Atf3 Cas9-CKO Strategy

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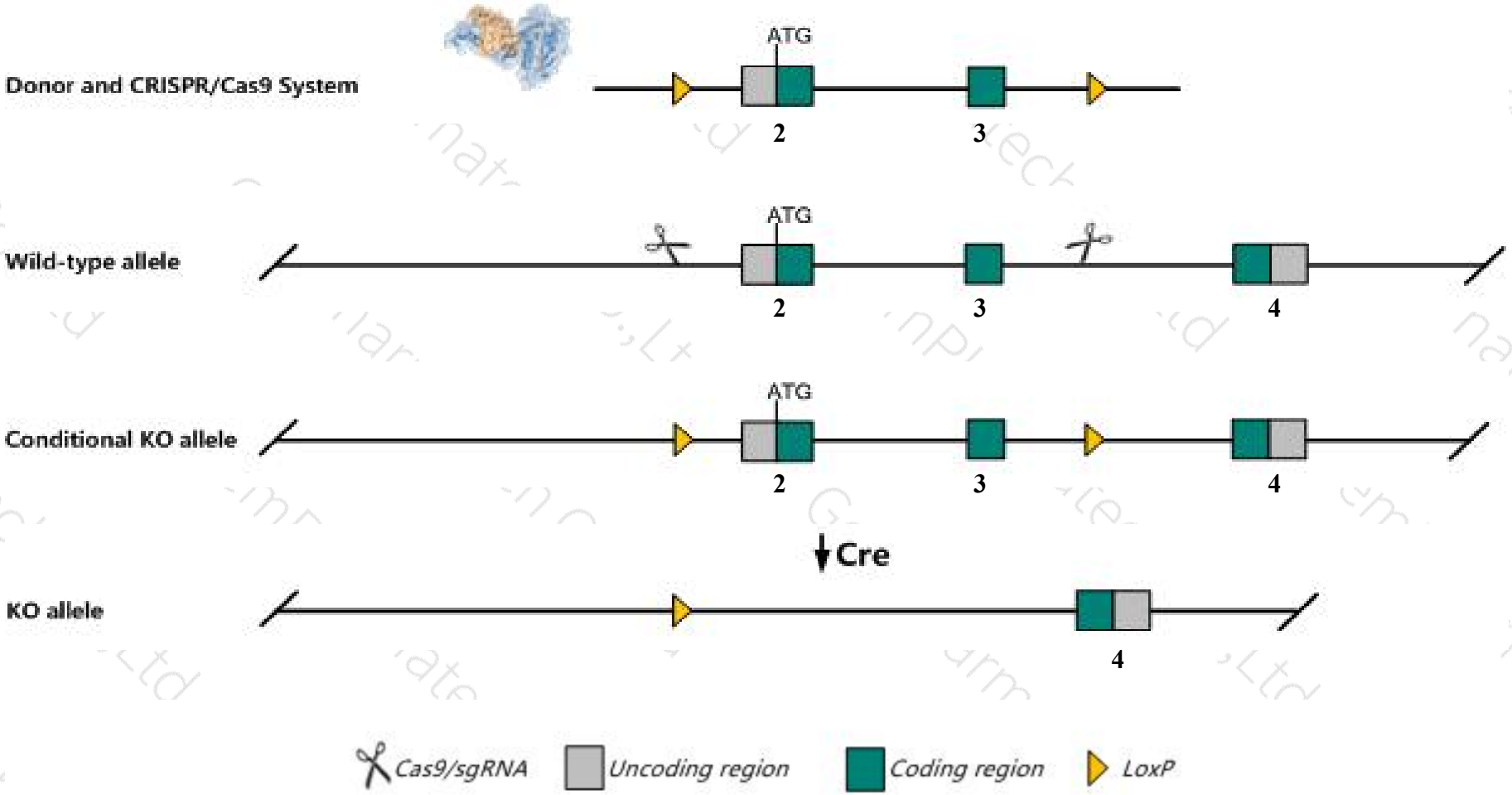
Project Overview

