

Smc1a Cas9-CKO Strategy

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Reviewer:

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Project Overview

Project Name

Smc1a

Project type

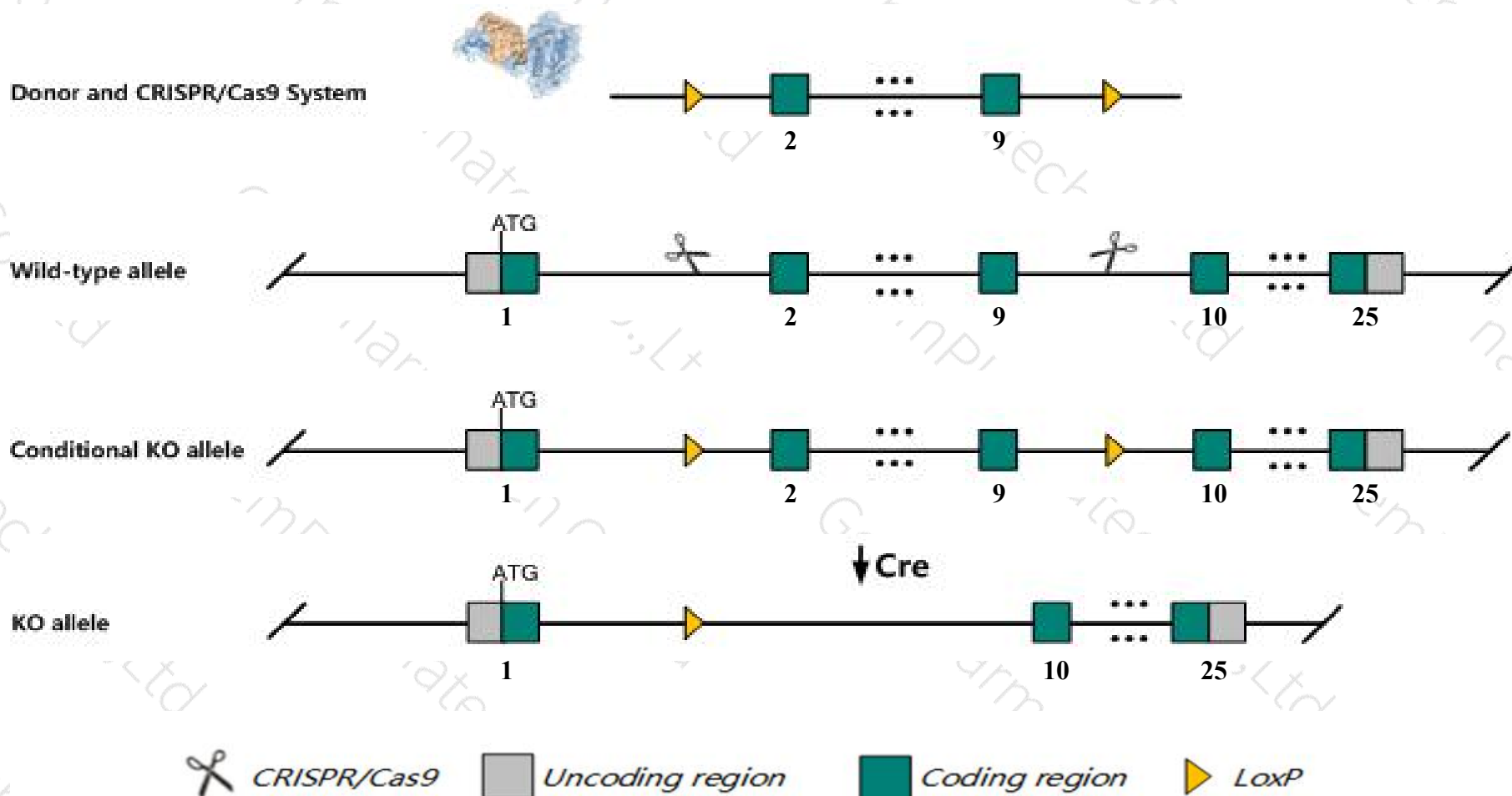
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Smc1a* gene. The schematic diagram is as follows:



