Smc1b Cas9-KO Strategy

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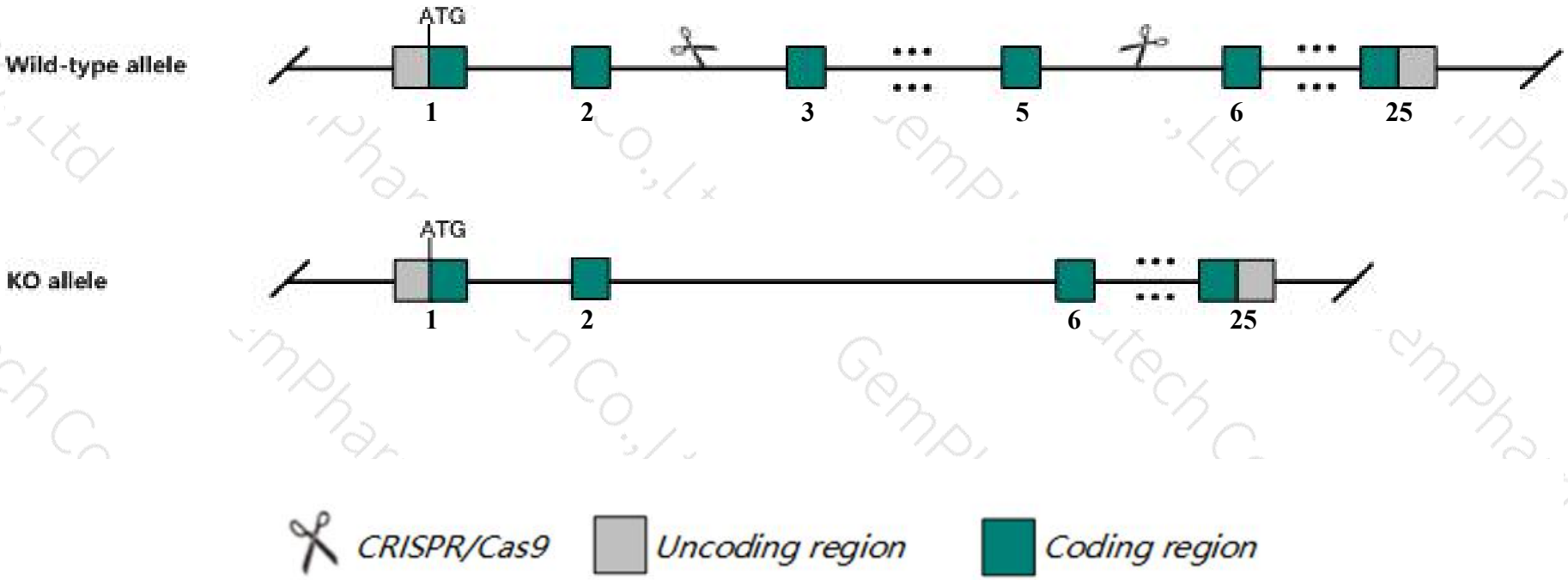
Project Overview

Project Name	***Smc1b***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Smc1b* gene. The schematic diagram is as follows:



Technical routes

➢ The *Smc1b* gene has 2 transcripts. According to the structure of *Smc1b* gene, exon3-exon5 of *Smc1b-201* (ENSMUST00000023068.7) transcript is recommended as the knockout region.The region contains 556bp coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Smc1b* gene. The brief process is as follows: CRISPR/Cas9 system

Notice

- According to the existing MGI data,Homozygous mutant mice display male and female infertility, abnormal male and female meiosis, and arrest of spematogenesis.
- Transcript *Smc1b*-202 may not be affected.
- The knockout region is near to the N-terminal of *Ribc2* gene,this strategy may influence the regulatory function of the N-terminal of *Ribc2* gene.
- The N-terminal of *Smc1b* gene will remain 99aa,it may remain the partial function of *Smc1b* gene.
- The *Smc1b* gene is located on the Chr15. 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）

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Smc1b structural maintenance of chromosomes 1B [*Mus musculus* (house mouse)]