Project Name	***Atf3***
Project type	**Cas9-CKO**
Strain background	**C57BL/6JGpt**

Conditional Knockout strategy

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



Technical routes

➢ 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, donor vector was constructed.Cas9, sgRNA 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 was 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,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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information （NCBI）

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

Gene ID: 11910, updated on 31-Jan-2019

Summary

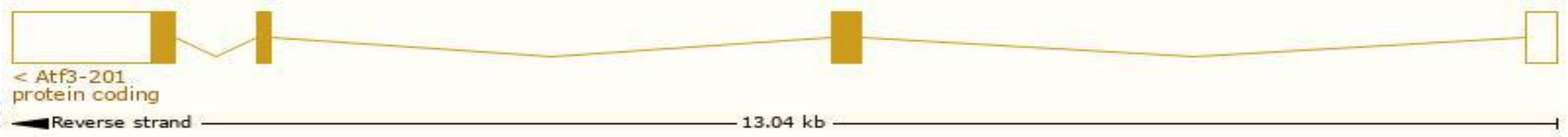
Official Symbol	Atf3 provided by MGI
Official Full Name	activating transcription factor 3 provided by MGI
Primary source	MGI:MGI:109384
See related	Ensembl:ENSMUSG00000026628
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; 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）

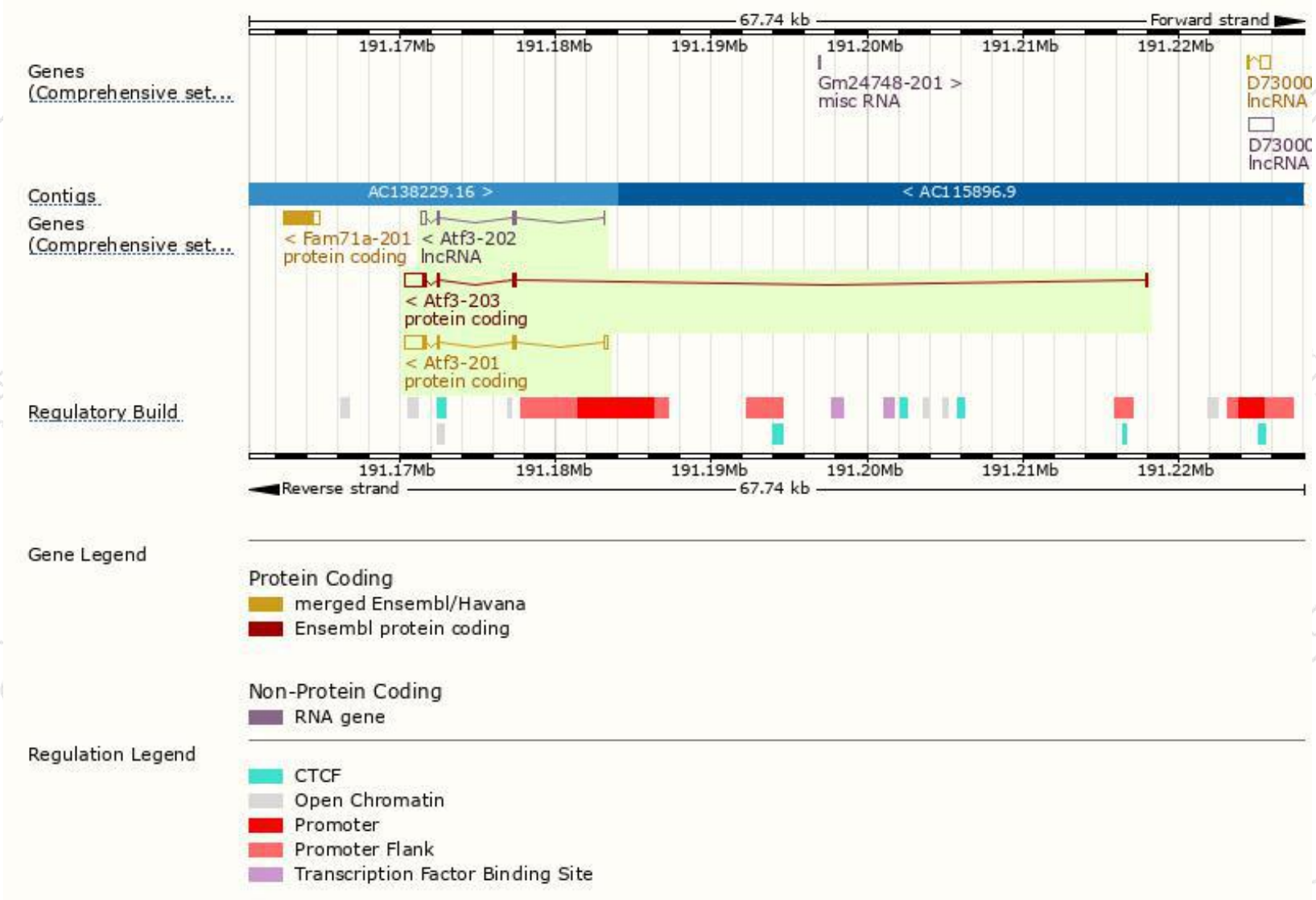
The gene has 3 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Atf3-201	ENSMUST00000027941.13	1984	181aa	Protein coding	CCDS15616	Q4FJW1 Q60765	TSL:1 GENCODE basic APPRIS P1
Atf3-203	ENSMUST00000195117.1	1906	181aa	Protein coding	CCDS15616	Q4FJW1 Q60765	TSL:1 GENCODE basic APPRIS P1
Atf3-202	ENSMUST00000131854.1	517	No protein	lncRNA	-	-	TSL:1

