Cdk12 Cas9-KO Strategy

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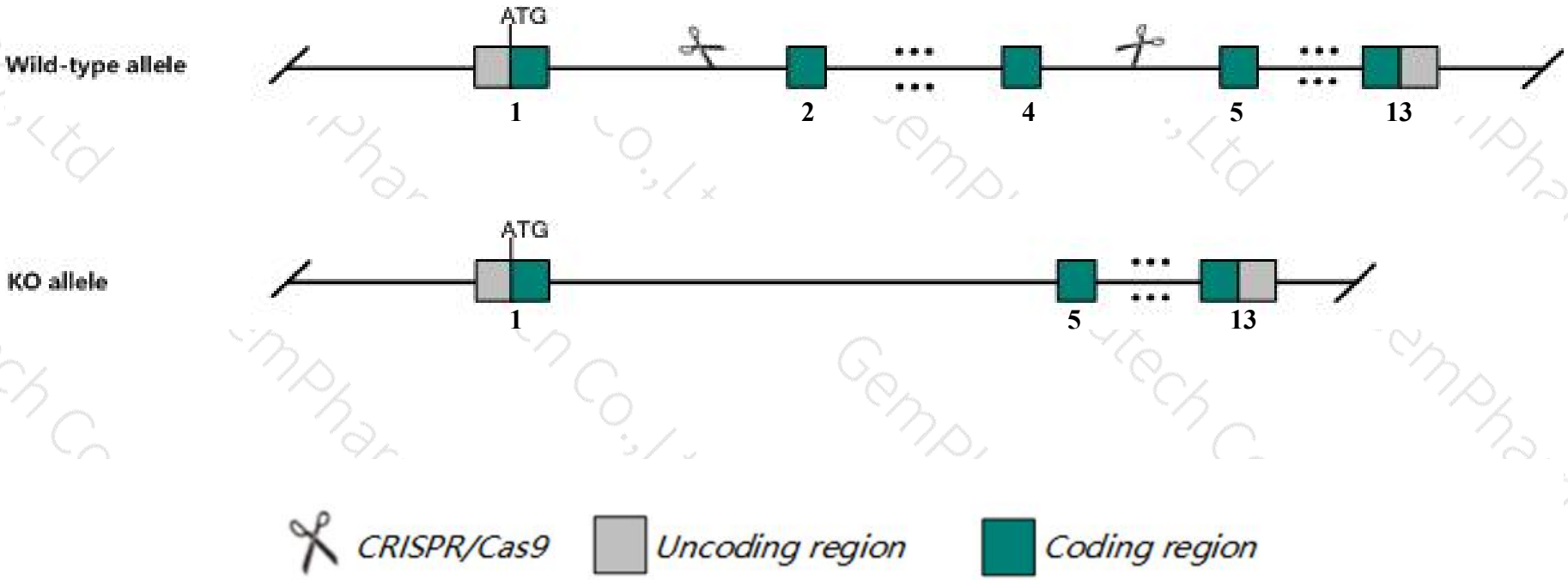
Design Date: 2019-12-25

Project Overview

Project Name	***Cdk12***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Cdk12* gene. The schematic diagram is as follows:



Technical routes

➢ The *Cdk12* gene has 6 transcripts. According to the structure of *Cdk12* gene, exon2-exon4 of *Cdk12-201* (ENSMUST00000003203.13) transcript is recommended as the knockout region.The region contains 1193bp coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Cdk12* gene. The brief process is as follows: gRNA was transcribed in vitro.Cas9 and gRNA 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.

Notice

- According to the existing MGI data,Mice homozygous for a knock-out allele exhibit lethality between implantation and E6.5 with decreased proliferation and increased apoptosis in the inner cell mass.

- The *Cdk12* gene is located on the Chr11. 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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Cdk12 cyclin-dependent kinase 12 [Mus musculus (house mouse)]

Gene ID: 69131, updated on 31-Jan-2019

Summary

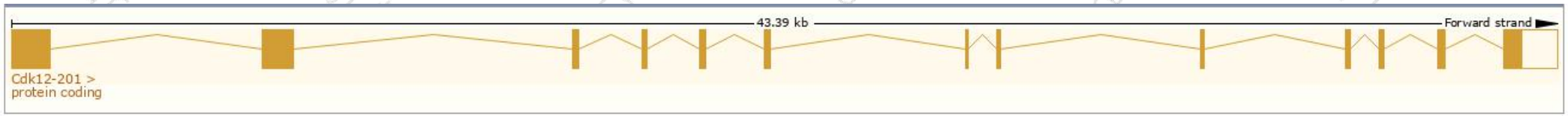
Official Symbol	Cdk12 provided by MGI
Official Full Name	cyclin-dependent kinase 12 provided byMGI
Primary source	MGI:MGI:1098802
See related	Ensembl:ENSMUSG00000003119
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	1810022J16Rik, AI646528, Crk7, Crkrs, D11Ertd752e, Pksc
Expression	Ubiquitous expression in CNS E11.5 (RPKM 3.5), limb E14.5 (RPKM 3.3) and 28 other tissuesSee more
Orthologs	human all

