

Cdk7 Cas9-CKO Strategy

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Project Overview

Project Name

Cdk7

Project type

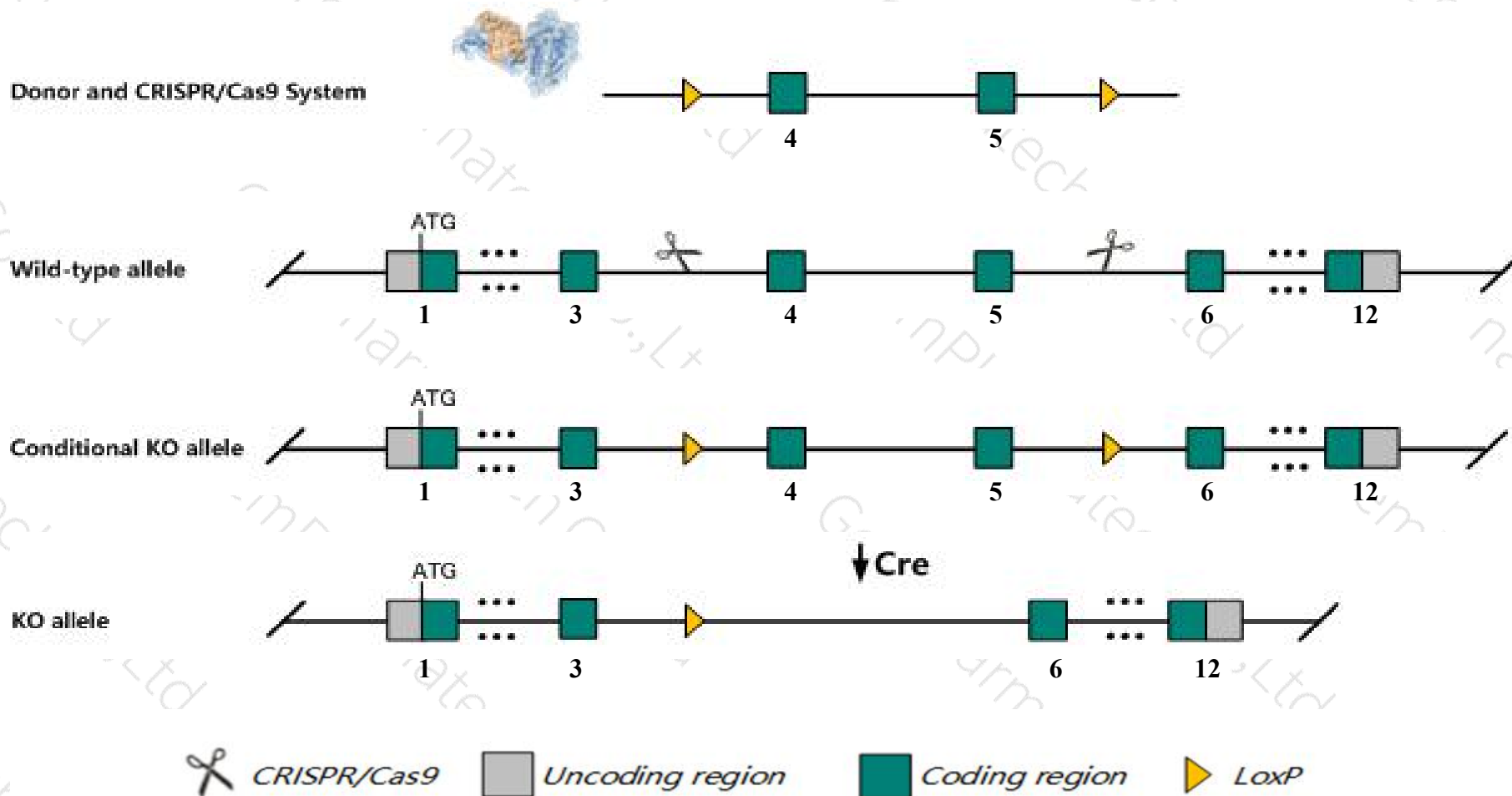
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Cdk7* gene. The schematic diagram is as follows:



