

Piwil2 Cas9-KO Strategy

Designer:

Ruirui Zhang

Reviewer:

Huimin Su

Design Date:

2019-9-19

Project Overview

Project Name

Piwil2

Project type

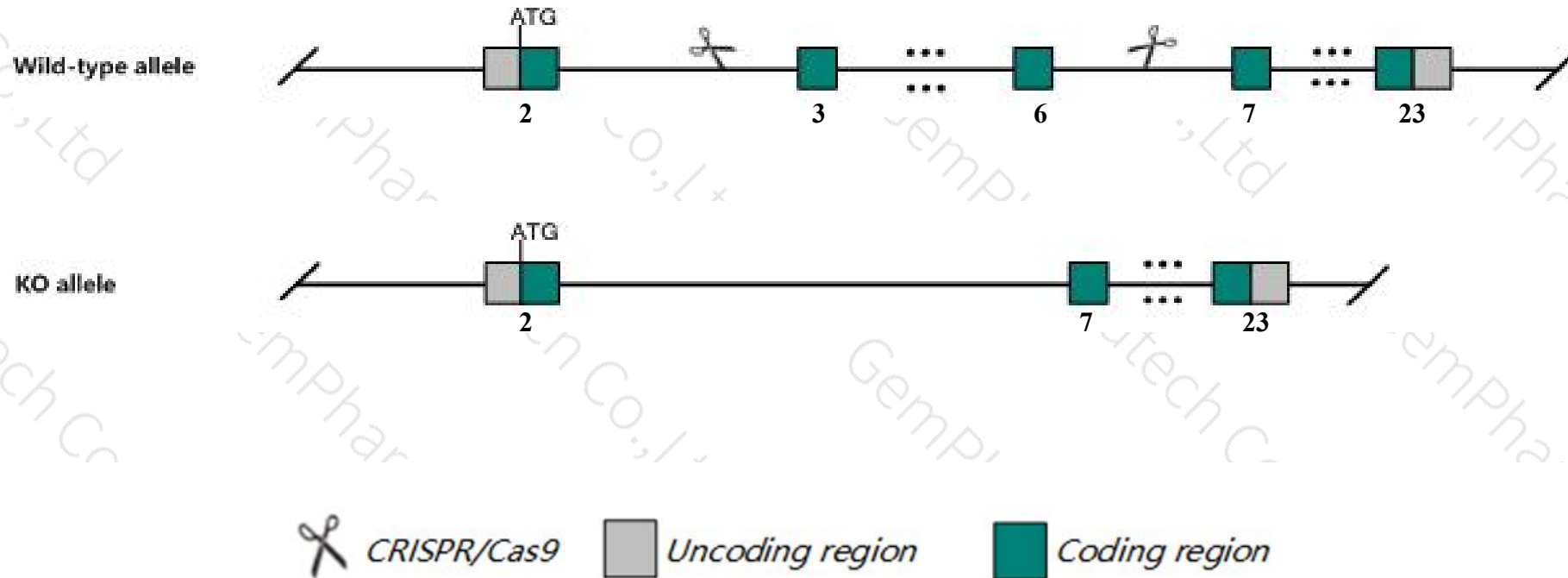
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Piwi2* gene. The schematic diagram is as follows:



- The *Piwil2* gene has 3 transcripts. According to the structure of *Piwil2* gene, exon3-exon6 of *Piwil2-201* (ENSMUST00000048129.5) transcript is recommended as the knockout region. The region contains 545bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Piwil2* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Mice homozygous for a knock-out allele exhibit decreased testis weight, azoospermia, and male infertility associated with a complete arrest of spermatogenesis and increased apoptotic cell death during the early prophase of the first meiosis.
- The KO region contains functional region of the *Gm22725* gene. Knockout the region may affect the function of *Gm22725* gene.
- The *Piwi2* gene is located on the Chr14. 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)

Piwi2 piwi-like RNA-mediated gene silencing 2 [*Mus musculus* (house mouse)]

