

Cask Cas9-KO Strategy

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Reviewer: Miaomiao Cui

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Project Overview

Project Name

Cask

Project type

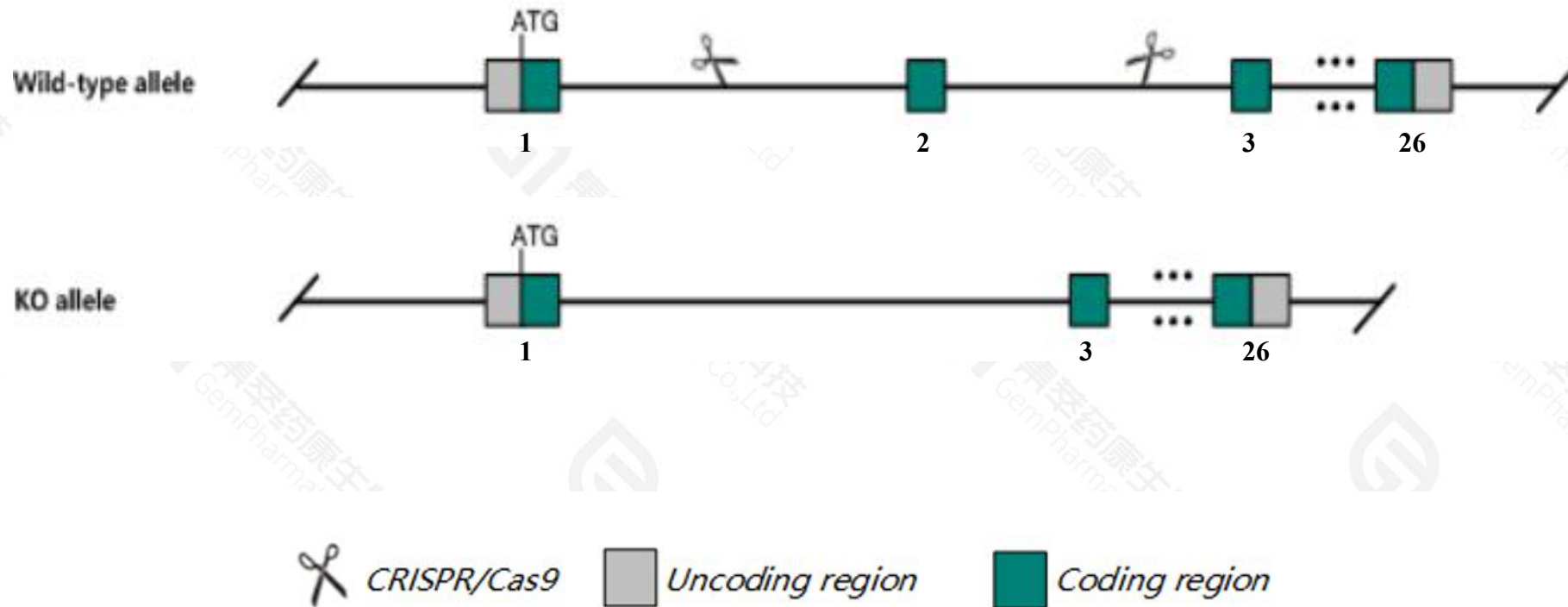
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

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



- The *Cask* gene has 12 transcripts. According to the structure of *Cask* gene, exon2 of *Cask*-204(ENSMUST00000115438.10) transcript is recommended as the knockout region. The region contains 113bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Cask* gene. The brief process is as follows: CRISPR/Cas9 system 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.

- According to the existing MGI data, mutation of this gene results in cleft palate and perinatal lethality in hemizygous males and death within 2 weeks in females on a C57BL/6J background. Some female animals on a CD1 background survive to adulthood exhibiting patchy fur, wrinkled skin, a kinked tail and spine, and give birth to small and infrequent litters. Male and female animals on all genetic backgrounds exhibit reduced head size, shortened jaw, and a pointed snout.
- Transcript *Cask*-202&206&207&209 may not be affected.
- The *Cask* 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 the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

Gene information (NCBI)

Cask calcium/calmodulin-dependent serine protein kinase (MAGUK family) [Mus musculus (house mouse)]

Gene ID: 12361, updated on 13-Mar-2020

Summary

Official Symbol Cask provided by [MGI](#)

Official Full Name calcium/calmodulin-dependent serine protein kinase (MAGUK family) provided by [MGI](#)

Primary source [MGI:MGI:1309489](#)

See related [Ensembl:ENSMUSG00000031012](#)