Technical routes

- The *Smc1a* gene has 6 transcripts. According to the structure of *Smc1a* gene, exon2-exon9 of *Smc1a-201* (ENSMUST00000045312.5) transcript is recommended as the knockout region. The region contains 1436bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Smc1a* 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 disruption in this gene display increased chromosomal instability, decreased cell survival, and defective S-phase checkpoint after ionizing radiation exposure.
- The *Smc1a* gene is located on the ChrX. 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)

Smc1a structural maintenance of chromosomes 1A [Mus musculus (house mouse)]

Gene ID: 24061, updated on 31-Jan-2019

Summary



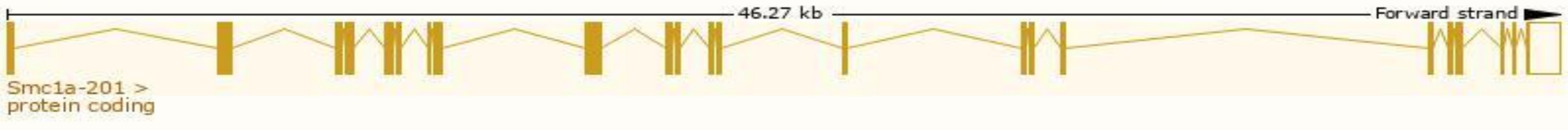
Official Symbol	Smc1a provided by MGI
Official Full Name	structural maintenance of chromosomes 1A provided by MGI
Primary source	MGI:MGI:1344345
See related	Ensembl:ENSMUSG00000041133
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	5830426I24Rik, SMC-1A, Sb1.8, Smc1, Smc1alpha, Smc1l1, Smcb, mKIAA0178
Expression	Ubiquitous expression in CNS E11.5 (RPKM 47.7), liver E14 (RPKM 30.8) and 27 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

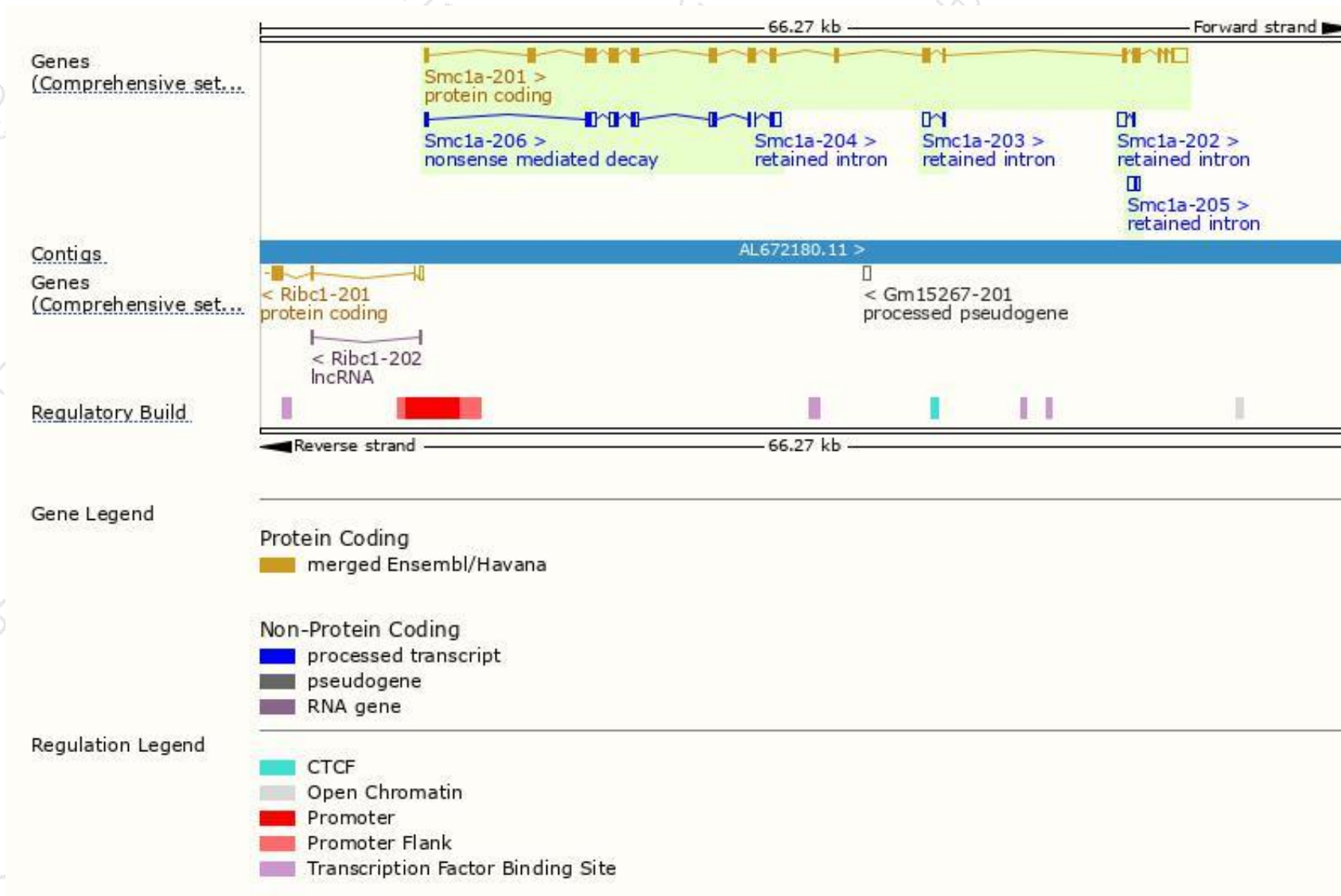
The gene has 6 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Smc1a-201	ENSMUST00000045312.5	4691	1233aa	Protein coding	CCDS30473	Q9CU62	TSL:1 GENCODE basic APPRIS P1
Smc1a-206	ENSMUST00000145518.7	1824	54aa	Nonsense mediated decay	-	S4R179	TSL:1
Smc1a-202	ENSMUST00000124681.1	620	No protein	Retained intron	-	-	TSL:2
Smc1a-204	ENSMUST00000135172.1	617	No protein	Retained intron	-	-	TSL:3
Smc1a-205	ENSMUST00000141457.1	591	No protein	Retained intron	-	-	TSL:3
Smc1a-203	ENSMUST00000131395.1	499	No protein	Retained intron	-	-	TSL:3

