

# *Atf3* Cas9-KO Strategy

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**Reviewer:**

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**Design Date:**

**2018-11-5**

# Project Overview

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**Project Name**

*Atf3*

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**Project type**

**Cas9-KO**

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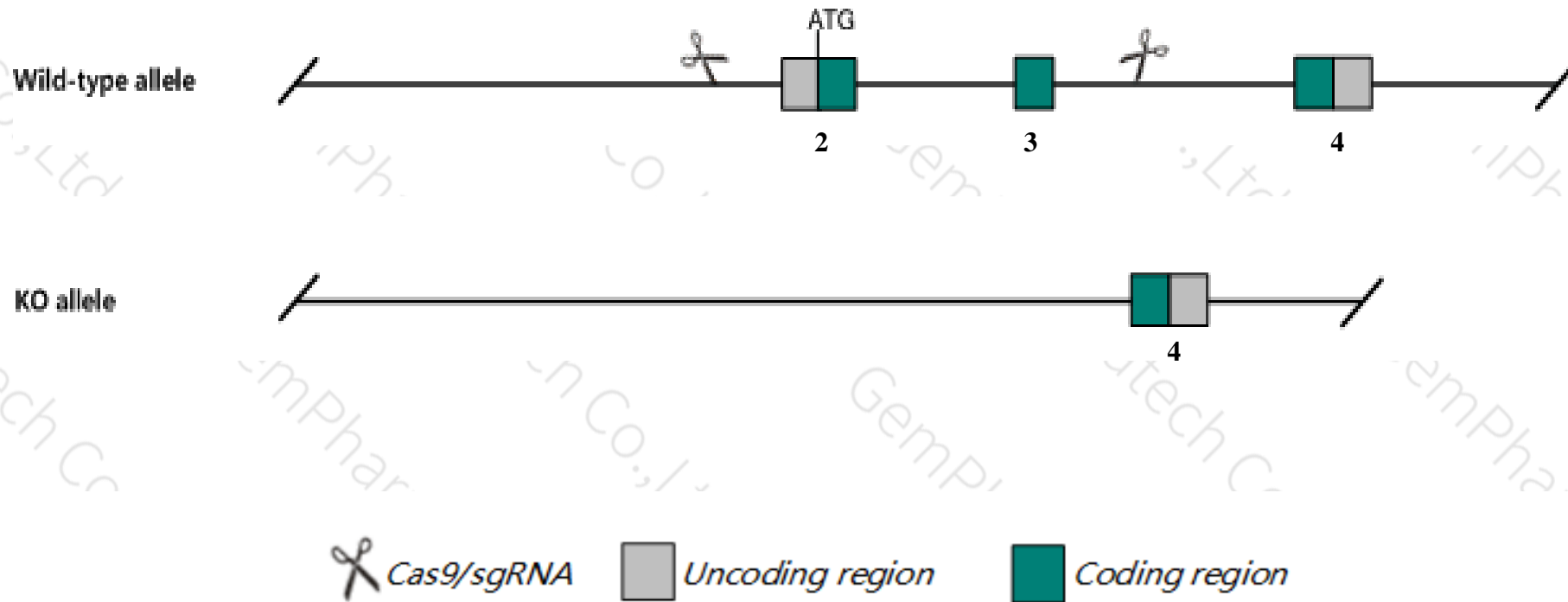
**Strain background**

**C57BL/6JGpt**

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# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Atf3* gene. The schematic diagram is as follows:



- The *Atf3* gene has 3 transcripts. According to the structure of *Atf3* gene, exon2-exon3 of *Atf3*-201(ENSMUST00000027941.13) transcript is recommended as the knockout region. The region contains start codon ATG. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Atf3* gene. The brief process is as follows: sgRNA was transcribed in vitro. Cas9 and sgRNA 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.