Gene ID: 140557, updated on 12-Aug-2019

Summary

Official Symbol	Smc1b provided by MGI
Official Full Name	structural maintenance of chromosomes 1B provided by MGI
Primary source	MGI:MGI:2154049
See related	Ensembl:ENSMUSG00000022432
Gene type	protein coding
RefSeq status	PROVISIONAL
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	SMC-1B; Smc1l2; SMC1beta
Expression	Restricted expression toward testis adult (RPKM 8.5) See more
Orthologs	human all

Genomic context

Location: 15; 15 E2

See Smc1b in Genome Data Viewer

Exon count: 25

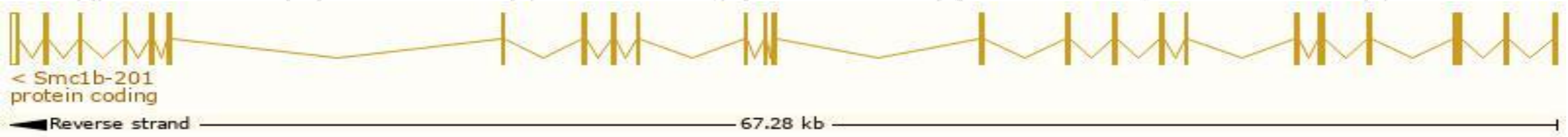
Annotation release	Status	Assembly	Chr	Location
108	current	GRCm38.p6 (GCF_000001635.26)	15	NC_000081.6 (85064689..85131957, complement)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	15	NC_000081.5 (84895119..84962387, complement)

Transcript information（Ensembl）

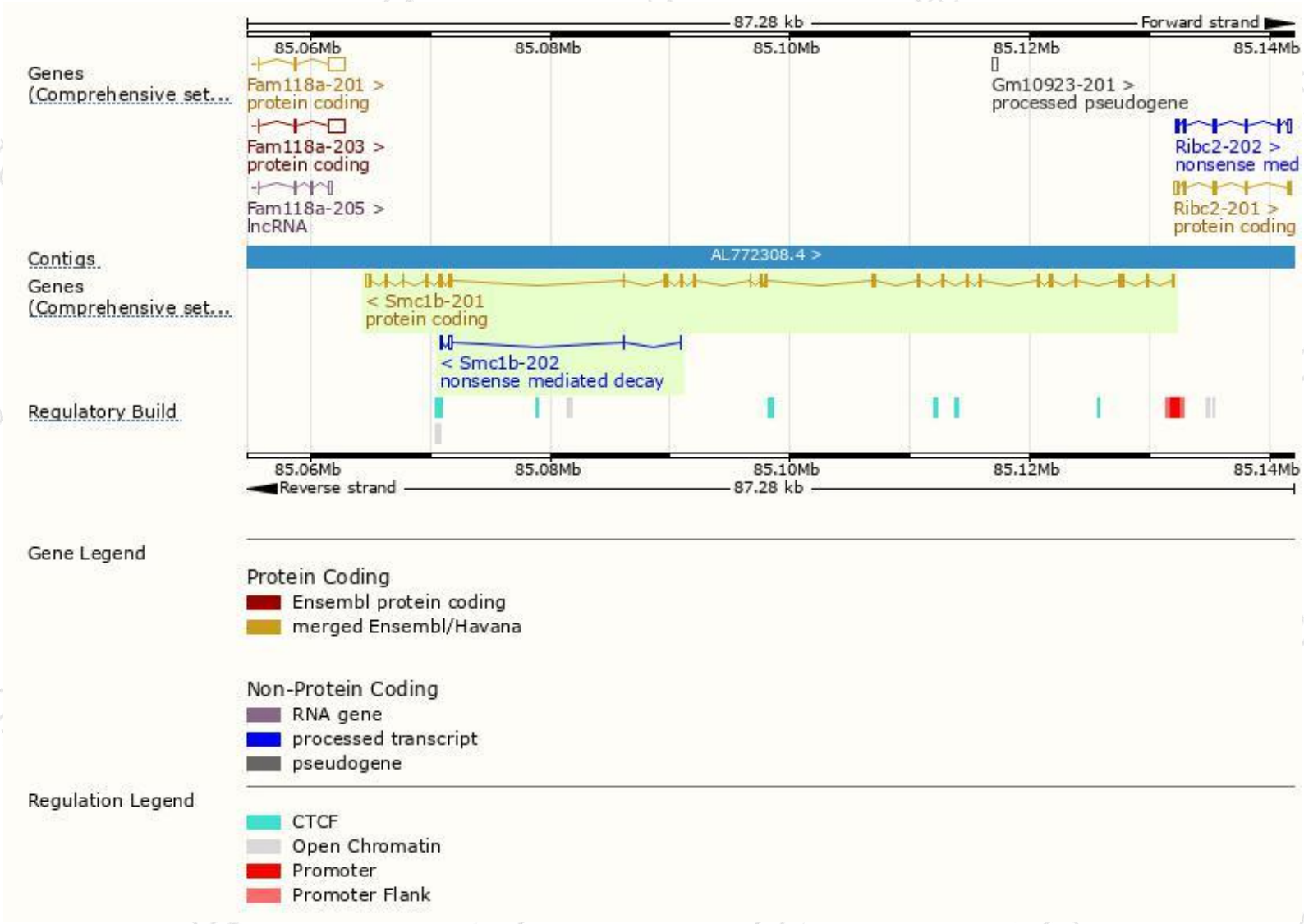
The gene has 2 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Smc1b-201	ENSMUST00000023068.7	4047	1248aa	Protein coding	CCDS27718	A1L2Z0 Q920F6	TSL:1 GENCODE basic APPRIS P1
Smc1b-202	ENSMUST00000227591.1	336	15aa	Nonsense mediated decay	-	A0A2I3BR69	CDS 5' incomplete