- The *Cdk7* gene has 5 transcripts. According to the structure of *Cdk7* gene, exon4-exon5 of *Cdk7-201* (ENSMUST00000091299.7) transcript is recommended as the knockout region. The region contains 137bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Cdk7* 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 null allele exhibit abnormal trophoblast layer morphology, abnormal inner cell mass apoptosis, and complete embryonic lethality during peri-implantation stages. Homozygous null MEFs display absent fibroblast proliferation.
- The *Cdk7* gene is located on the Chr13. 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)

Cdk7 cyclin-dependent kinase 7 [*Mus musculus* (house mouse)]

Gene ID: 12572, updated on 12-Aug-2019

Summary

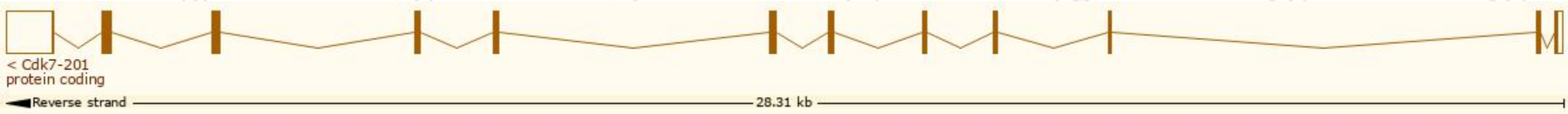
Official Symbol	Cdk7 provided by MGI
Official Full Name	cyclin-dependent kinase 7 provided by MGI
Primary source	MGI:MGI:102956
See related	Ensembl:ENSMUSG00000069089
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Crk4; Cdkn7; AI323415; AI528512; C230069N13
Expression	Ubiquitous expression in limb E14.5 (RPKM 5.1), placenta adult (RPKM 4.4) and 28 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

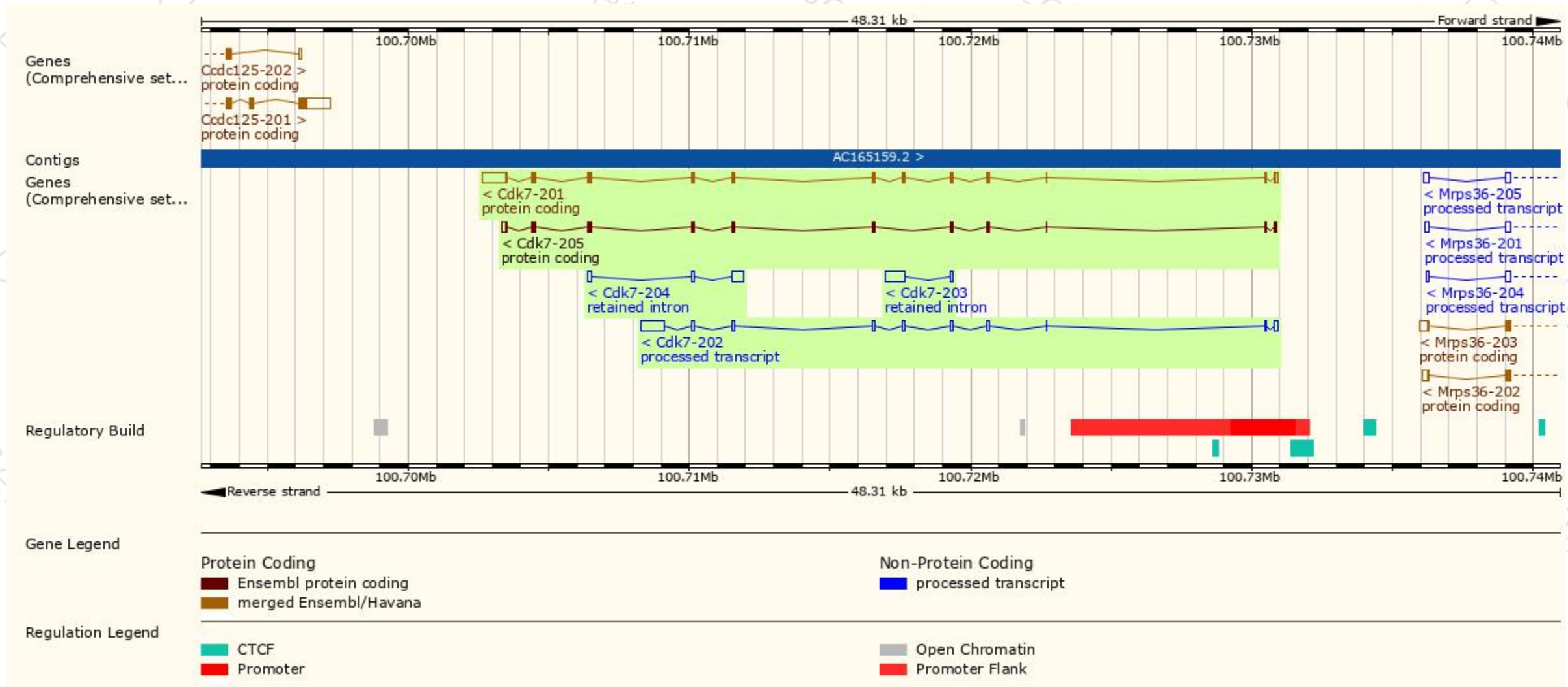
The gene has 5 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Cdk7-201	ENSMUST00000091299.7	1988	346aa	Protein coding	CCDS36766	Q03147 Q3THG5	TSL:1 GENCODE basic APPRIS P1
Cdk7-205	ENSMUST00000225990.1	1159	309aa	Protein coding	-	A0A286YDC0	GENCODE basic
Cdk7-202	ENSMUST00000225056.1	1595	No protein	Processed transcript	-	-	-
Cdk7-203	ENSMUST00000225578.1	763	No protein	Retained intron	-	-	-
Cdk7-204	ENSMUST00000225946.1	681	No protein	Retained intron	-	-	-