Transcript information（Ensembl）

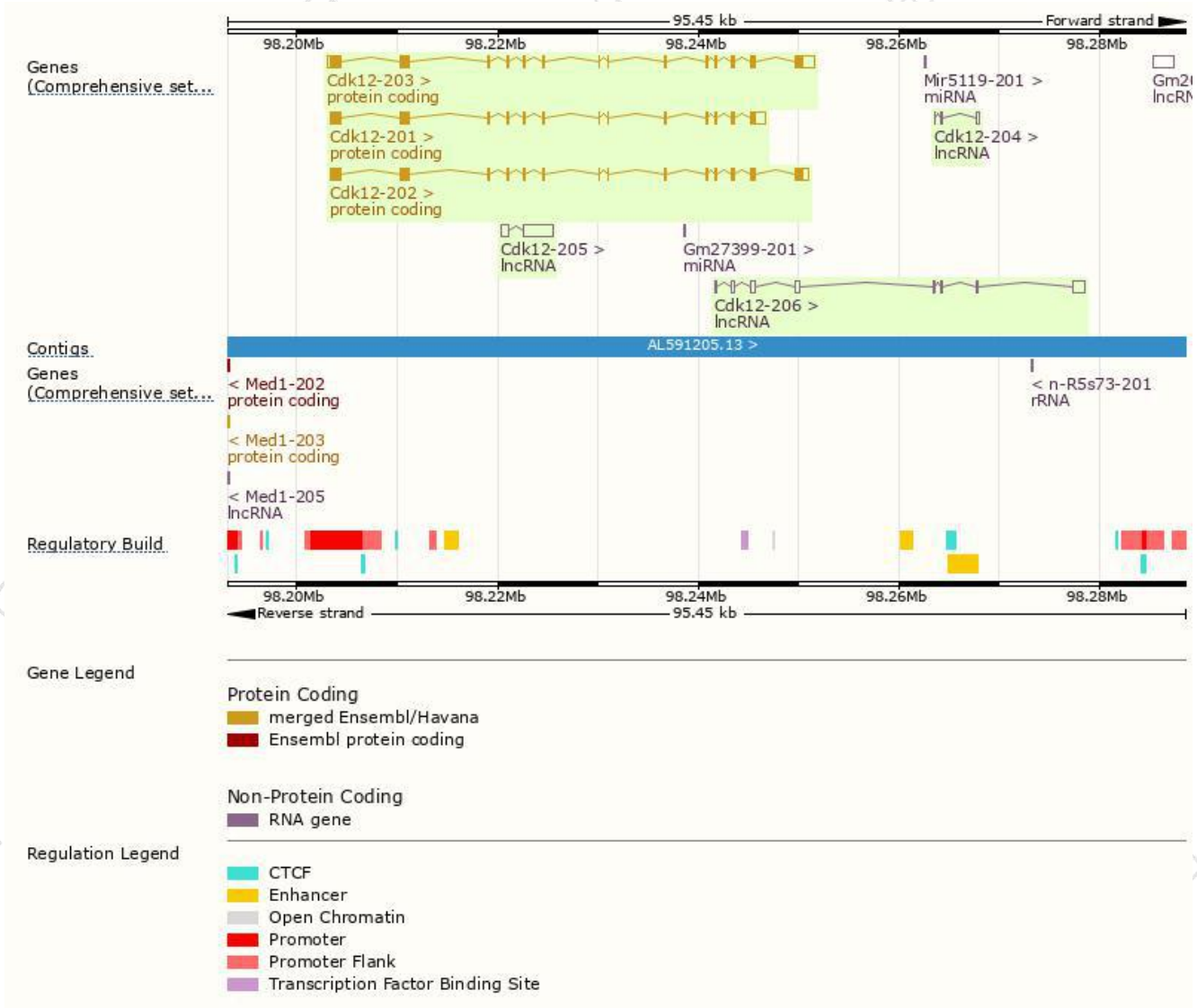
The gene has 6 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Cdk12-203	ENSMUST00000107539.7	5912	1475aa	Protein coding	CCDS48902	Q14AX6	TSL:5 GENCODE basic APPRIS ALT2
Cdk12-202	ENSMUST00000107538.1	5143	1484aa	Protein coding	CCDS48901	Q14AX6	TSL:1 GENCODE basic APPRIS ALT2
Cdk12-201	ENSMUST00000003203.13	4837	1258aa	Protein coding	CCDS25342	Q14AX6	TSL:1 GENCODE basic APPRIS P3
Cdk12-205	ENSMUST00000145113.1	3648	No protein	lncRNA	-	-	TSL:1
Cdk12-206	ENSMUST00000147441.7	2605	No protein	lncRNA	-	-	TSL:2
Cdk12-204	ENSMUST00000125152.1	443	No protein	lncRNA	-	-	TSL:2

