

Cacna2d1 Cas9-KO Strategy

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Reviewer:

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Project Overview

Project Name

Cacna2d1

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Cacna2d1* gene. The schematic diagram is as follows:



- The *Cacna2d1* gene has 12 transcripts. According to the structure of *Cacna2d1* gene, exon2 of *Cacna2d1*-202 (ENSMUST00000078272.12) transcript is recommended as the knockout region. The region contains 82bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Cacna2d1* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Mice with a point mutation allele exhibit abnormal CNS synaptic transmission and decreased response to pregabalin.
- The *Cacna2d1* gene is located on the Chr5. 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.

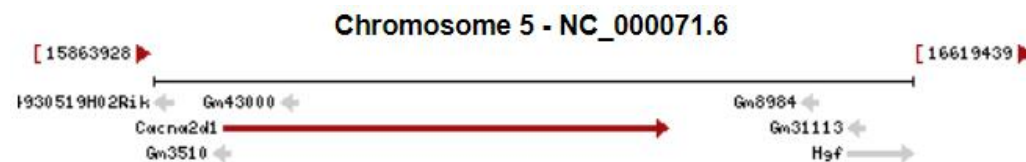
Gene information (NCBI)

Cacna2d1 calcium channel, voltage-dependent, alpha2/delta subunit 1 [*Mus musculus* (house mouse)]

Gene ID: 12293, updated on 28-Oct-2019

Summary

Official Symbol	Cacna2d1 provided by MGI
Official Full Name	calcium channel, voltage-dependent, alpha2/delta subunit 1 provided by MGI
Primary source	MGI:MGI:88295
See related	Ensembl:ENSMUSG00000040118
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Cacna2; Cchl2a; Ca(v)alpha2delta1
Summary	This gene encodes a regulatory component of the voltage-dependent calcium channel complex. The product of this gene is a proprotein that is proteolytically processed into alpha-2 and delta subunits, which are linked by a disulfide bond. Alternatively spliced transcript variants encoding multiple isoforms have been observed for this gene. [provided by RefSeq, Jan 2013]
Expression	Biased expression in frontal lobe adult (RPKM 14.3), cortex adult (RPKM 11.8) and 14 other tissues See more
Orthologs	human all

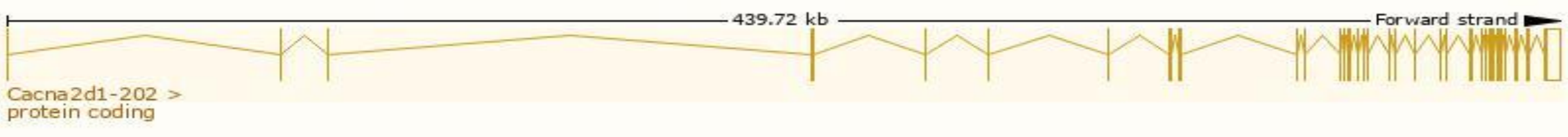


Transcript information (Ensembl)