Gene ID: 57746, updated on 17-Sep-2019

Summary

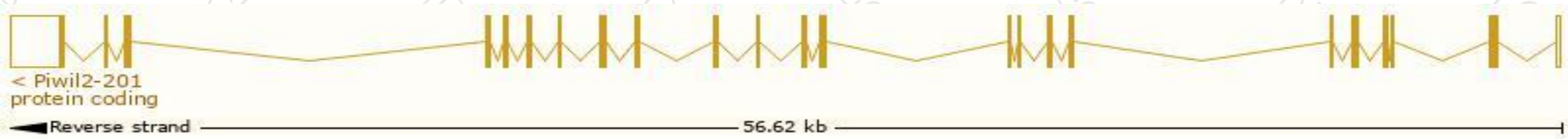
Official Symbol	Piwi2 provided by MGI
Official Full Name	piwi-like RNA-mediated gene silencing 2 provided by MGI
Primary source	MGI:MGI:1930036
See related	Ensembl:ENSMUSG00000033644
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	mili; Piwil1l
Expression	Biased expression in testis adult (RPKM 14.5) and genital fat pad adult (RPKM 0.5) See more
Orthologs	human all

Transcript information (Ensembl)

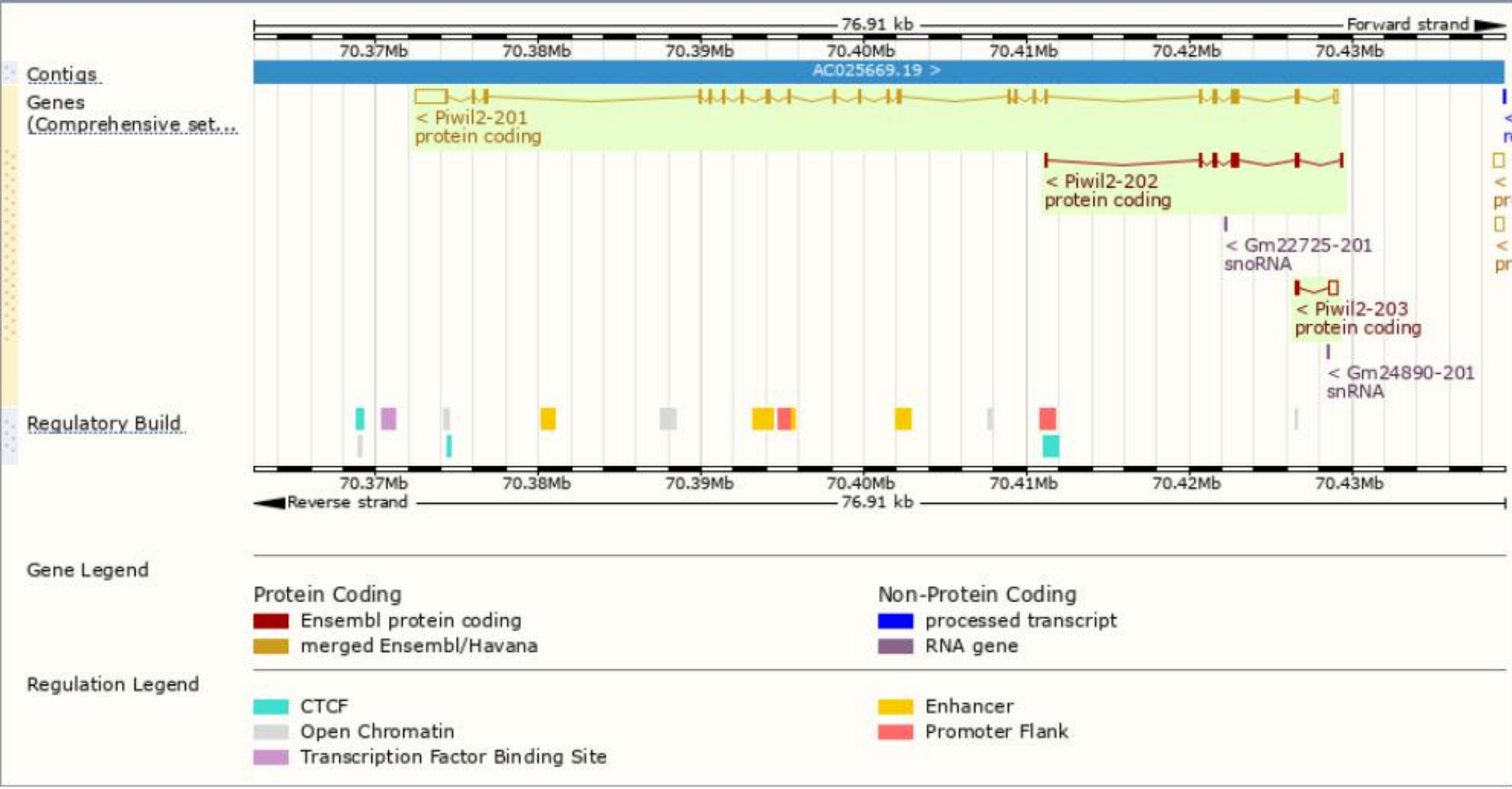
The gene has 3 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Piwil2-201	ENSMUST00000048129.5	4916	971aa	Protein coding	CCDS27252	Q8CDG1	TSL:1 Gencode basic APPRIS P1
Piwil2-202	ENSMUST00000226229.1	962	285aa	Protein coding	-	A0A2I3BRK1	CDS 3' incomplete
Piwil2-203	ENSMUST00000226426.1	666	63aa	Protein coding	-	A0A2I3BRD3	CDS 3' incomplete