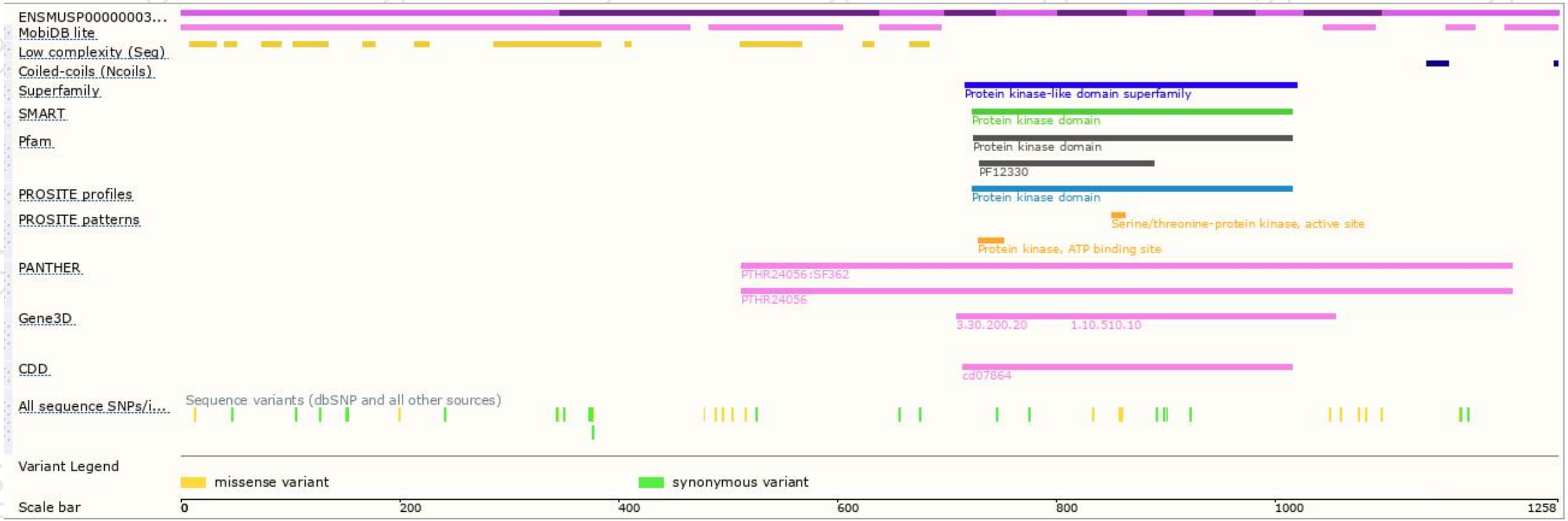
The strategy is based on the design of *Cdk12-201* transcript,The transcription is shown below



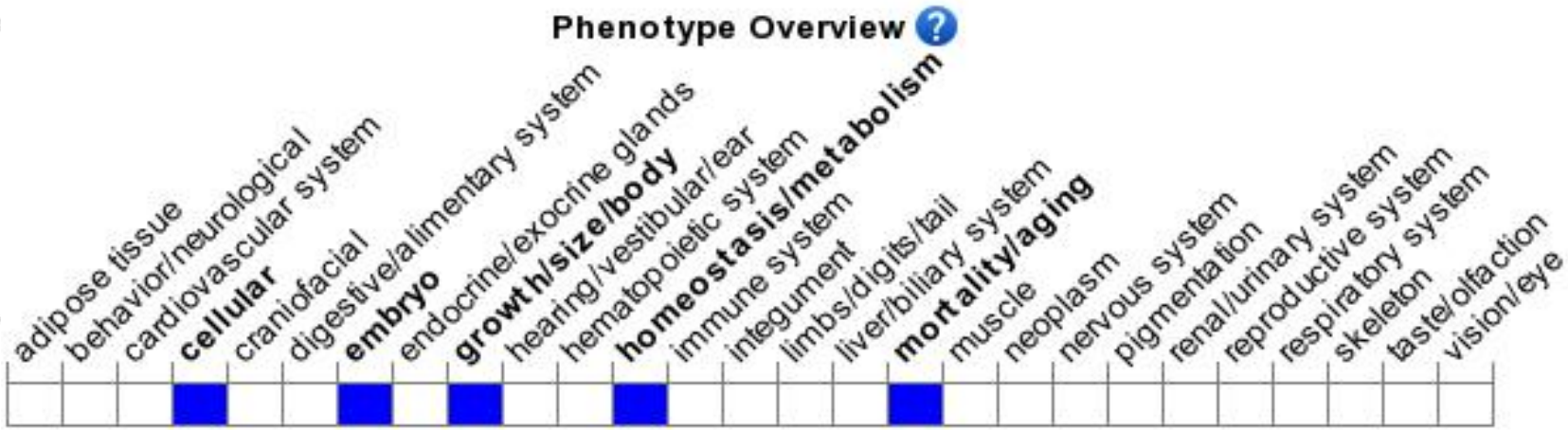
Genomic location distribution



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 lethality between implantation and E6.5 with decreased proliferation and increased apoptosis in the inner cell mass.

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

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