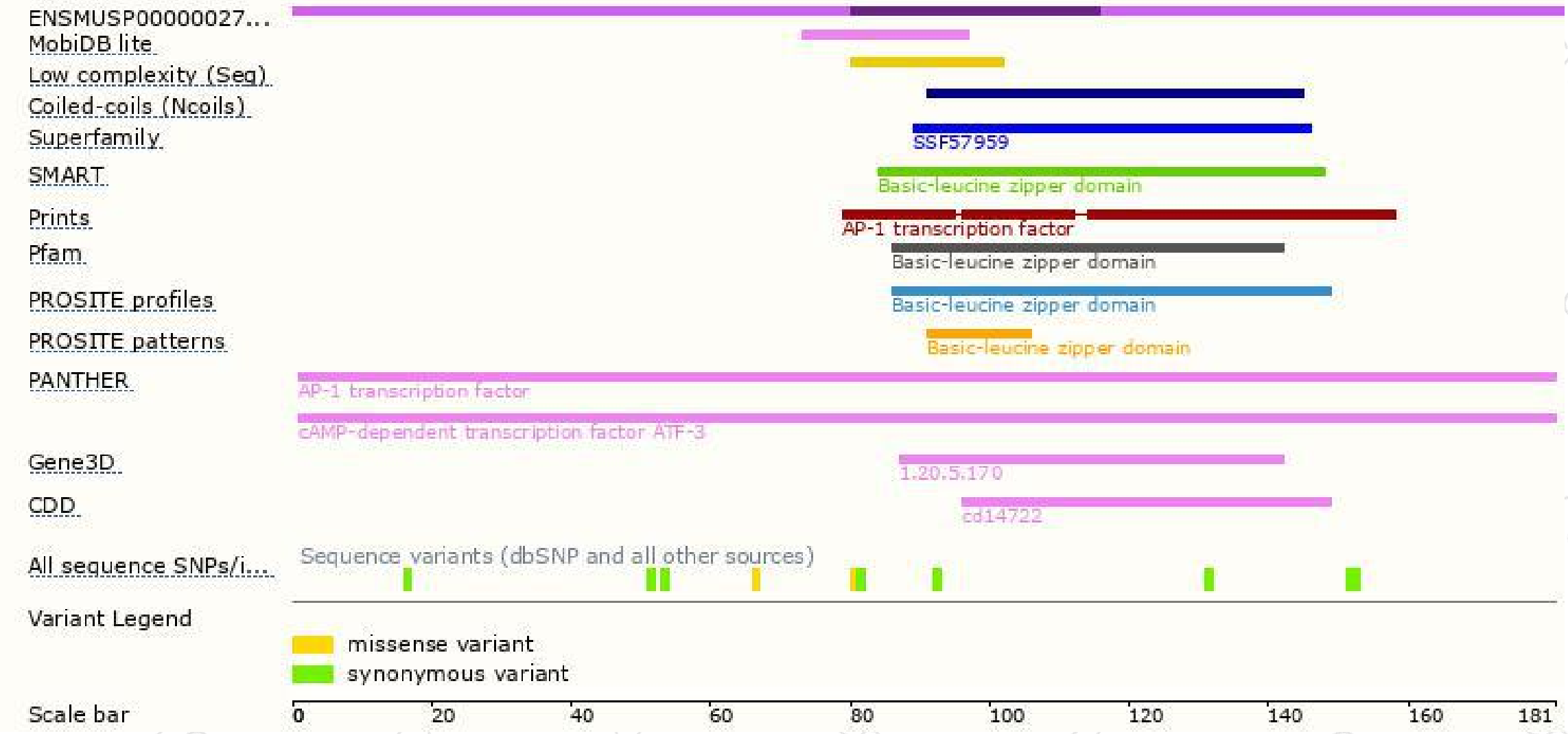
The strategy is based on the design of *Atf3-201* transcript,The transcription is shown below



