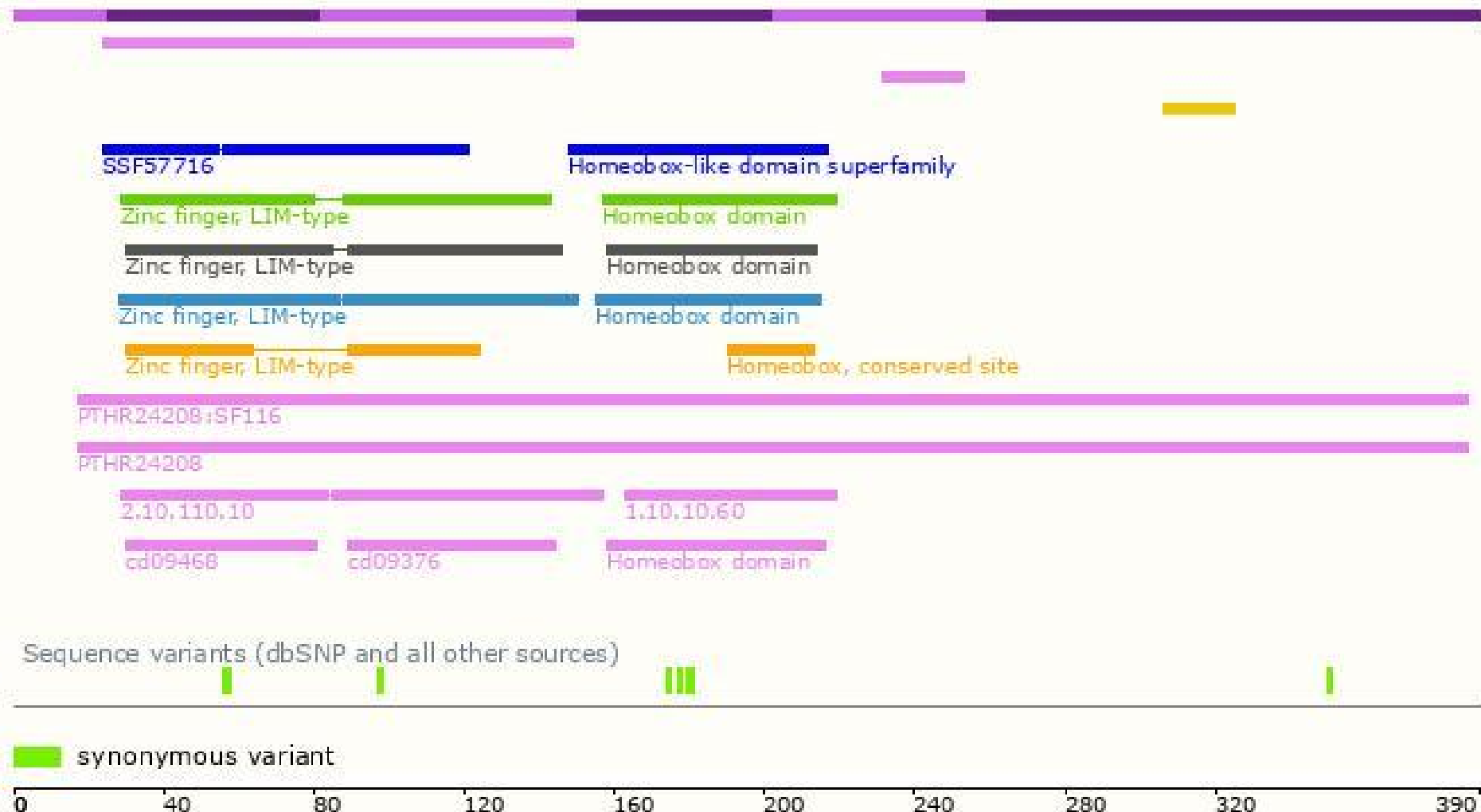
[Gene3D](#)

[CDD](#)

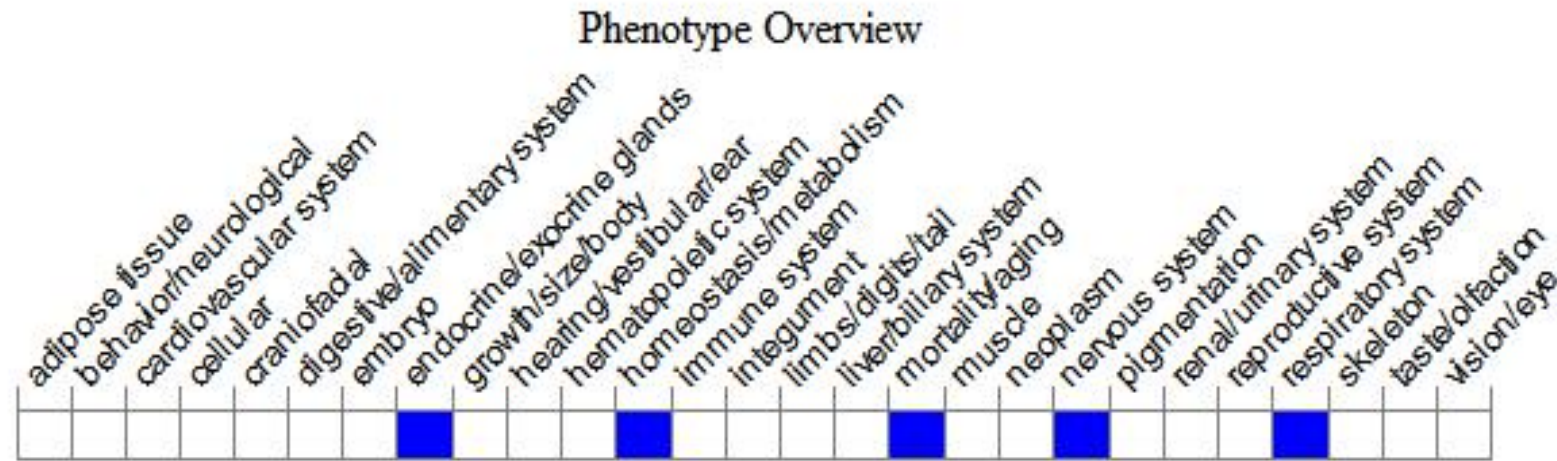
[All sequence SNPs/i...](#)

Variant Legend

Scale bar



# Mouse phenotype description(MGI)



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

According to the existing MGI data, mutations in this gene result in abnormal lung development and neonatal lethality.

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

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