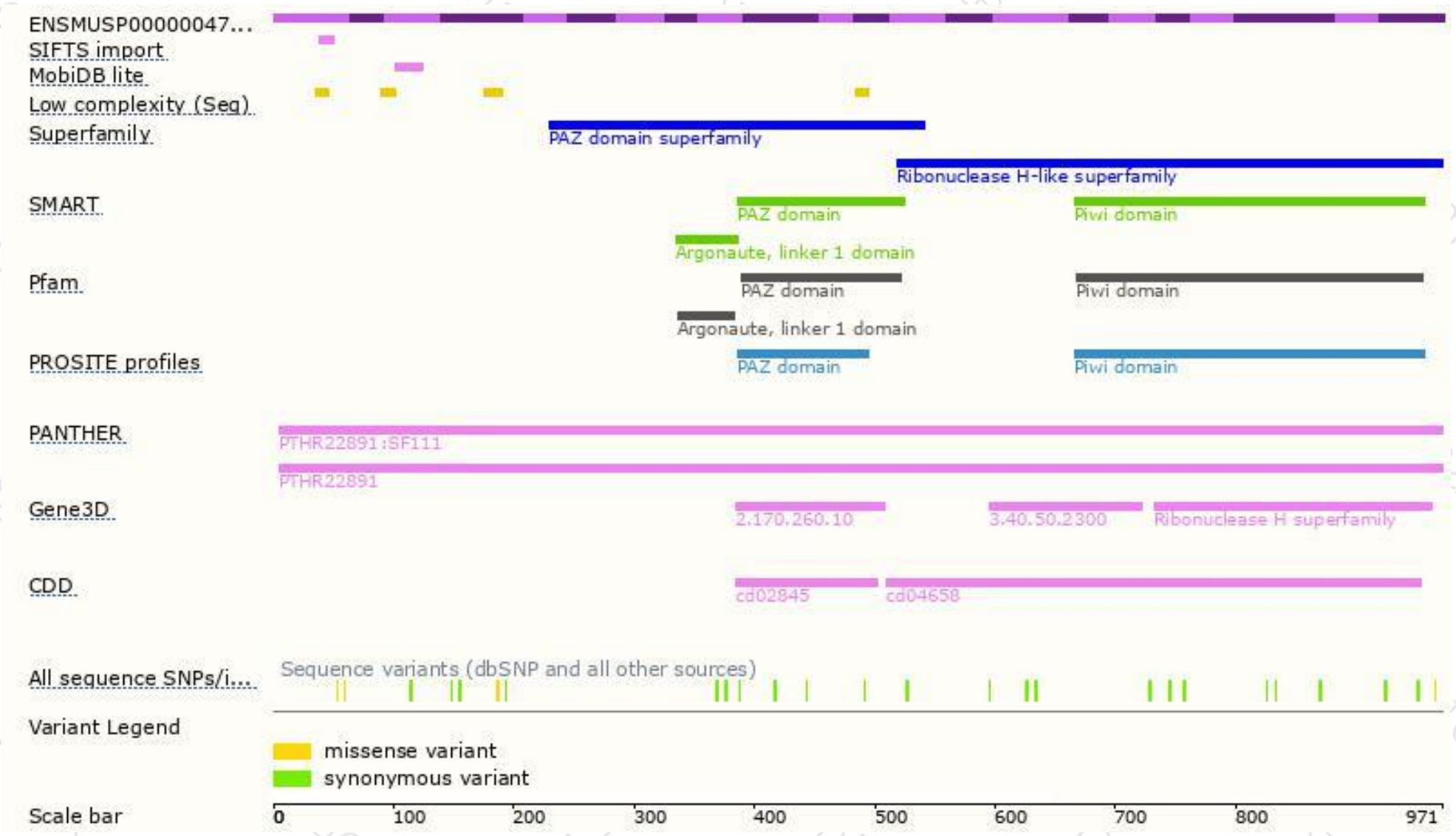
The strategy is based on the design of *Piwil2-201* transcript,The transcription is shown below