- According to the existing MGI data, homozygous null mice display enhanced allergen-induced airway hyperresponsiveness, pulmonary eosinophilia, and chemokine and Th2 cytokine responses in lung tissue and lung-derived CD4+ lymphocytes. Primary pancreatic islets are partially protected from cytokine- or nitric oxide-induced apoptosis.
- The *Atf3* 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 the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

# Gene information (NCBI)

## Atf3 activating transcription factor 3 [Mus musculus (house mouse)]

Gene ID: 11910, updated on 13-Mar-2020

### Summary

**Official Symbol** Atf3 provided by [MGI](#)

**Official Full Name** activating transcription factor 3 provided by [MGI](#)

**Primary source** [MGI:MGI:109384](#)

**See related** [Ensembl:ENSMUSG00000026628](#)

**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** LRG-21

**Expression** Broad expression in small intestine adult (RPKM 10.5), large intestine adult (RPKM 10.2) and 19 other tissues [See more](#)

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

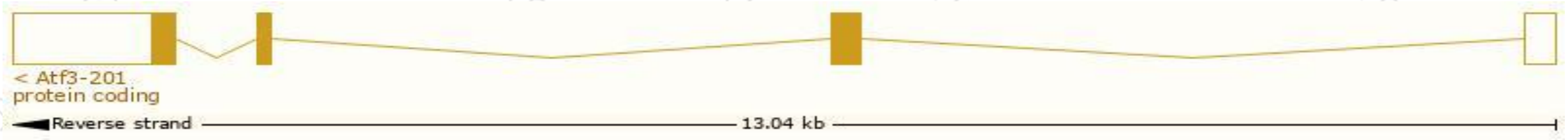


# Transcript information (Ensembl)

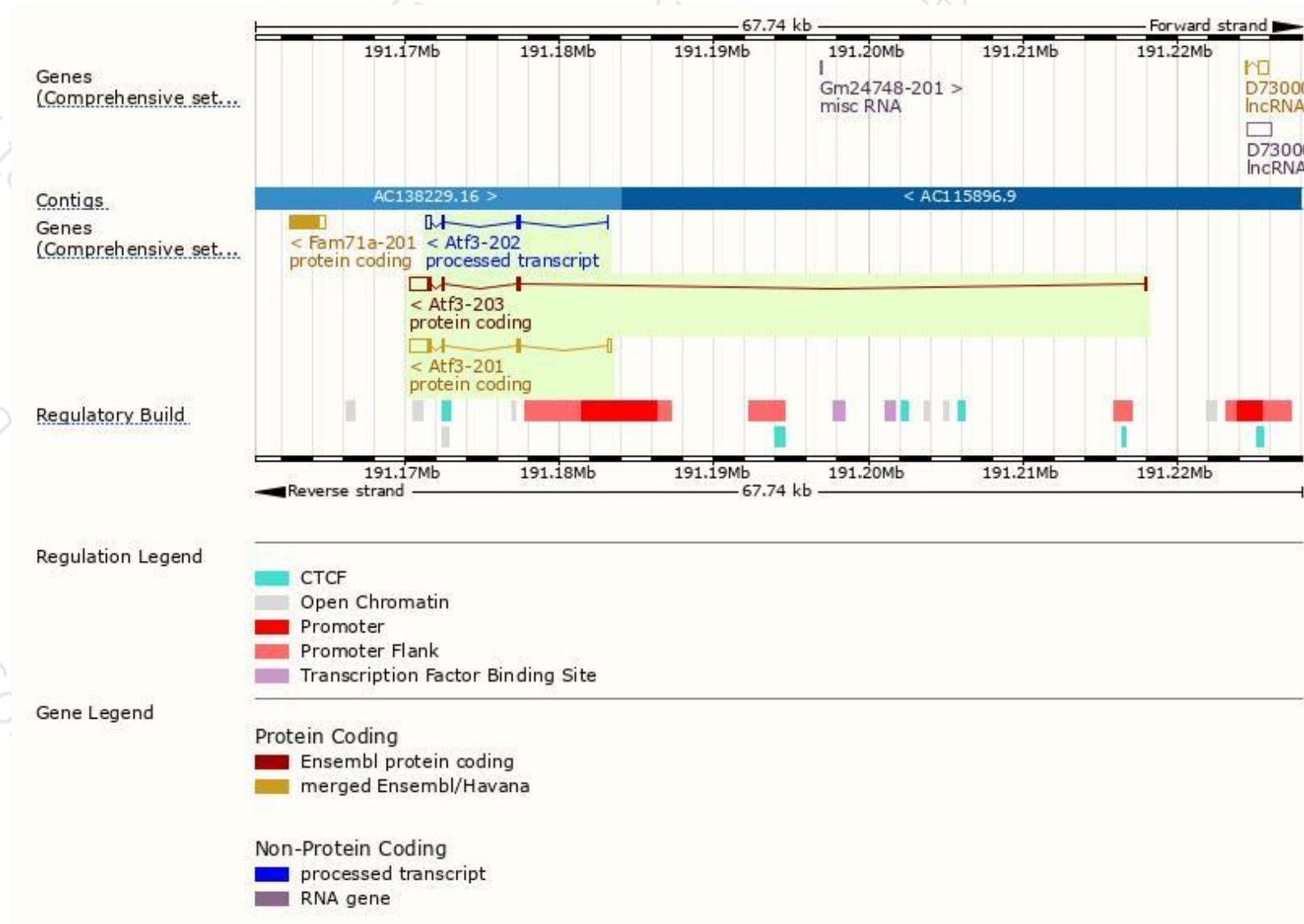
The gene has 3 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Atf3-201	<a href="#">ENSMUST00000027941.13</a>	1984	<a href="#">181aa</a>	Protein coding	<a href="#">CCDS15616</a>	<a href="#">Q4FJW1 Q60765</a>	TSL:1 GENCODE basic APPRIS P1
Atf3-203	<a href="#">ENSMUST00000195117.1</a>	1906	<a href="#">181aa</a>	Protein coding	<a href="#">CCDS15616</a>	<a href="#">Q4FJW1 Q60765</a>	TSL:1 GENCODE basic APPRIS P1
Atf3-202	<a href="#">ENSMUST00000131854.1</a>	517	No protein	Processed transcript	-	-	TSL:1