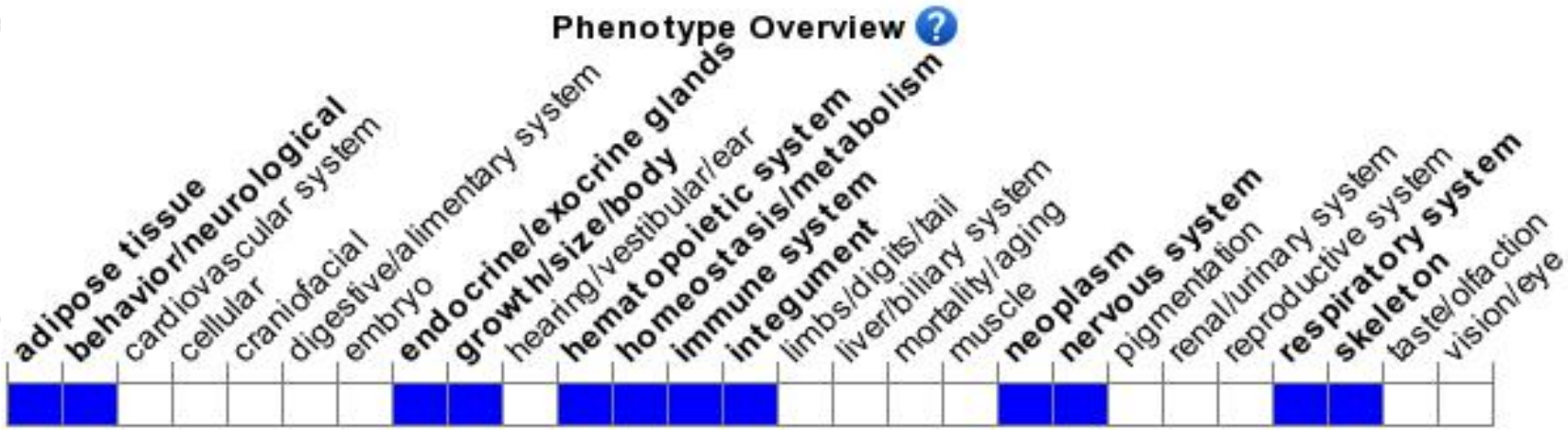
Genomic location distribution



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+ lymphocytes. Primary pancreatic islets are partially protected from cytokine- or nitric oxide-induced apoptosis.

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

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