

Cacna1c Cas9-KO Strategy

Designer:Lixin LYU

Project Overview

Project Name

Cacna1c

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

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



- The *Cacnalc* gene has 27 transcripts. According to the structure of *Cacnalc* gene, exon7-exon8 of *Cacnalc*-202 (ENSMUST00000078320.13) transcript is recommended as the knockout region. The region contains 301bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Cacnalc* 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, Mice homozygous for mutations that inactivate the gene do not survive to term. Selective ablation in beta cells resulted in impaired insulin secretion and systemic glucose intolerance. Heterozygotes were hypoactive, showed increased anxiety, and poor motor coordination.
- The *Cacnal* 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)

Cacna1c calcium channel, voltage-dependent, L type, alpha 1C subunit [Mus musculus (house mouse)]

Gene ID: 12288, updated on 30-Mar-2019

Summary



Official Symbol	Cacna1c provided by MGI
Official Full Name	calcium channel, voltage-dependent, L type, alpha 1C subunit provided by MGI
Primary source	MGI:MGI:103013
See related	Ensembl:ENSMUSG000000051331
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	Cav1.2, Cchl1a1, D930026N18Rik, MBC, MELC-CC
Expression	Broad expression in heart adult (RPKM 11.2), adrenal adult (RPKM 6.3) and 16 other tissues See more
Orthologs	human all

Transcript information（Ensembl）

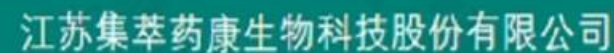
The gene has 27 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Cacna1c-207	ENSMUST00000186889.6	13162	2169aa	Protein coding	CCDS80592	Q0PCR6	TSL1 GENCODE basic APPRIS ALT2
Cacna1c-202	ENSMUST00000078320.13	8062	2139aa	Protein coding	CCDS80590	Q01815	TSL1 GENCODE basic APPRIS ALT2
Cacna1c-203	ENSMUST00000112790.8	7631	2139aa	Protein coding	CCDS80589	F8WJL1	TSL1 GENCODE basic APPRIS ALT2
Cacna1c-201	ENSMUST00000075591.12	7584	2139aa	Protein coding	CCDS80590	Q01815	TSL1 GENCODE basic APPRIS ALT2
Cacna1c-205	ENSMUST00000112825.8	7577	1889aa	Protein coding	CCDS71821	Q01815	TSL1 GENCODE basic
Cacna1c-212	ENSMUST00000187940.6	7507	2169aa	Protein coding	CCDS80593	G7TQ57	TSL1 GENCODE basic APPRIS ALT2
Cacna1c-210	ENSMUST00000187474.6	6911	2169aa	Protein coding	CCDS80594	G7TQ59	TSL1 GENCODE basic APPRIS ALT2
Cacna1c-204	ENSMUST00000112793.9	6669	2222aa	Protein coding	CCDS80587	E7C376	TSL1 GENCODE basic
Cacna1c-222	ENSMUST00000190285.1	6585	2194aa	Protein coding	CCDS80585	A0A087WSE7	TSL1 GENCODE basic APPRIS P4
Cacna1c-214	ENSMUST00000188106.6	6462	2153aa	Protein coding	CCDS80588	A0A087WS40	TSL1 GENCODE basic
Cacna1c-227	ENSMUST00000220022.1	7765	2063aa	Protein coding	-	A0A1W2P731	TSL5 GENCODE basic
Cacna1c-226	ENSMUST00000219833.1	7591	2005aa	Protein coding	-	A0A1W2P6Z7	TSL5 GENCODE basic
Cacna1c-224	ENSMUST00000219018.1	7516	1980aa	Protein coding	-	A0A1W2P805	TSL5 GENCODE basic
Cacna1c-225	ENSMUST00000219223.1	7483	1969aa	Protein coding	-	A0A1W2P6T3	TSL5 GENCODE basic
Cacna1c-216	ENSMUST00000188522.6	7338	2164aa	Protein coding	-	A0A087WS67	TSL5 GENCODE basic APPRIS ALT2
Cacna1c-209	ENSMUST00000187386.6	6906	2135aa	Protein coding	-	A0A087WQ79	TSL5 GENCODE basic
Cacna1c-208	ENSMUST00000187317.6	6663	2187aa	Protein coding	-	A0A087WRM3	TSL5 GENCODE basic APPRIS ALT2
Cacna1c-219	ENSMUST00000189389.6	6603	2167aa	Protein coding	-	A0A087WPP1	TSL5 GENCODE basic APPRIS ALT2
Cacna1c-206	ENSMUST00000185345.6	6579	2159aa	Protein coding	-	A0A087WRZ6	TSL5 GENCODE basic APPRIS ALT2
Cacna1c-220	ENSMUST00000189520.6	6570	2156aa	Protein coding	-	A0A087WQJ4	TSL5 GENCODE basic APPRIS ALT2
Cacna1c-213	ENSMUST00000188078.6	6519	2139aa	Protein coding	-	A0A087WR02	TSL5 GENCODE basic APPRIS ALT2
Cacna1c-217	ENSMUST00000188865.6	6519	2139aa	Protein coding	-	A0A087WPZ8	TSL5 GENCODE basic APPRIS ALT2
Cacna1c-215	ENSMUST00000188181.6	7577	No protein	Processed transcript	-	-	TSL1
Cacna1c-223	ENSMUST00000191196.1	2374	No protein	Processed transcript	-	-	TSL1
Cacna1c-218	ENSMUST00000189057.1	954	No protein	Processed transcript	-	-	TSL1
Cacna1c-211	ENSMUST00000187849.1	715	No protein	Processed transcript	-	-	TSL3
Cacna1c-221	ENSMUST00000189930.1	4931	No protein	Retained intron	-	-	TSLNA

