

***Shank1* Cas9-KO Strategy**

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Project Overview

Project Name

Shank1

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Shank1* gene. The schematic diagram is as follows:



- The *Shank1* gene has 6 transcripts. According to the structure of *Shank1* gene, exon5-exon12 of *Shank1*-203 (ENSMUST00000107938.7) transcript is recommended as the knockout region. The region contains 1216bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Shank1* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Homozygous mutation of this gene results in smaller pyramidal neuron dendritic spines, smaller and thinner postsynaptic density of central excitatory synapses, weaker synaptic transmission, increased anxiety-related behavior, and impaired contextual fear memory, but enhanced spatial learning.
- Transcript *Shank1*-204&205&206 may not be affected.
- The N-terminal of *Shank1* gene will remain several amino acids, it may remain the partial function of *Shank1* gene.
- The knockout region is near to the N-terminal of *Clec11a* gene, this strategy may influence the regulatory function of the N-terminal of *Clec11a* gene.
- The *Shank1* gene is located on the Chr7. 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)

Shank1 SH3 and multiple ankyrin repeat domains 1 [*Mus musculus* (house mouse)]

Gene ID: 243961, updated on 1-Oct-2019

Summary

- Official Symbol** Shank1 provided by [MGI](#)
- Official Full Name** SH3 and multiple ankyrin repeat domains 1 provided by [MGI](#)
- Primary source** [MGI:MGI:3613677](#)
- See related** [Ensembl:ENSMUSG00000038738](#)
- 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
- Expression** Biased expression in frontal lobe adult (RPKM 16.9), cortex adult (RPKM 13.3) and 9 other tissues [See more](#)
- Orthologs** [human](#) [all](#)

Genomic context

Location: 7; 7 B3

See Shank1 in [Genome Data Viewer](#)

Exon count: 32

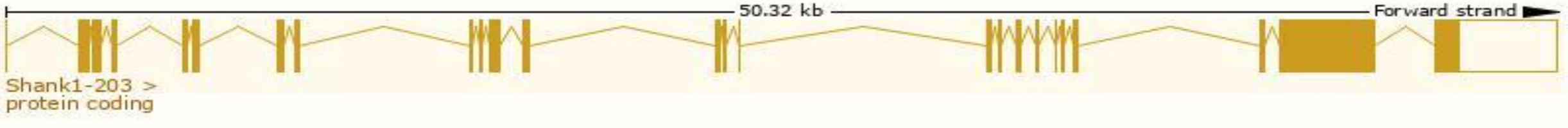
Annotation release	Status	Assembly	Chr	Location
108	current	GRCm38.p6 (GCF_000001635.26)	7	NC_000073.6 (44308916..44360094)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	7	NC_000073.5 (51565634..51613723)

Transcript information (Ensembl)

