

Serpine2 Cas9-CKO Strategy

Designer: Jiayuan Yao

Reviewer: Shanhong Tao

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Project Overview

Project Name

Serpine2

Project type

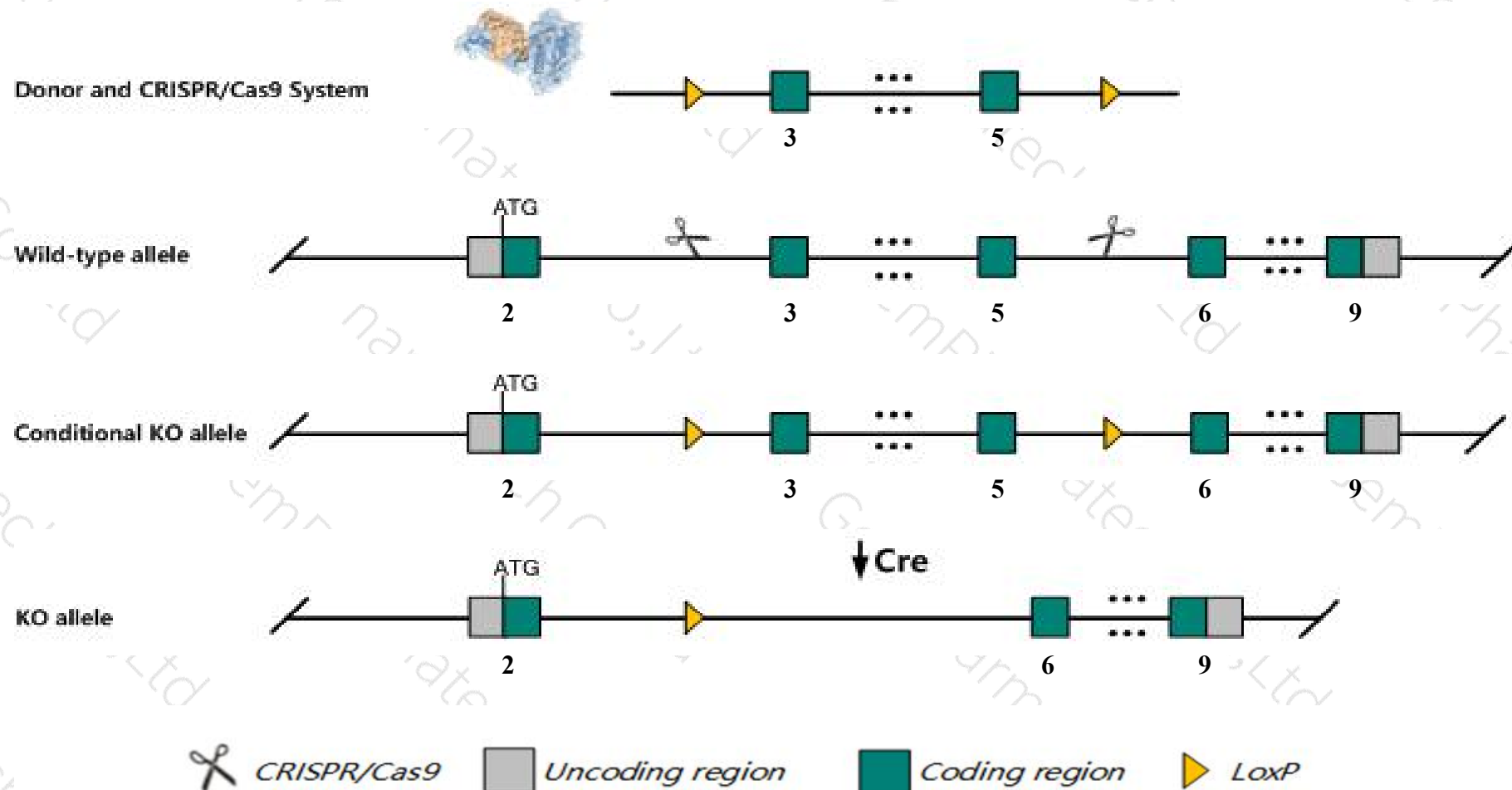
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Serpine2* gene. The schematic diagram is as follows:



Technical routes

- The *Serpine2* gene has 6 transcripts. According to the structure of *Serpine2* gene, exon3-exon5 of *Serpine2*-201(ENSMUST00000027467.10) transcript is recommended as the knockout region. The region contains 625bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Serpine2* gene. The brief process is as follows: CRISPR/Cas9 system 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.

