

Cav1 Cas9-KO Strategy

Designer:

Jinling Wang

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Project Overview

Project Name

Cav1

Project type

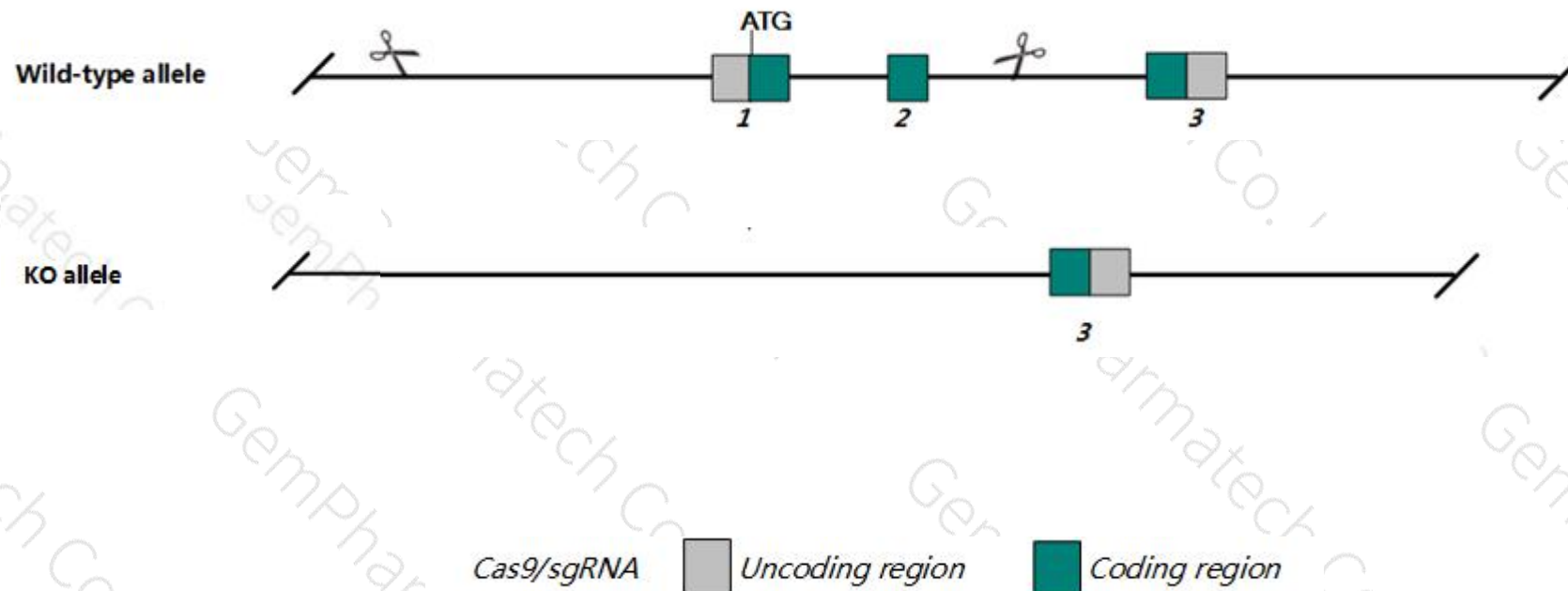
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Cav1* gene. The schematic diagram is as follows:



Technical routes

- The *Cav1* gene has 10 transcripts. According to the structure of *Cav1* gene, the predicted promoter region and exon1-2 of *Cav1*-201 (ENSMUST000000007799.12) transcript is recommended as the knockout region. The region contains the predicted promoter sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Cav1* 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.

- According to the existing MGI data: Homozygous targeted mutants displayed vascular system dysfunctions and thickening of lung aveloar septa from hyperproliferation and fibrosis, ultimately causing the mice physical limitations. Mice also display increased incidence of calcium calculi, kidney stones, and decreased adiposity.
- The *Cav1* gene is located on the Chr6. 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)

Cav1 caveolin 1, caveolae protein [*Mus musculus* (house mouse)]

Gene ID: 12389, updated on 23-Oct-2018

Summary

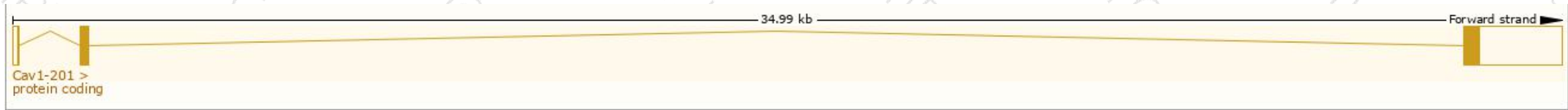
| | |
|--------------------|---|
| Official Symbol | Cav1 provided by MGI |
| Official Full Name | caveolin 1, caveolae protein provided by MGI |
| Primary source | MGI:MGI:102709 |
| See related | Ensembl:ENSMUSG000000007655 Vega:OTTMUSG000000024023 |
| Gene type | protein coding |
| RefSeq status | 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 | Cav, Cav-1 |
| Expression | Biased expression in subcutaneous fat pad adult (RPKM 331.4), genital fat pad adult (RPKM 281.9) and 8 other tissues See more |
| Orthologs | human all |