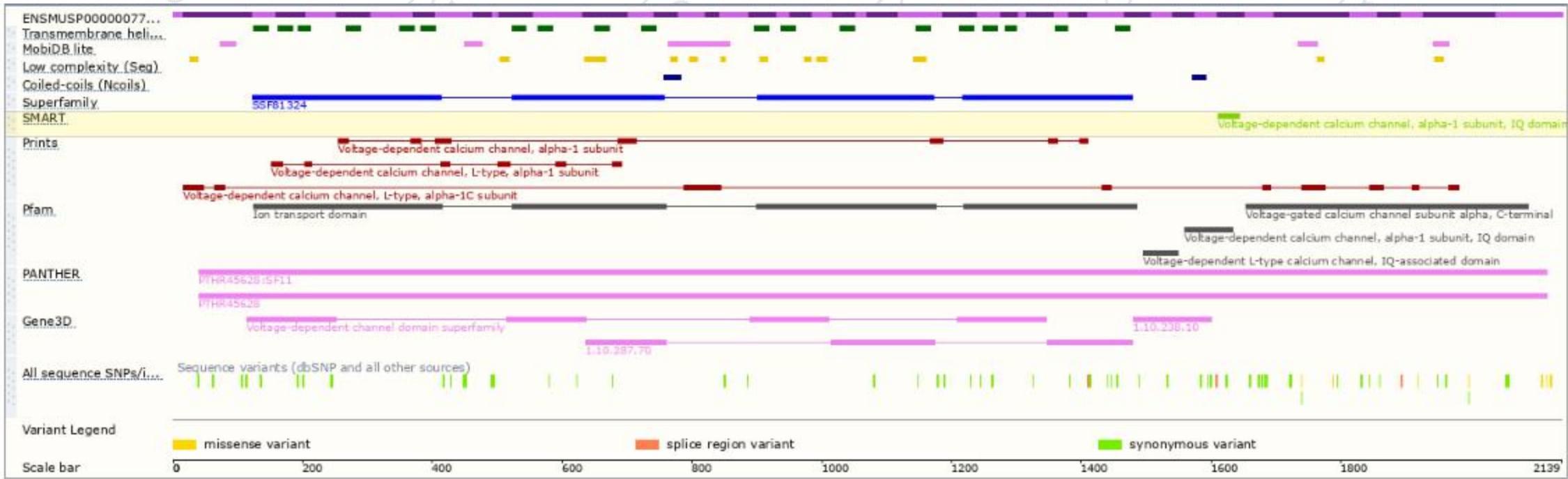
The strategy is based on the design of *Cacna1c-202* transcript,The transcription is shown below



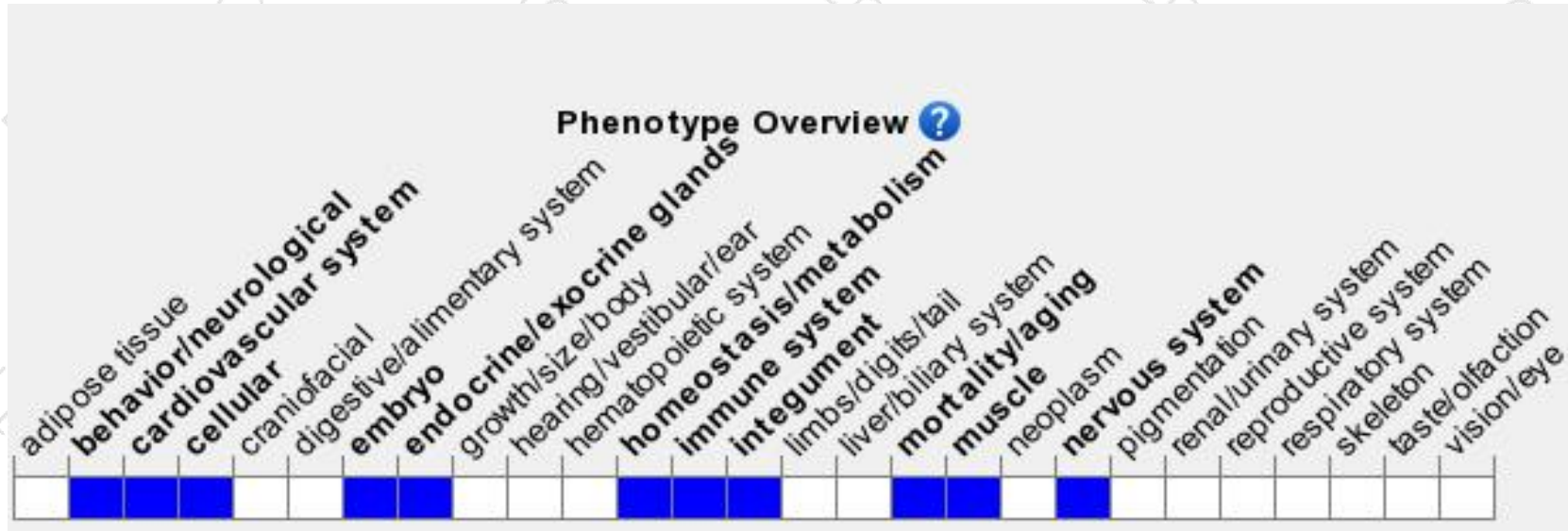
集萃药康
GemPharmatech



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 mutations that inactivate the gene do not survive to term.

Selective ablation in beta cells resulted in impaired insulin secretion and systemic glucose intolerance. Heterozygotes were hypoactive, showed increased anxiety, and poor motor coordination.

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

Tel: 400-9660890