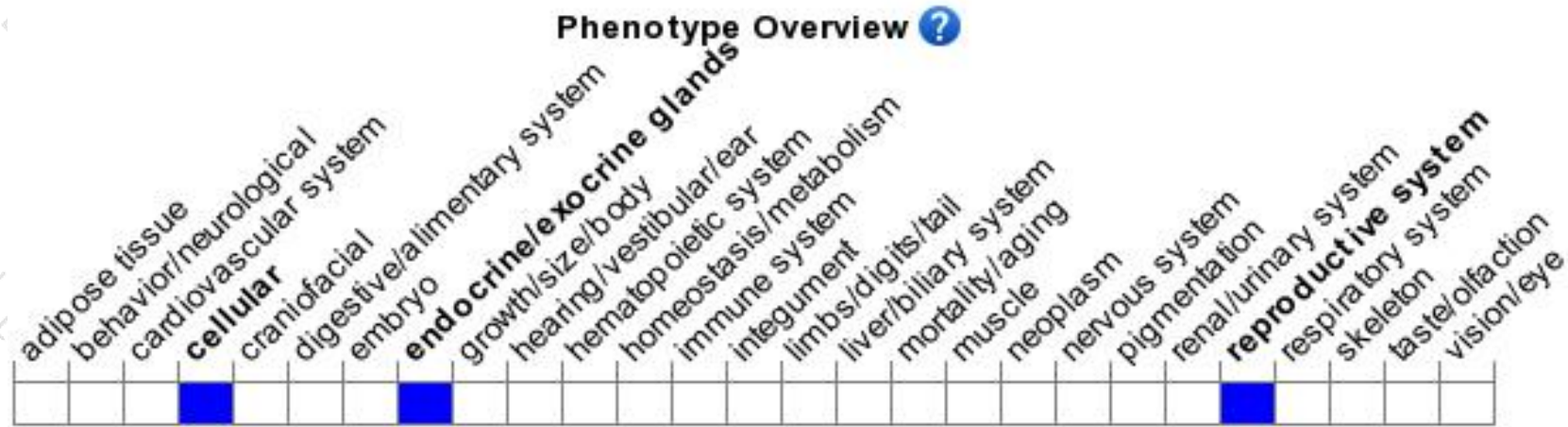
Genomic location distribution



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 knock-out allele exhibit decreased testis weight, azoospermia, and male infertility associated with a complete arrest of spermatogenesis and increased apoptotic cell death during the early prophase of the first meiosis.

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

Tel: 400-9660890