Transcript information (Ensembl)

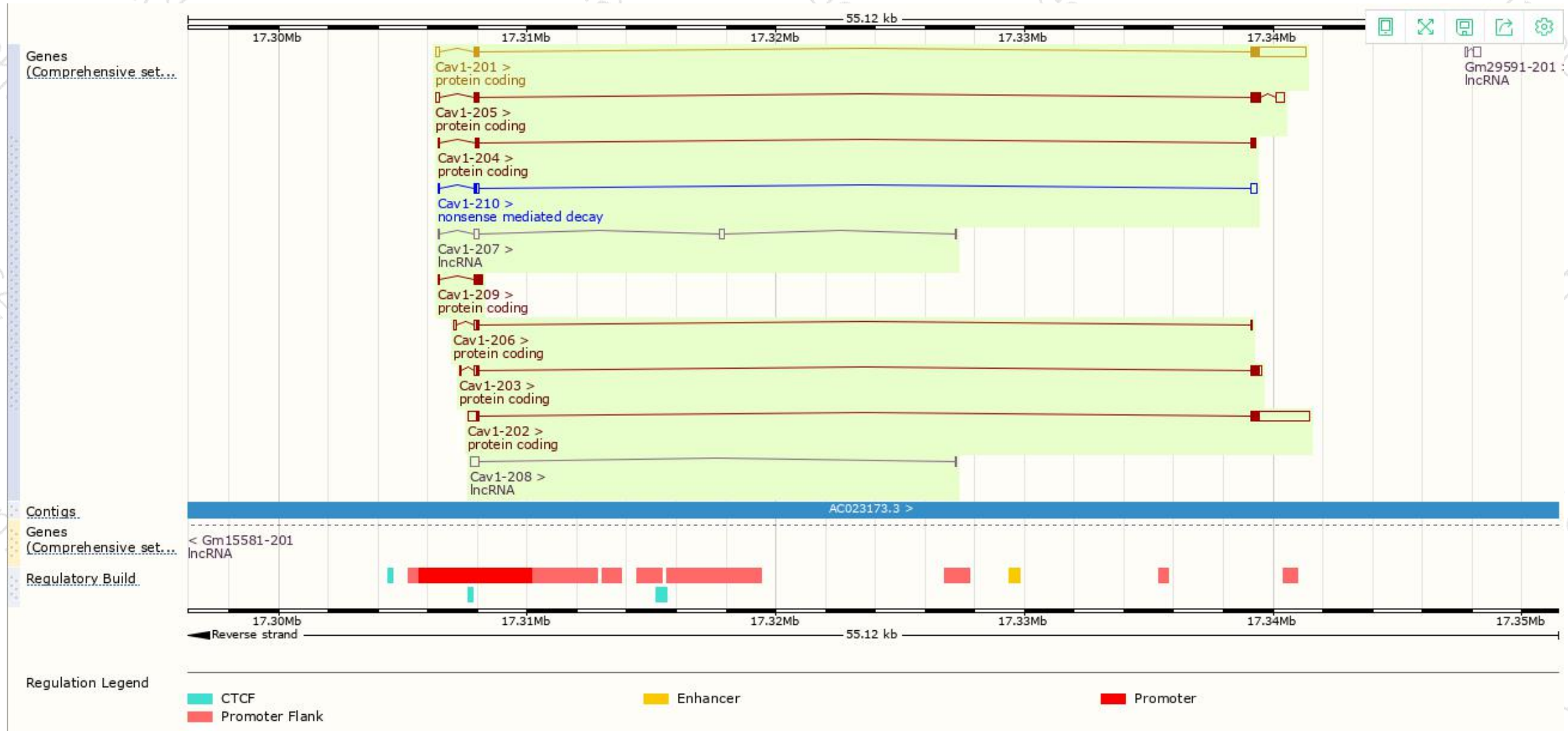
The gene has 10 transcripts, and all transcripts are shown below:

| Name ▲ | Transcript ID ▲ | bp ▲ | Protein ▲ | Biotype ▲ | CCDS ▲ | UniProt ▲ | Flags ▲ |
|----------|---------------------------------------|------|-----------------------|-------------------------|---------------------------|------------------------|---------------------------------|
| Cav1-201 | ENSMUST00000007799.12 | 2522 | 178aa | Protein coding | CCDS19924 | P49817 | TSL:1 GENCODE basic APPRIS P3 |
| Cav1-202 | ENSMUST00000115453.1 | 2746 | 147aa | Protein coding | CCDS57410 | P49817 | TSL:1 GENCODE basic APPRIS ALT1 |
| Cav1-203 | ENSMUST00000115454.1 | 613 | 147aa | Protein coding | CCDS57410 | P49817 | TSL:2 GENCODE basic APPRIS ALT1 |
| Cav1-204 | ENSMUST00000115455.2 | 386 | 115aa | Protein coding | - | D3Z148 | CDS 3' incomplete TSL:3 |
| Cav1-205 | ENSMUST00000115456.5 | 995 | 178aa | Protein coding | CCDS19924 | P49817 | TSL:2 GENCODE basic APPRIS P3 |
| Cav1-206 | ENSMUST00000123439.7 | 323 | 47aa | Protein coding | - | D3Z0J2 | CDS 3' incomplete TSL:3 |
| Cav1-207 | ENSMUST00000130505.2 | 461 | No protein | lncRNA | - | - | TSL:3 |
| Cav1-208 | ENSMUST00000133065.1 | 345 | No protein | lncRNA | - | - | TSL:5 |
| Cav1-209 | ENSMUST00000150901.1 | 380 | 93aa | Protein coding | - | H3BKG0 | TSL:2 GENCODE basic |
| Cav1-210 | ENSMUST00000177234.1 | 483 | 40aa | Nonsense mediated decay | - | H3BLQ4 | TSL:3 |