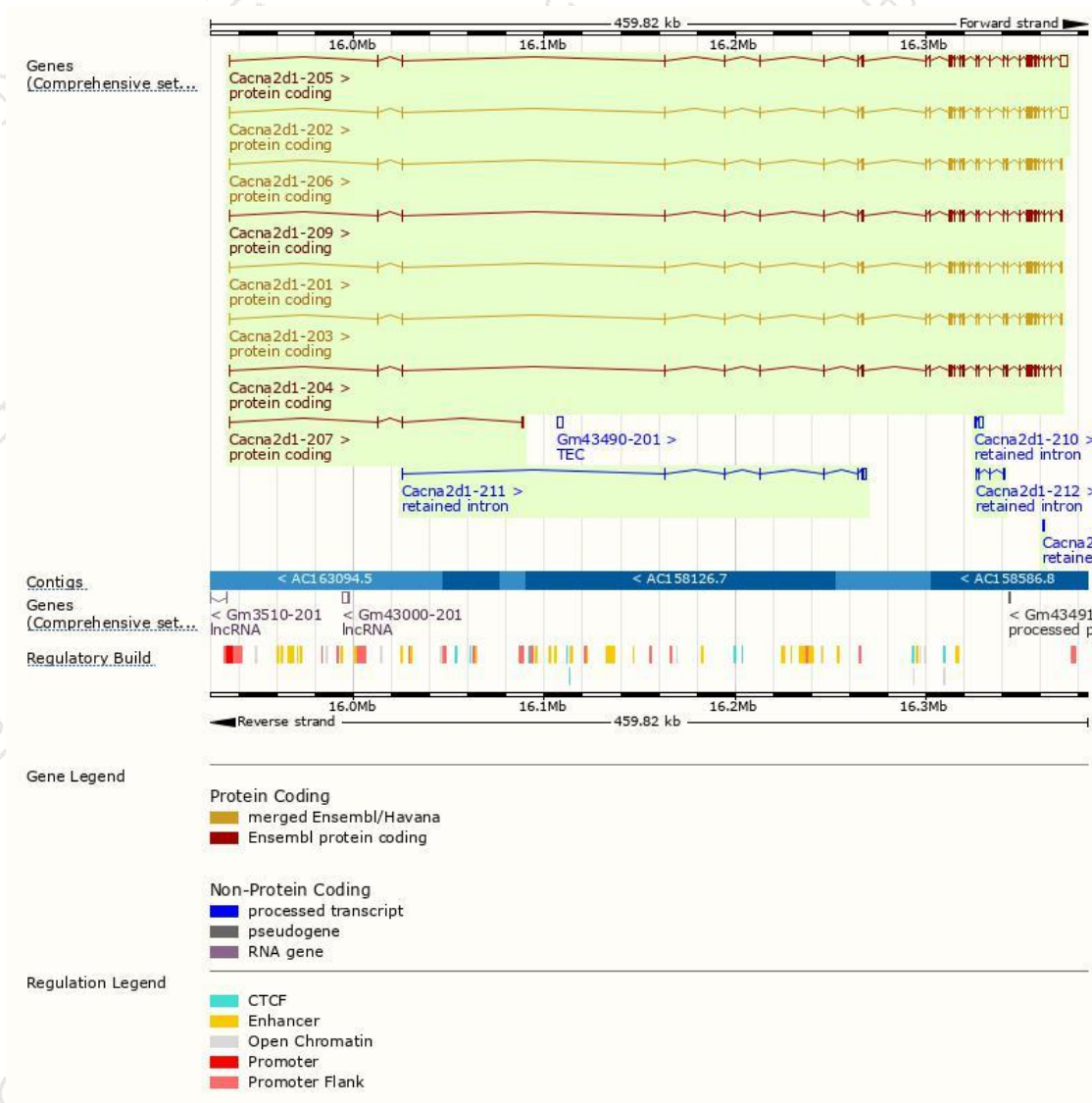
The gene has 12 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Cacna2d1-202	ENSMUST00000078272.12	7311	1084aa	Protein coding	CCDS19096	O08532	TSL:1 GENCODE basic APPRIS P3
Cacna2d1-201	ENSMUST00000039370.13	3933	1103aa	Protein coding	CCDS51421	O08532	TSL:1 GENCODE basic APPRIS ALT1
Cacna2d1-206	ENSMUST00000180204.7	3882	1086aa	Protein coding	CCDS51423	O08532 Q14BH8	TSL:1 GENCODE basic APPRIS ALT1
Cacna2d1-203	ENSMUST00000101581.9	3879	1091aa	Protein coding	CCDS51422	O08532	TSL:1 GENCODE basic APPRIS ALT1
Cacna2d1-209	ENSMUST00000199704.4	3861	1079aa	Protein coding	CCDS80212	O08532	TSL:1 GENCODE basic APPRIS ALT1
Cacna2d1-204	ENSMUST00000115281.6	3412	1086aa	Protein coding	CCDS51423	O08532 Q14BH8	TSL:1 GENCODE basic APPRIS ALT1
Cacna2d1-205	ENSMUST00000167946.8	7436	1091aa	Protein coding	-	E9Q1X8	TSL:5 GENCODE basic APPRIS ALT1
Cacna2d1-207	ENSMUST00000196750.1	1272	100aa	Protein coding	-	Q8C6Y3	TSL:1 GENCODE basic
Cacna2d1-210	ENSMUST00000200158.1	2310	No protein	Retained intron	-	-	TSL:2
Cacna2d1-211	ENSMUST00000200270.1	1866	No protein	Retained intron	-	-	TSL:5
Cacna2d1-212	ENSMUST00000200294.1	720	No protein	Retained intron	-	-	TSL:3
Cacna2d1-208	ENSMUST00000199236.1	543	No protein	Retained intron	-	-	TSL:5