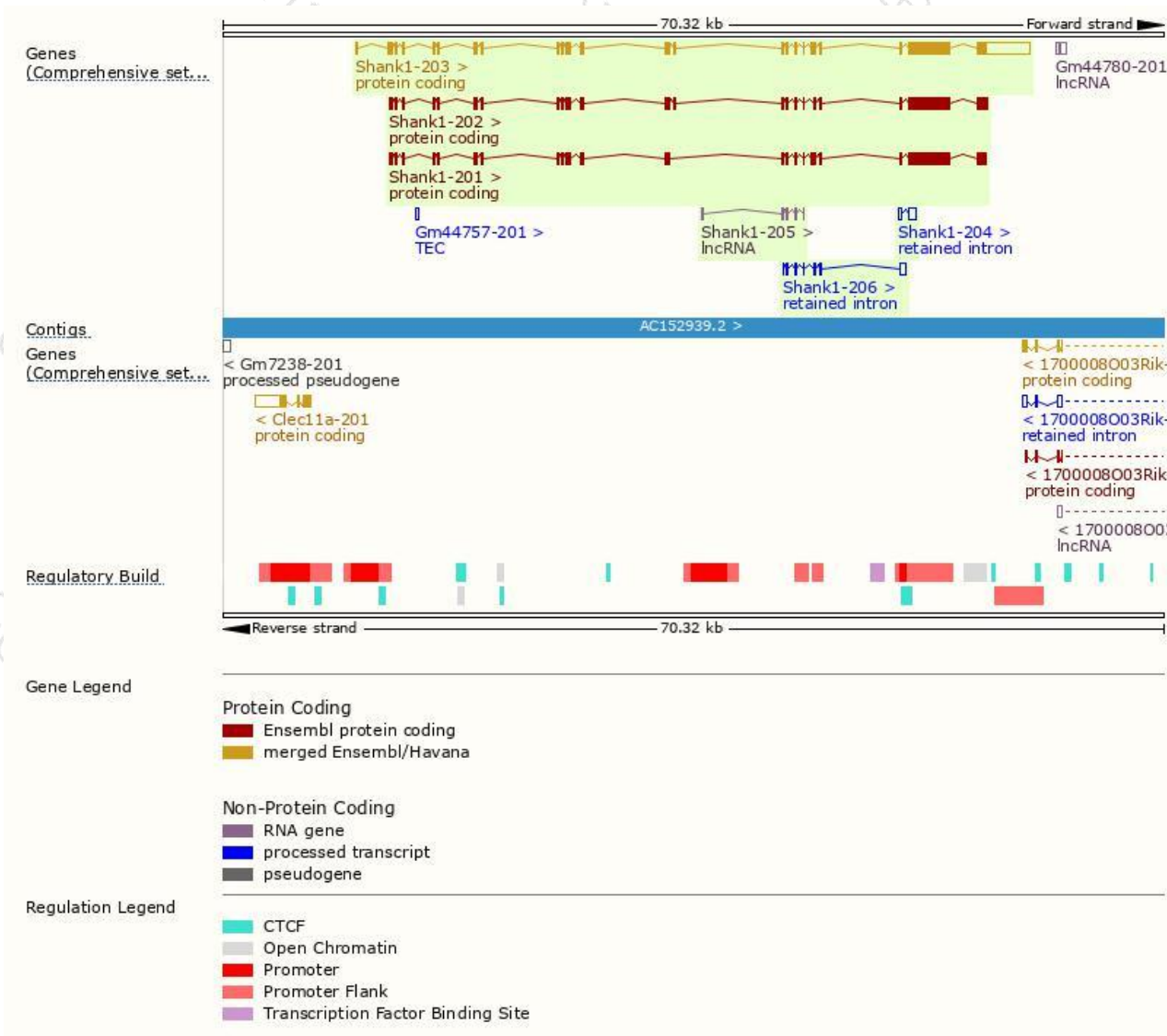
The gene has 6 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Shank1-203	ENSMUST00000107938.7	9826	2167aa	Protein coding	CCDS52229	D3YZU1	TSL:5 GENCODE basic APPRIS P2
Shank1-202	ENSMUST00000107935.7	6649	2159aa	Protein coding	-	D3YZU4	TSL:5 GENCODE basic APPRIS ALT 2
Shank1-201	ENSMUST00000107934.1	6477	2158aa	Protein coding	-	D3YZU5	TSL:5 GENCODE basic APPRIS ALT 2
Shank1-206	ENSMUST00000154776.1	987	No protein	Retained intron	-	-	TSL:1
Shank1-204	ENSMUST00000127164.1	784	No protein	Retained intron	-	-	TSL:2
Shank1-205	ENSMUST00000134470.7	608	No protein	lncRNA	-	-	TSL:3