The strategy is based on the design of *Atf3-201* transcript,the transcription is shown below:

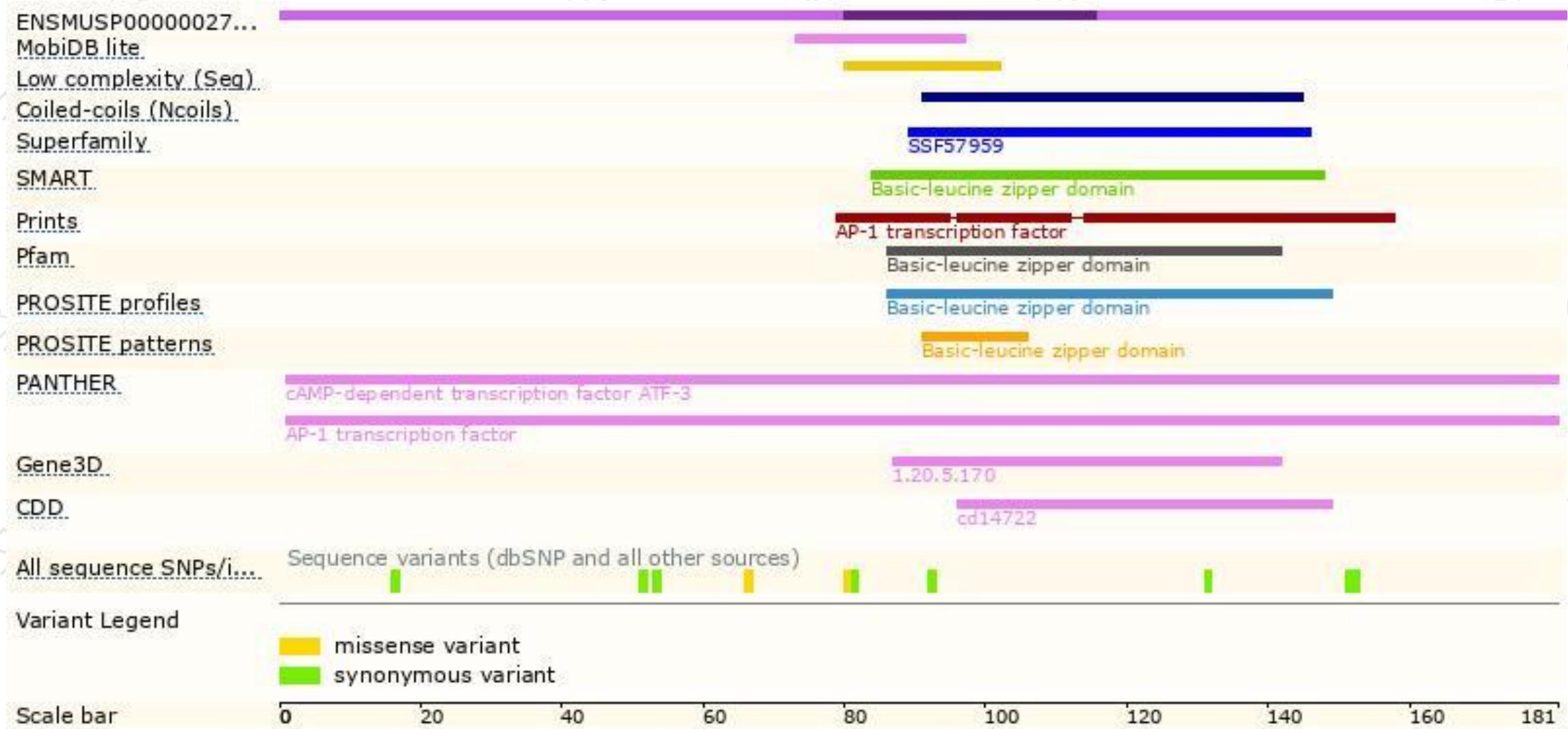


# Genomic location distribution

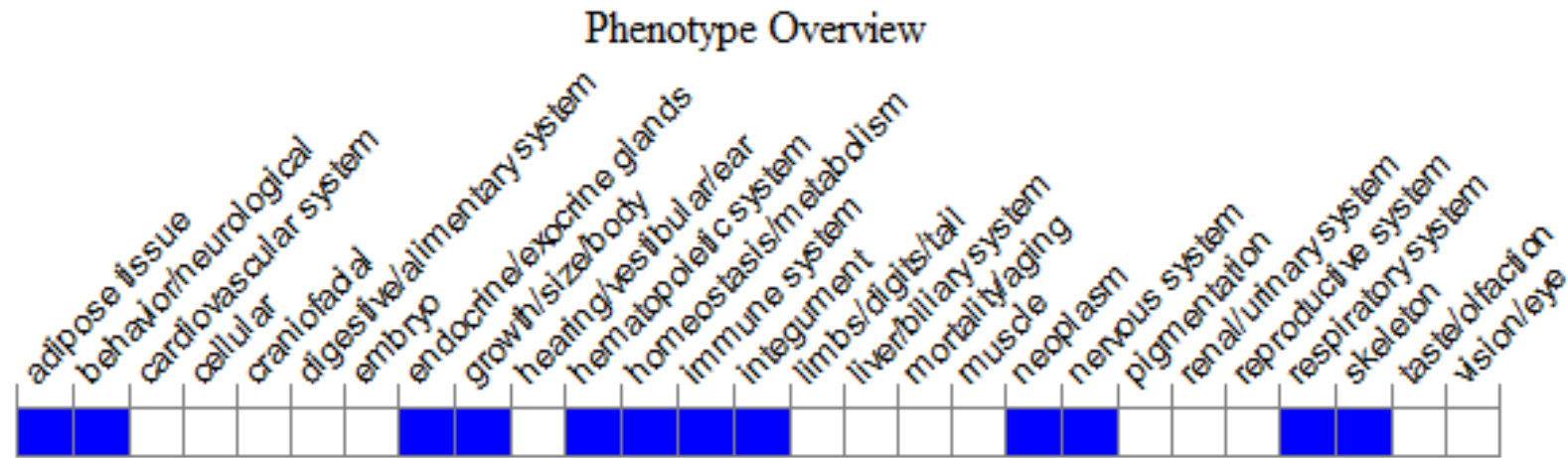




# Protein domain



# Mouse phenotype description(MGI )



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

According to the existing MGI data, homozygous null mice display enhanced allergen-induced airway hyperresponsiveness, pulmonary eosinophilia, and chemokine and Th2 cytokine responses in lung tissue and lung-derived CD4<sup>+</sup> lymphocytes. Primary pancreatic islets are partially protected from cytokine- or nitric oxide-induced apoptosis.

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

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