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 DXPri1, DXRib1, LIN-2, Pals3, mLin-2

Expression Broad expression in CNS E18 (RPKM 10.1), whole brain E14.5 (RPKM 9.1) and 24 other tissues [See more](#)

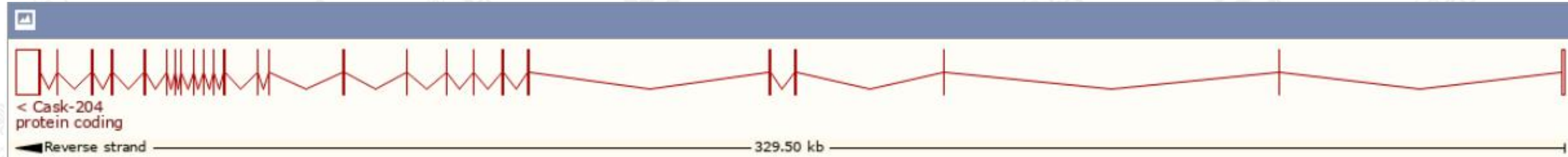
Orthologs [human](#) [all](#)

Transcript information (Ensembl)

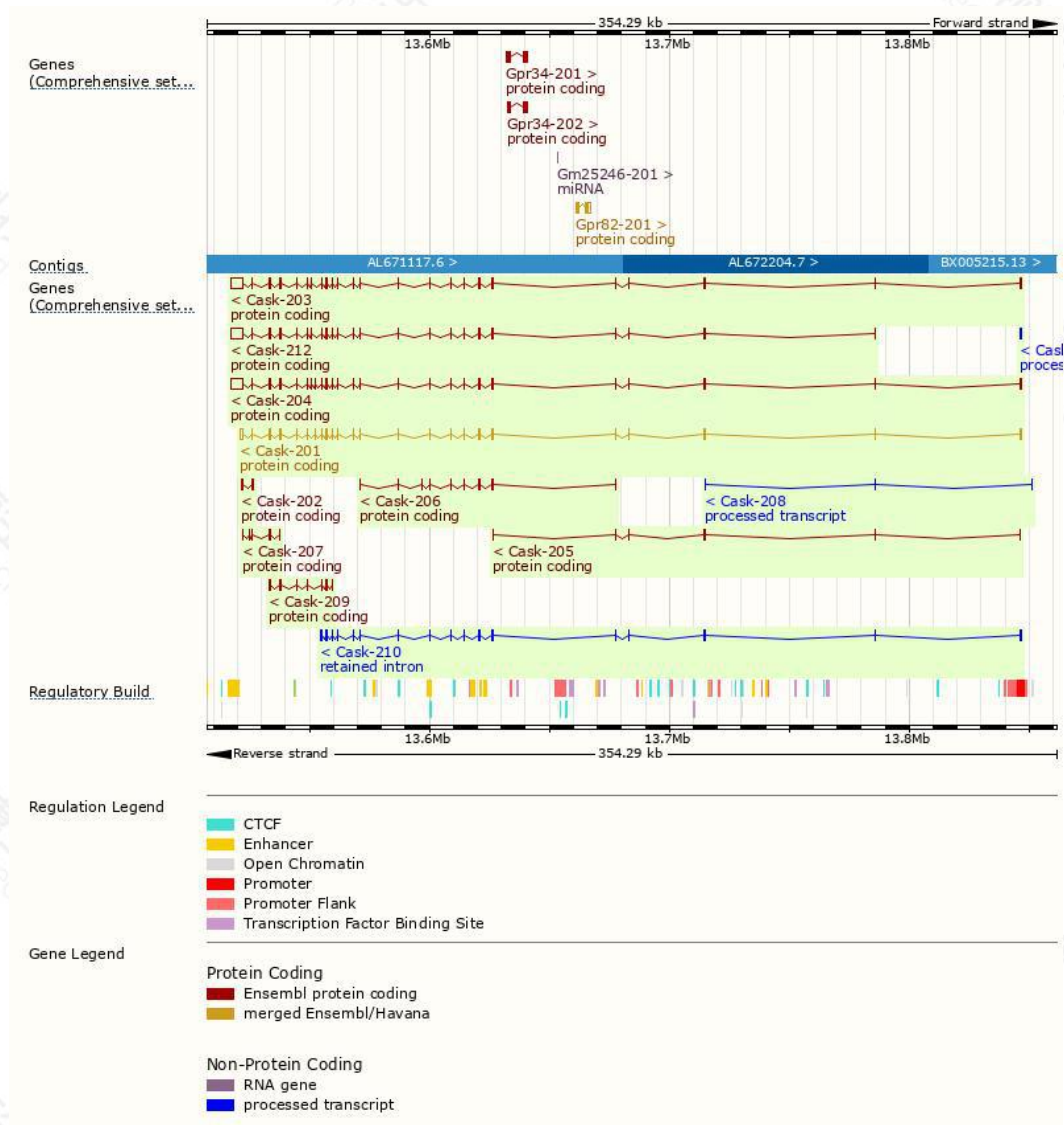
The gene has 12 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Cask-204	ENSMUST00000115438.9	8366	920aa	Protein coding	CCDS72343	O70589	TSL:1 GENCODE basic APPRIS ALT1
Cask-203	ENSMUST00000115436.8	8260	897aa	Protein coding	CCDS40878	O70589	TSL:2 GENCODE basic APPRIS P3
Cask-212	ENSMUST00000156096.7	7707	871aa	Protein coding	-	A0A067XG53	CDS 5' incomplete TSL:5
Cask-201	ENSMUST00000033321.10	4057	908aa	Protein coding	-	O70589	TSL:5 GENCODE basic
Cask-209	ENSMUST00000139735.2	845	282aa	Protein coding	-	F6Y9I5	5' and 3' truncations in transcript evidence prevent annotation of the start and the end of the CDS. CDS 5' and 3' incomplete TSL:5
Cask-206	ENSMUST00000128012.1	745	249aa	Protein coding	-	F6ZQR2	5' and 3' truncations in transcript evidence prevent annotation of the start and the end of the CDS. CDS 5' and 3' incomplete TSL:5
Cask-202	ENSMUST00000115435.8	726	111aa	Protein coding	-	B1AUH6	TSL:3 GENCODE basic
Cask-207	ENSMUST00000128095.2	666	191aa	Protein coding	-	F7CD87	CDS 5' incomplete TSL:5
Cask-205	ENSMUST00000124710.1	487	155aa	Protein coding	-	B1AUH5	CDS 3' incomplete TSL:5
Cask-208	ENSMUST00000132240.1	354	No protein	Processed transcript	-	-	TSL:3
Cask-211	ENSMUST00000155989.1	212	No protein	Processed transcript	-	-	TSL:3
Cask-210	ENSMUST00000152358.7	2525	No protein	Retained intron	-	-	TSL:5