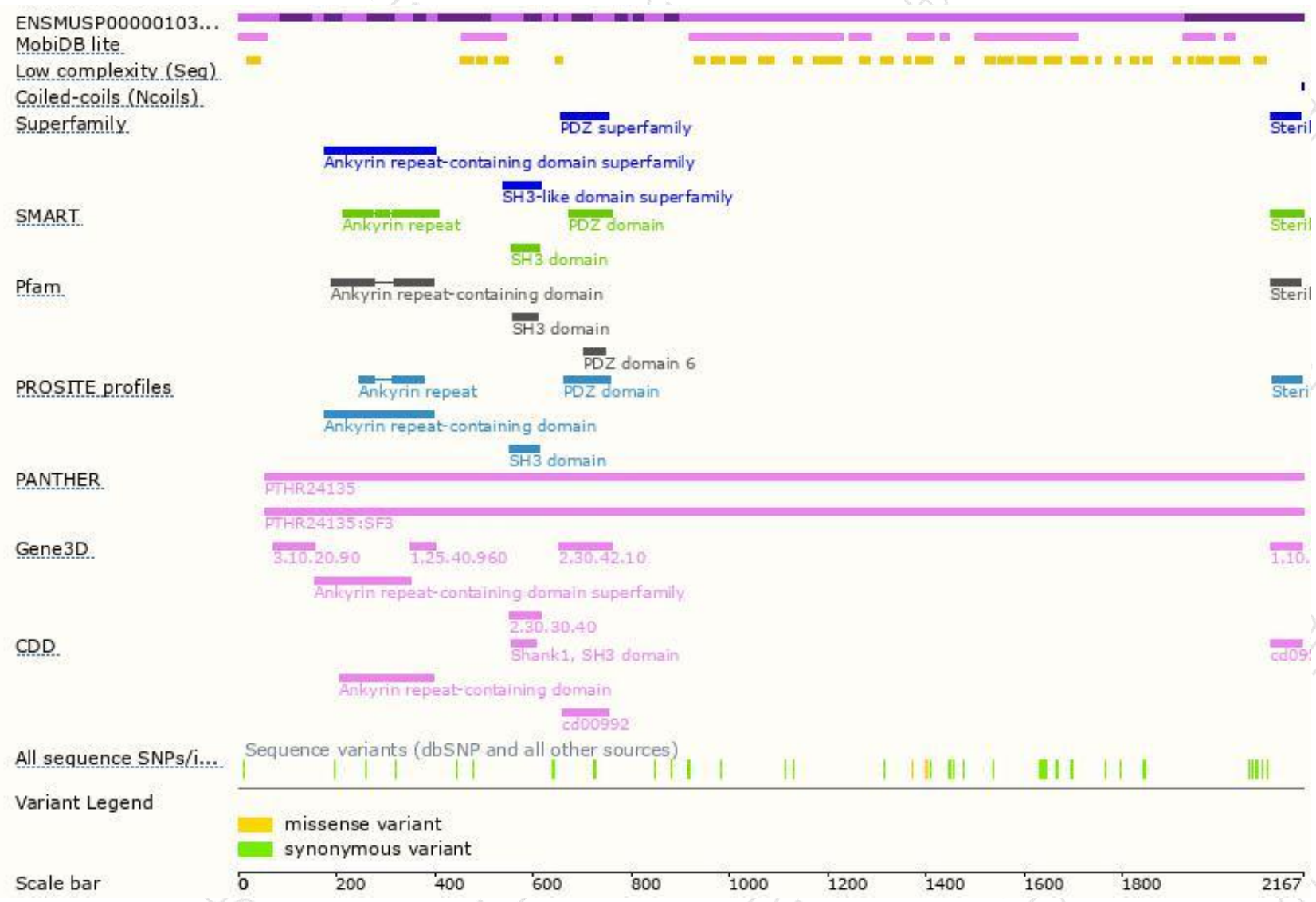
The strategy is based on the design of *Shank1-203* transcript,The transcription is shown below



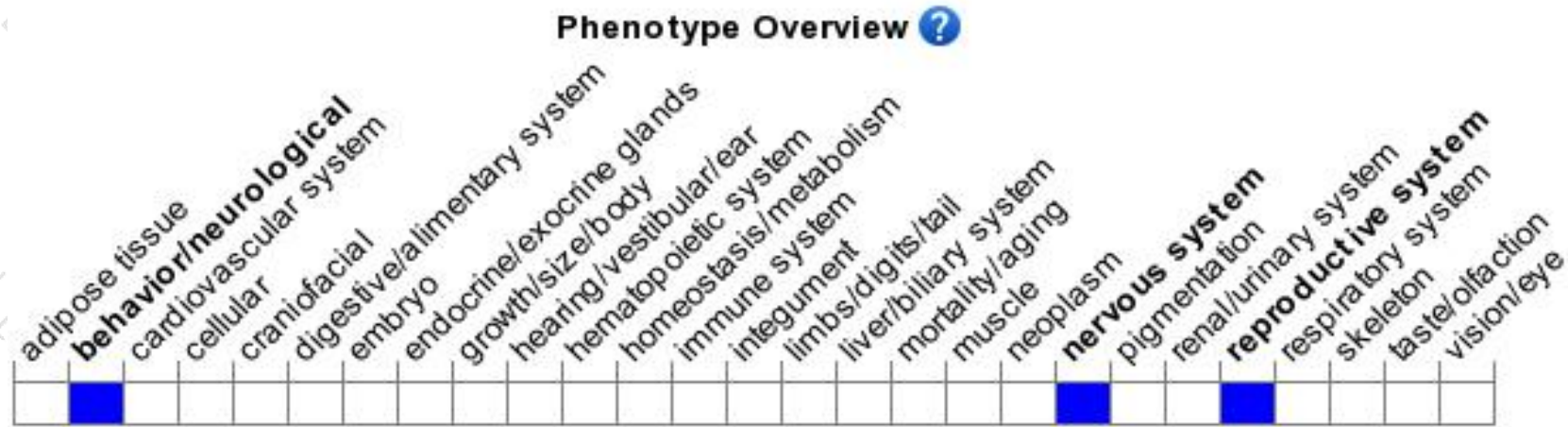
Genomic location distribution



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 mutation of this gene results in smaller pyramidal neuron dendritic spines, smaller and thinner postsynaptic density of central excitatory synapses, weaker synaptic transmission, increased anxiety-related behavior, and impaired contextual fear memory, but enhanced spatial learning.

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

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