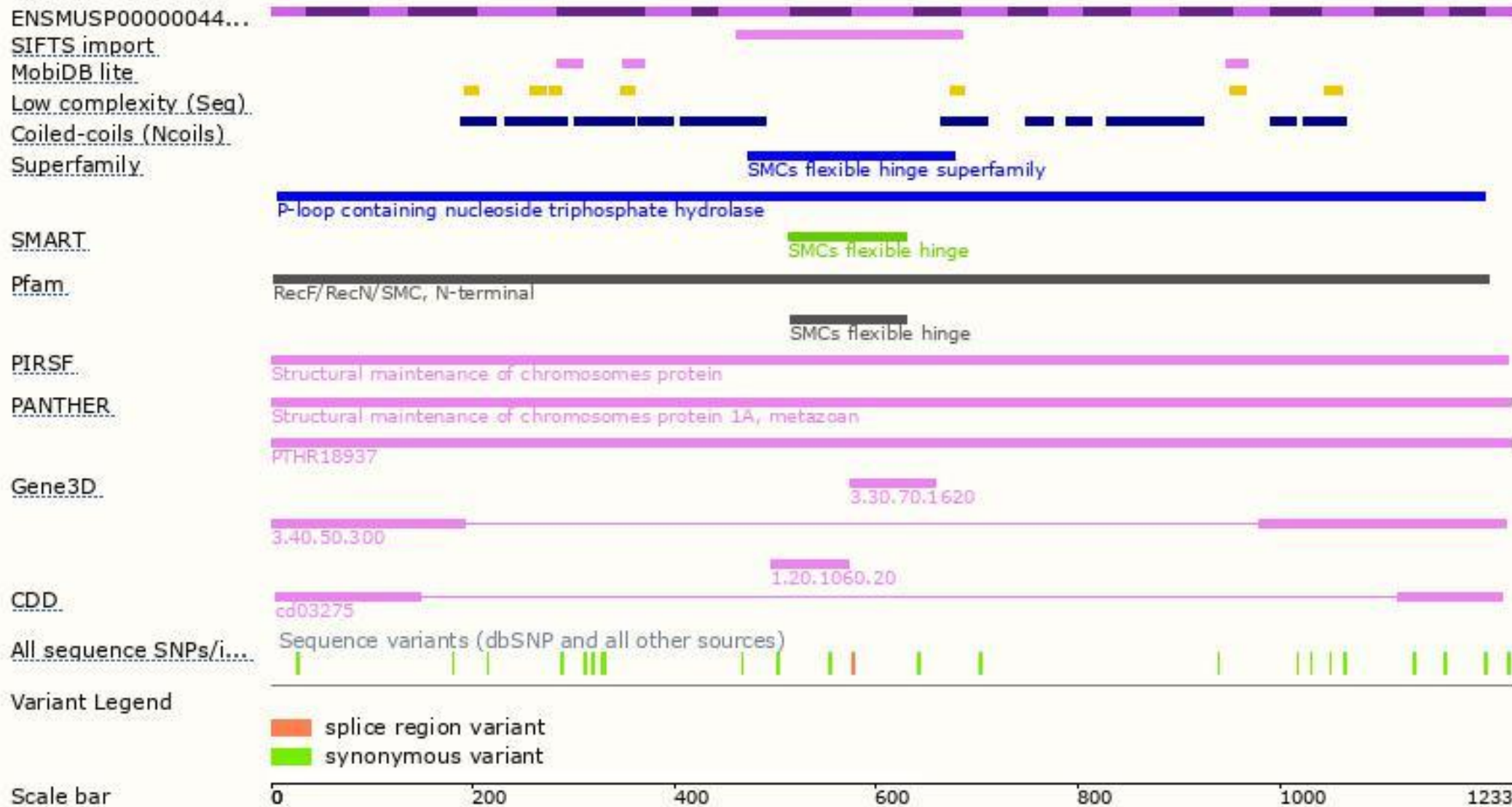
The strategy is based on the design of *Smc1a-201* transcript,The transcription is shown below