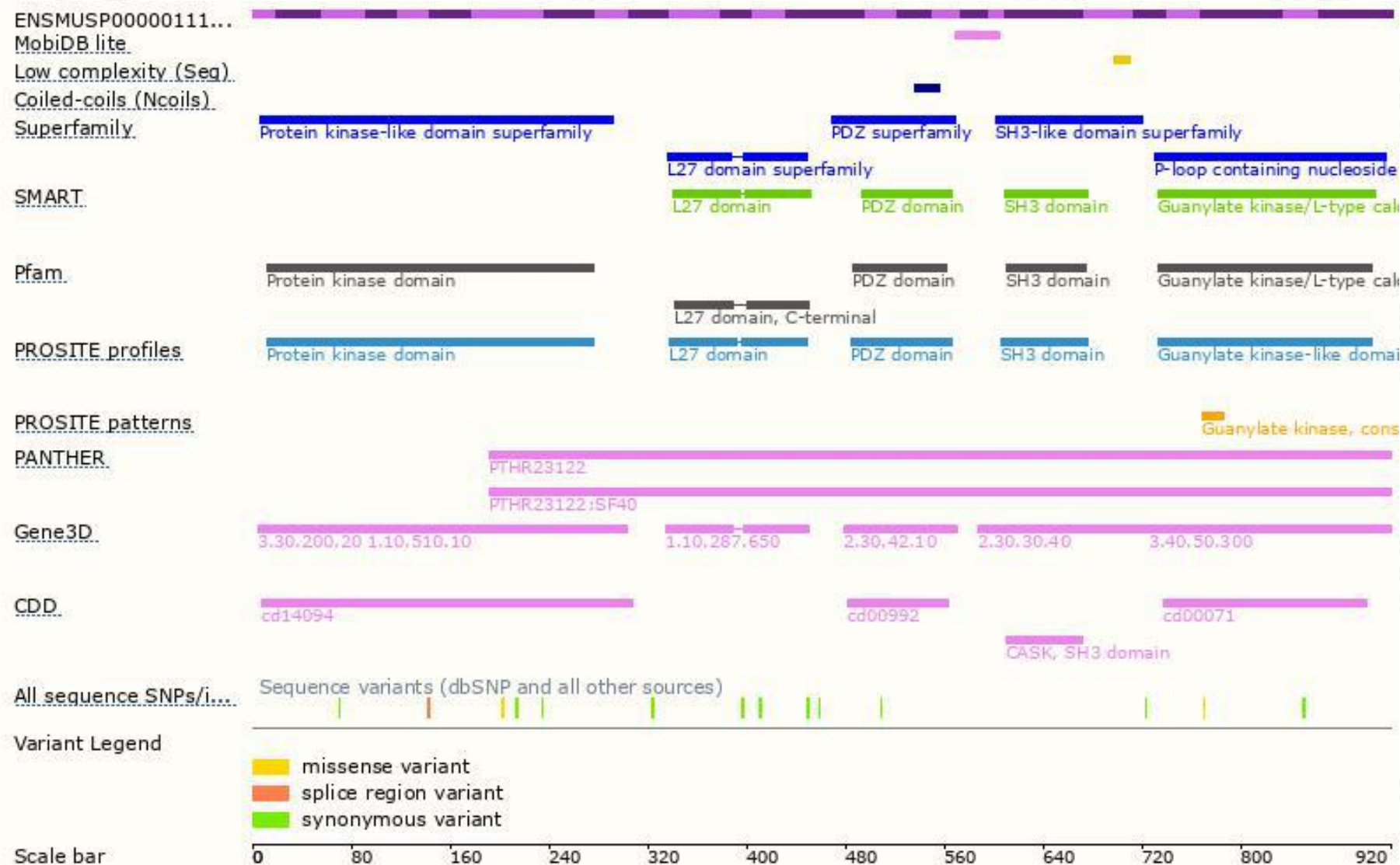
The strategy is based on the design of *Cask-204* transcript,the transcription is shown below:



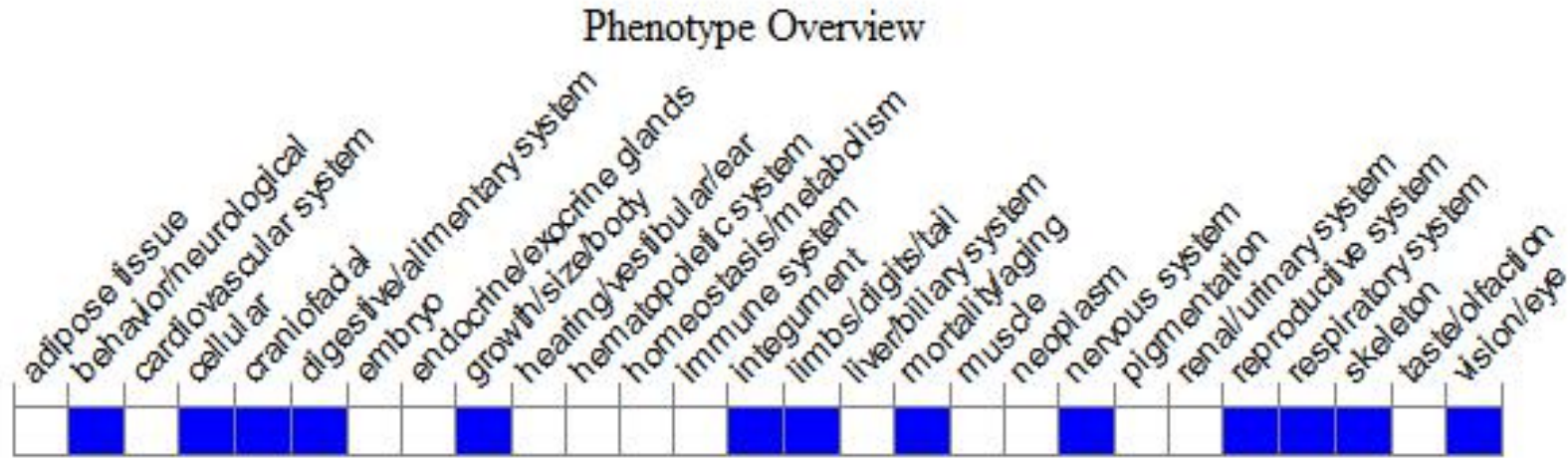
Genomic location distribution



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, mutation of this gene results in cleft palate and perinatal lethality in hemizygous males and death within 2 weeks in females on a C57BL/6J background. Some female animals on a CD1 background survive to adulthood exhibiting patchy fur, wrinkled skin, a kinked tail and spine, and give birth to small and infrequent litters. Male and female animals on all genetic backgrounds exhibit reduced head size, shortened jaw, and a pointed snout.

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