- According to the existing MGI data, mice homozygous for a targeted mutation of this gene are viable and healthy but develop epileptic activity as well as reduced theta burst-induced LTP and NMDA receptor-mediated synaptic transmission in the CA1 field of the hippocampus; notably, homozygous mutant males are infertile.
- The *Serpine2* 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)

Serpine2 serine (or cysteine) peptidase inhibitor, clade E, member 2 [Mus musculus (house mouse)]

Gene ID: 20720, updated on 13-Mar-2020

Summary



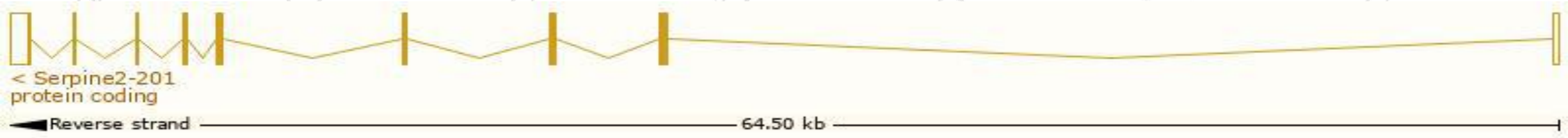
Official Symbol	Serpine2 provided by MGI
Official Full Name	serine (or cysteine) peptidase inhibitor, clade E, member 2 provided by MGI
Primary source	MGI:MGI:101780
See related	Ensembl:ENSMUSG00000026249
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	B230326M24Rik, PAI-1, PI-7, PI7, PN-1, Spi4
Expression	Broad expression in ovary adult (RPKM 75.8), frontal lobe adult (RPKM 44.2) and 16 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

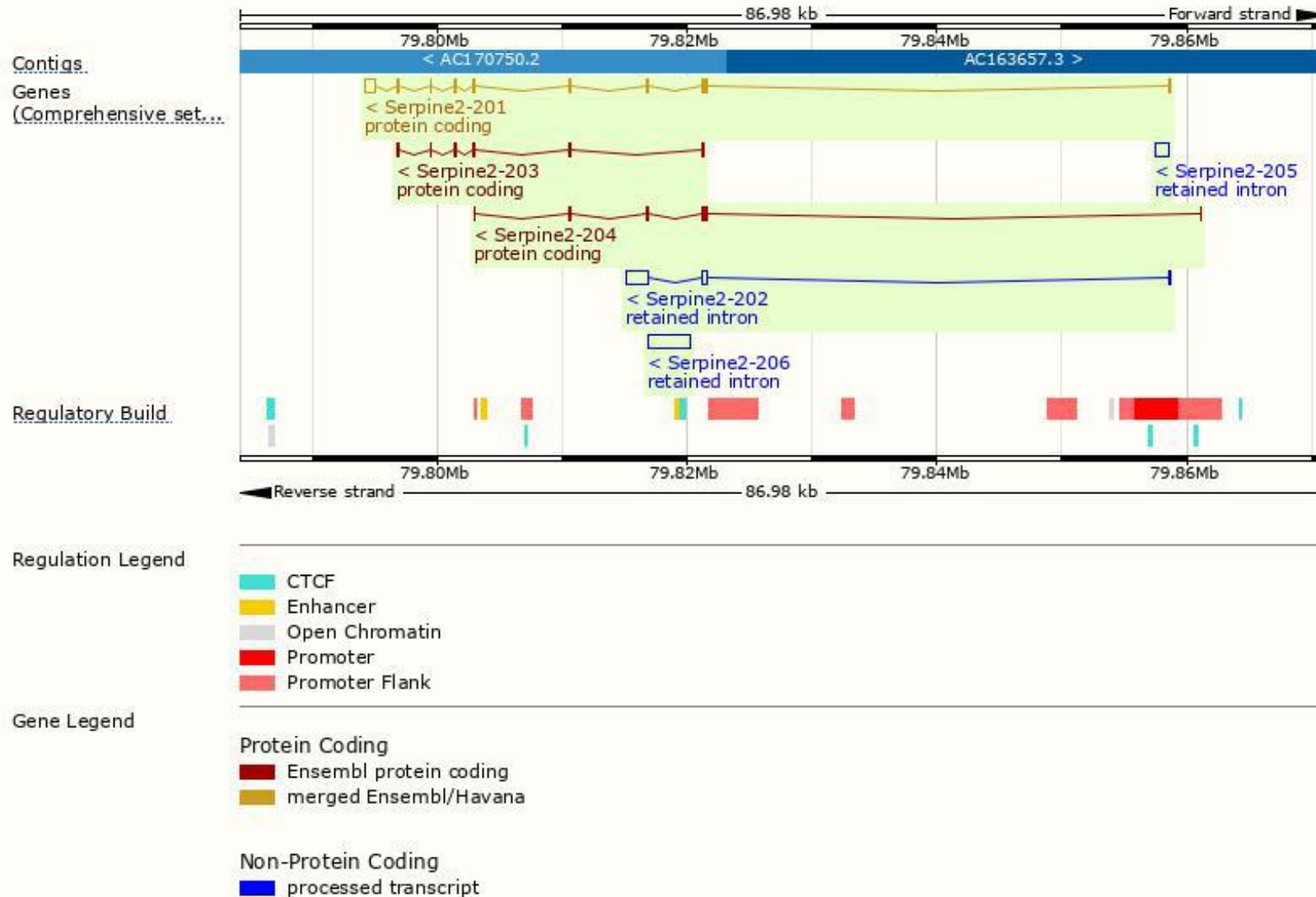
The gene has 6 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Serpine2-201	ENSMUST00000027467.10	2210	397aa	Protein coding	CCDS15092	Q07235 Q543R5	TSL:1 GENCODE basic APPRIS P1
Serpine2-204	ENSMUST00000190724.1	822	232aa	Protein coding	-	A0A087WQM1	CDS 3' incomplete TSL:5
Serpine2-203	ENSMUST00000189793.6	696	232aa	Protein coding	-	A0A087WQ70	CDS 5' and 3' incomplete TSL:5
Serpine2-206	ENSMUST00000191529.1	3393	No protein	Retained intron	-	-	TSL:NA
Serpine2-202	ENSMUST00000153862.1	2315	No protein	Retained intron	-	-	TSL:1
Serpine2-205	ENSMUST00000191026.1	1129	No protein	Retained intron	-	-	TSL:NA