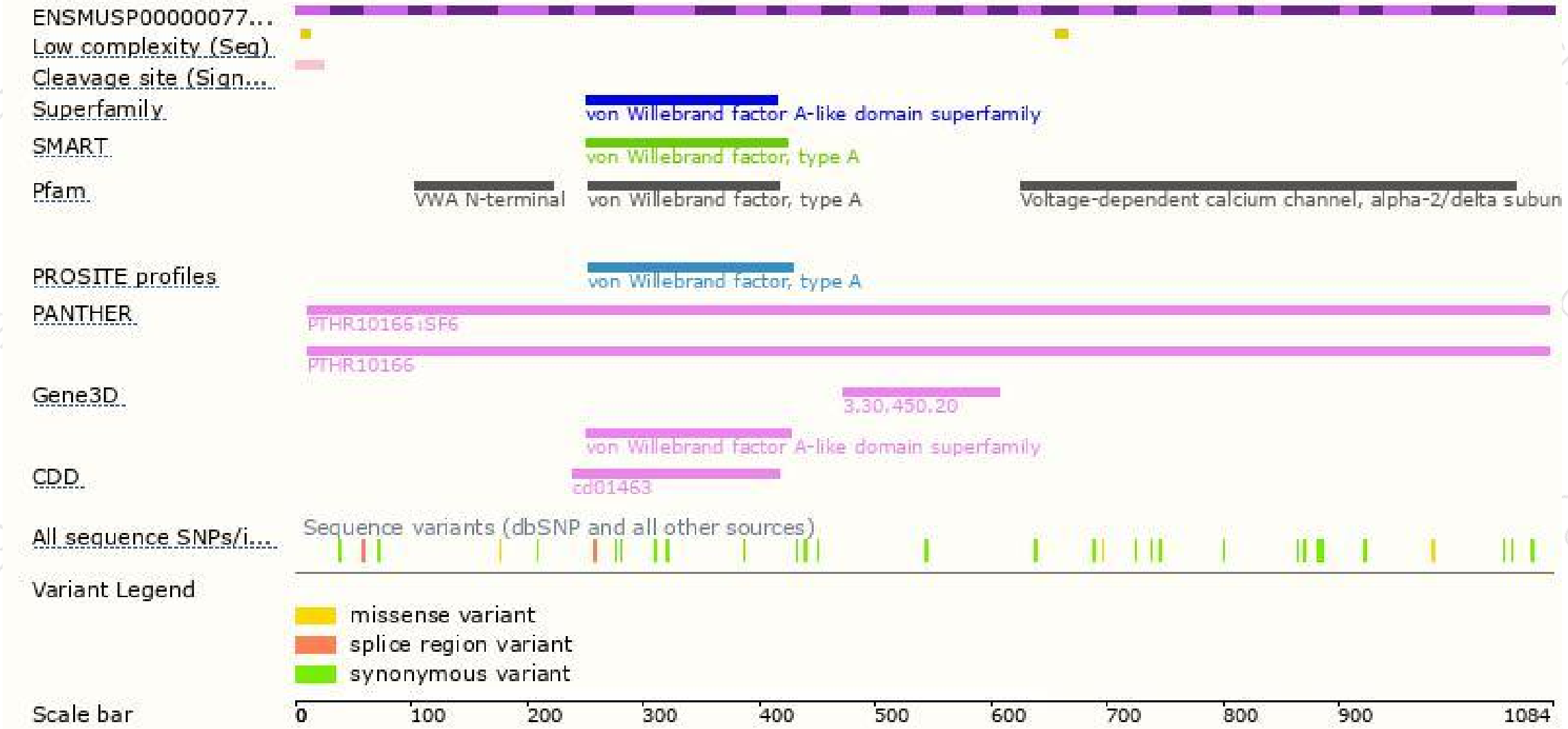
The strategy is based on the design of *Cacna2d1-202* transcript,The transcription is shown below



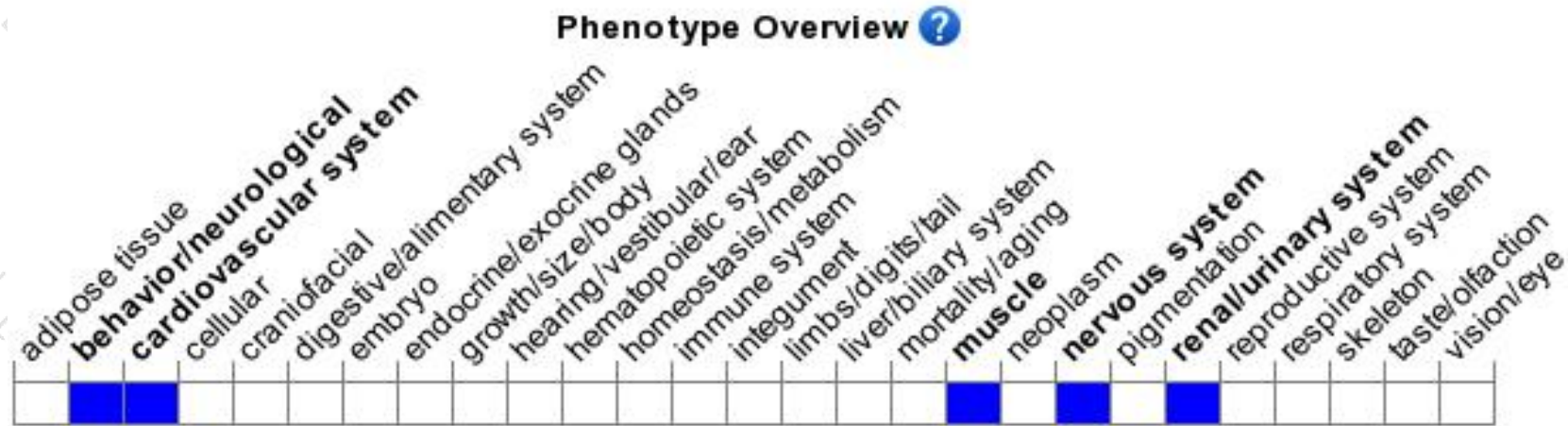
Genomic location distribution



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 with a point mutation allele exhibit abnormal CNS synaptic transmission and decreased response to pregabalin.

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

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