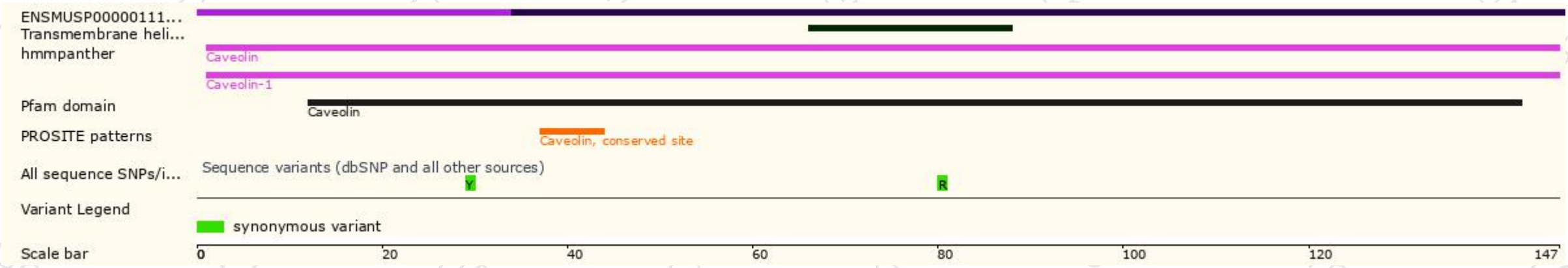
The strategy is based on the design of *Cav1*-201 transcript, The transcription is shown below



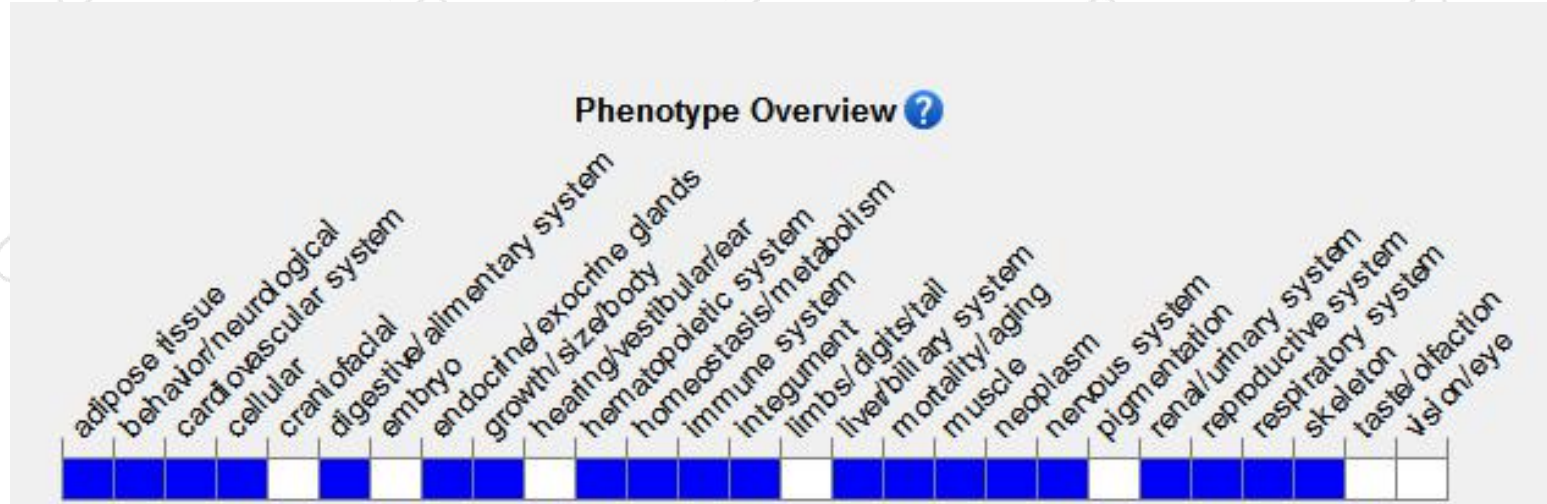
Genomic location distribution



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/>) .

Homozygous targeted mutants displayed vascular system dysfunctions and thickening of lung alveolar septa from hyperproliferation and fibrosis, ultimately causing the mice physical limitations. Mice also display increased incidence of calcium calculi, kidney stones, and decreased adiposity.

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

Tel: 400-9660890



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