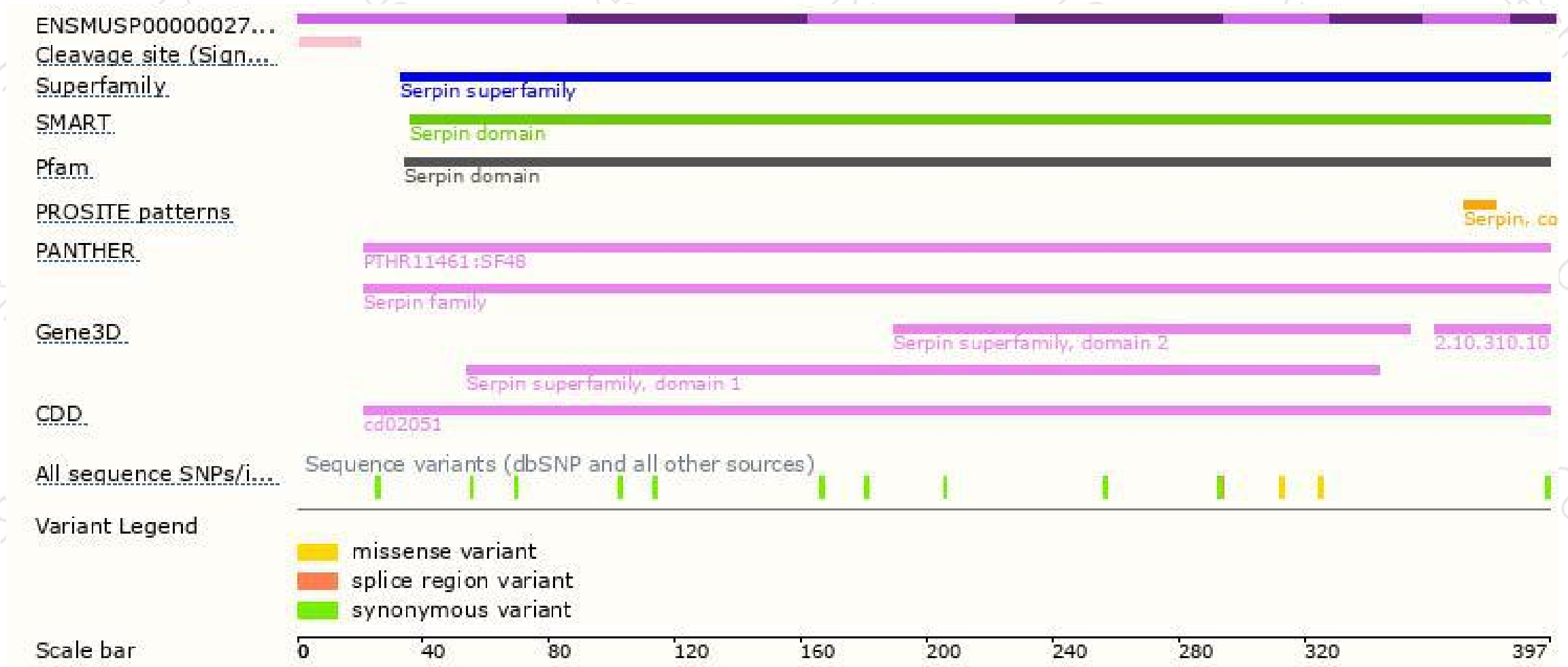
The strategy is based on the design of *Serpine2-201* transcript,the transcription is shown below:



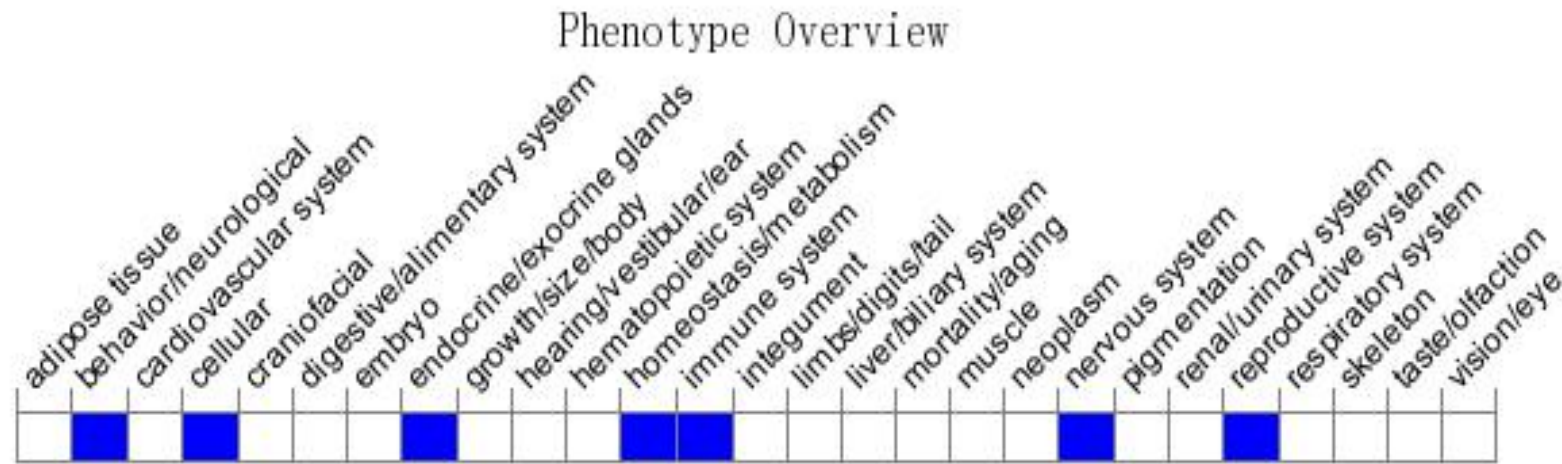
Genomic location distribution



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, mice homozygous for a targeted mutation of this gene are viable and healthy but develop epileptic activity as well as reduced theta burst-induced LTP and NMDA receptor-mediated synaptic transmission in the CA1 field of the hippocampus; notably, homozygous mutant males are infertile.

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

Tel: 400-9660890