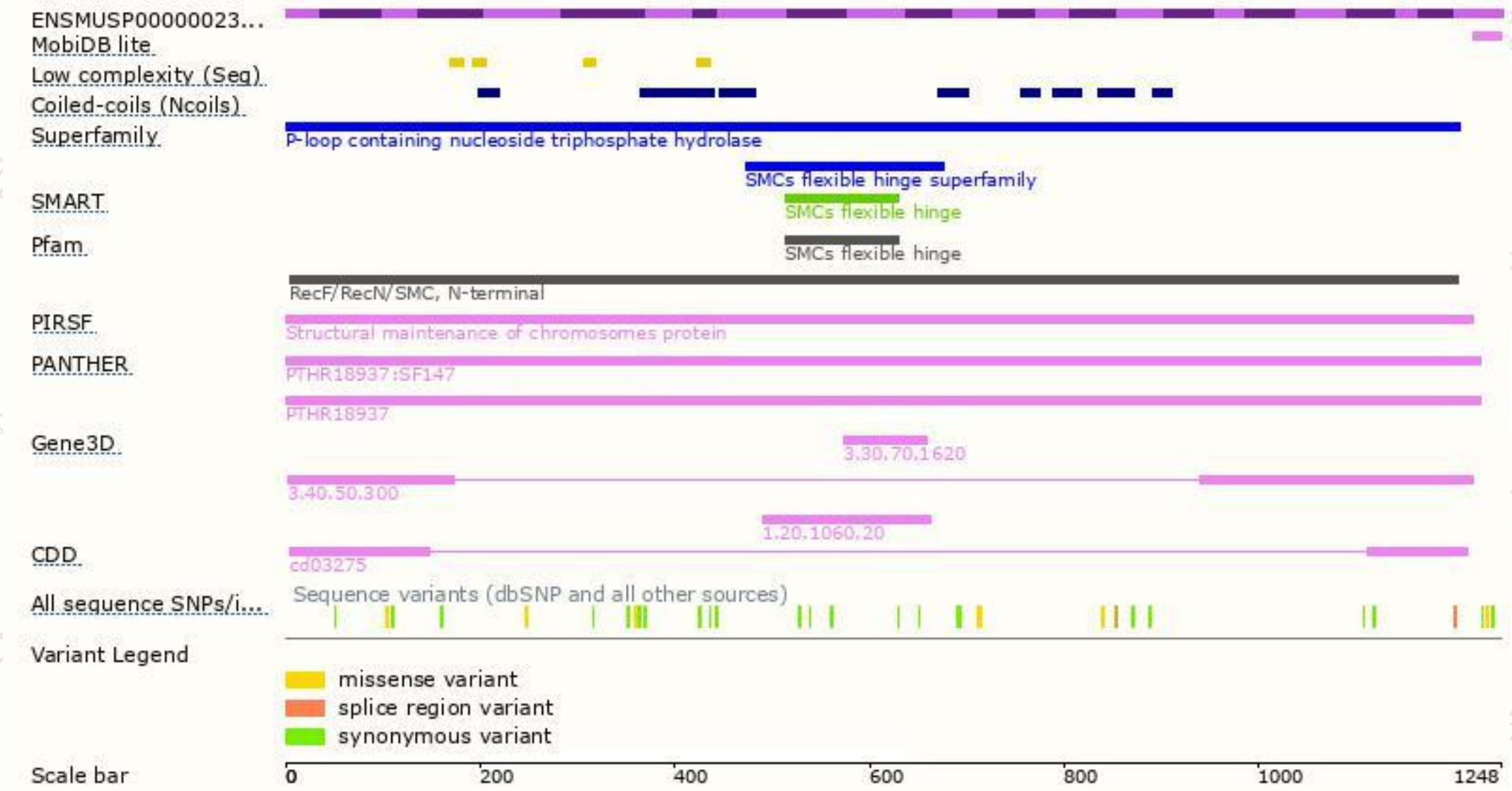
The strategy is based on the design of *Smc1b-201* transcript,The transcription is shown below