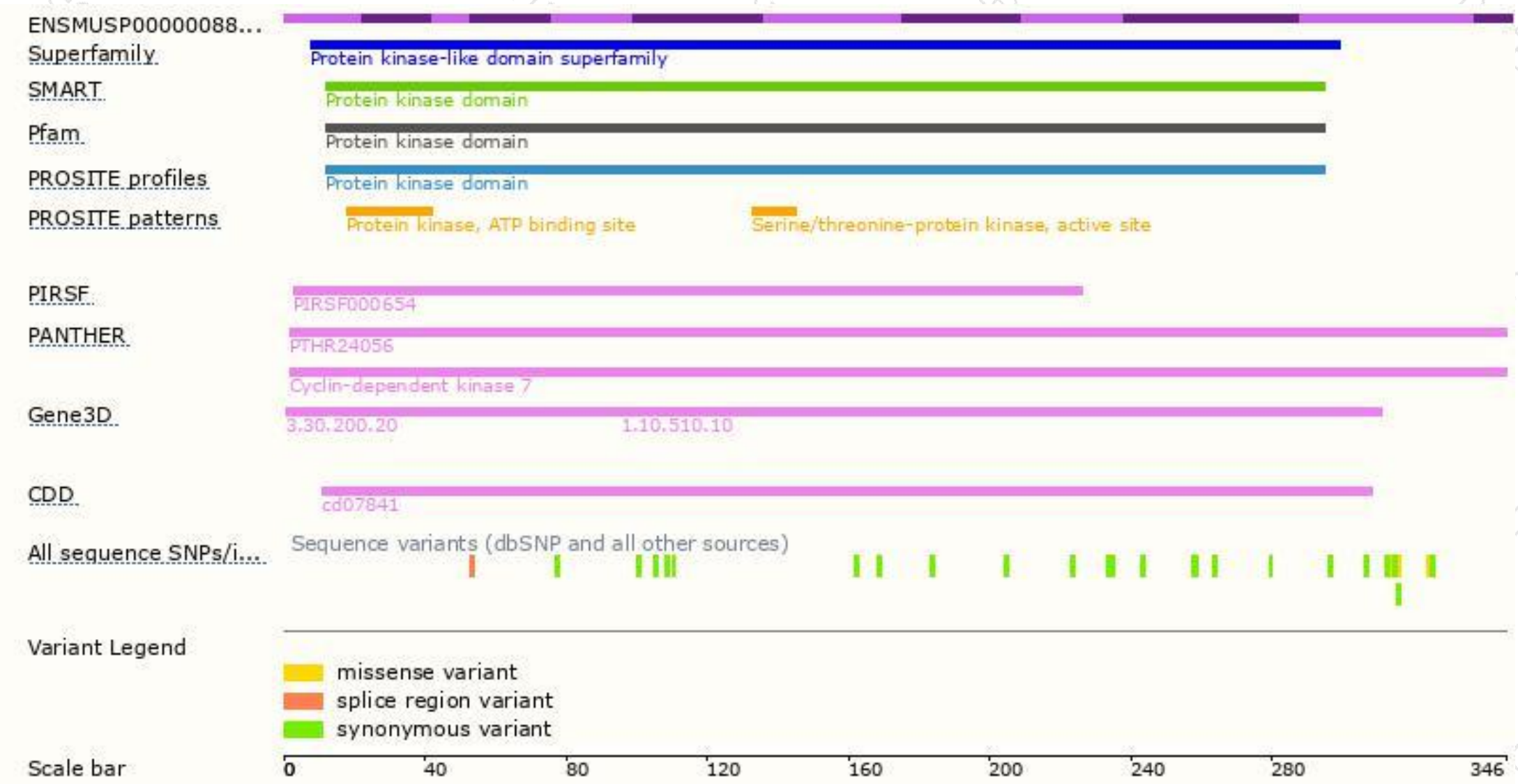
The strategy is based on the design of *Cdk7-201* transcript,the transcription is shown below:



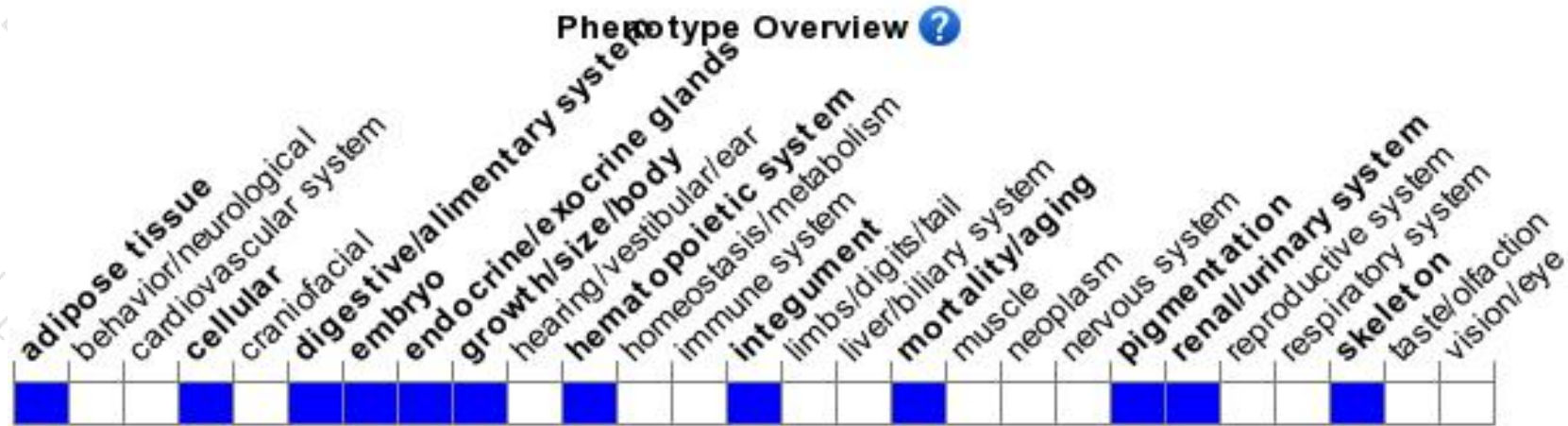
Genomic location distribution



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 null allele exhibit abnormal trophoblast layer morphology, abnormal inner cell mass apoptosis, and complete embryonic lethality during peri-implantation stages. Homozygous null MEI display absent fibroblast proliferation.

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

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