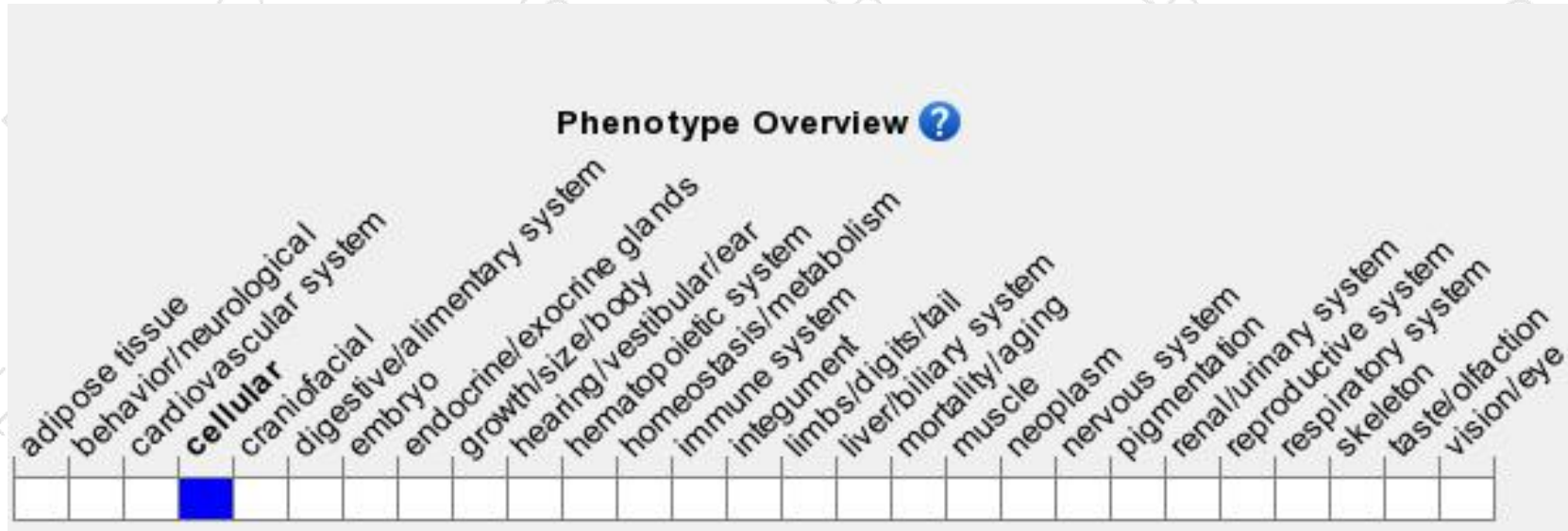
Genomic location distribution



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/>).

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

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