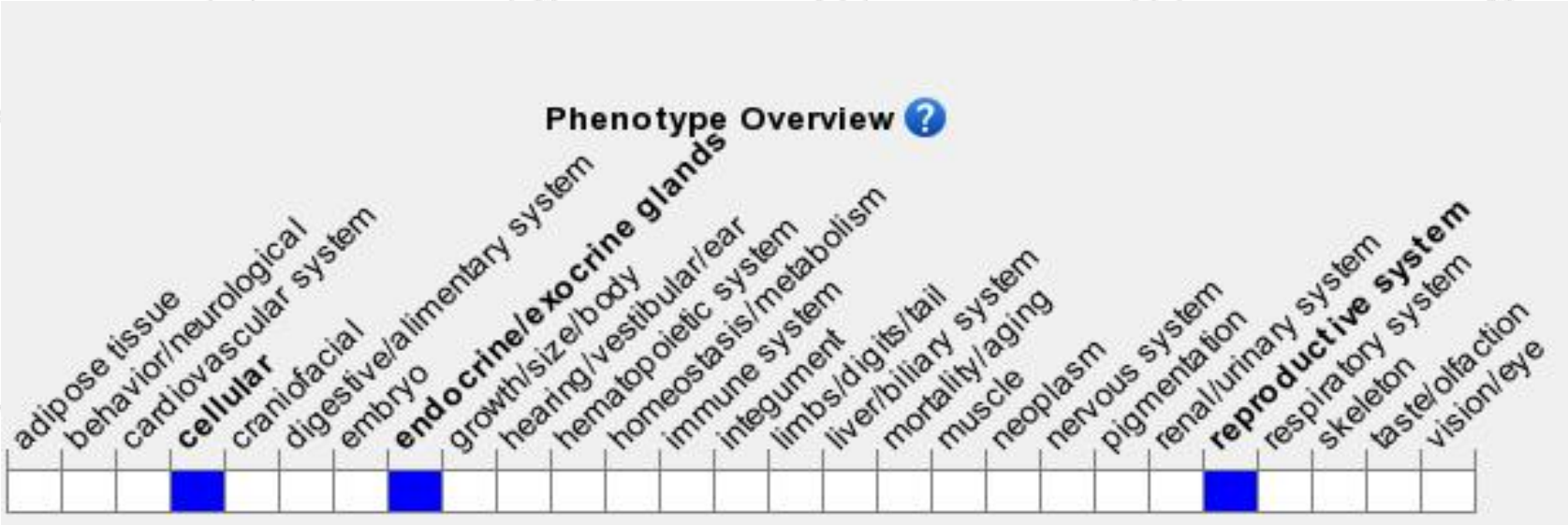
Genomic location distribution



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 mutant mice display male and female infertility, abnormal male and female meiosis, and arrest of spematogenesis.

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

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