

***Camk2d* Cas9-KO Strategy**

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Project Overview

Project Name

Camk2d

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Camk2d* gene. The schematic diagram is as follows:



- The *Camk2d* gene has 28 transcripts. According to the structure of *Camk2d* gene, exon2 of *Camk2d*-226 (ENSMUST00000199300.4) transcript is recommended as the knockout region. The region contains 95bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Camk2d* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Mice homozygous for a knock-out allele exhibit reduced response to heart induced stress. Mice homozygous for an allele that produces an oxidant-resistant product exhibit reduced response to myocardial infarction in a diabetic model.
- *Gm43011* gene will be destroyed in this strategy.
- Transcript *Camk2d*-201&211&214&217&218&220&222&223&224&225&227 may not be affected.
- The *Camk2d* gene is located on the Chr3. 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)

Camk2d calcium/calmodulin-dependent protein kinase II, delta [*Mus musculus* (house mouse)]

Gene ID: 108058, updated on 10-Oct-2019

Summary

Official Symbol	Camk2d provided by MGI
Official Full Name	calcium/calmodulin-dependent protein kinase II, delta provided by MGI
Primary source	MGI:MGI:1341265
See related	Ensembl:ENSMUSG00000053819
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	CaMK II; [d]-CaMKII; 2810011D23Rik; 8030469K03Rik
Expression	Ubiquitous expression in bladder adult (RPKM 17.7), adrenal adult (RPKM 15.0) and 24 other tissues See more
Orthologs	human all

Genomic context

Location: 3; 3 G1

See Camk2d in [Genome Data Viewer](#)

Exon count: 26

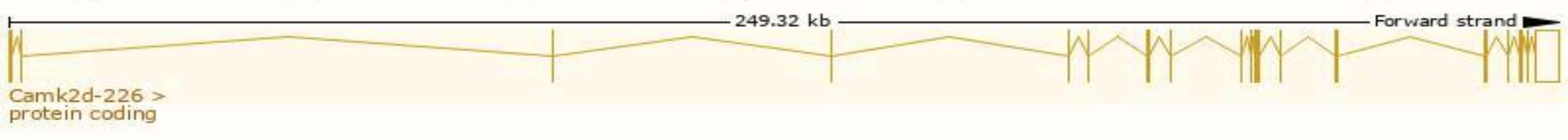
Annotation release	Status	Assembly	Chr	Location
108	current	GRCm38.p6 (GCF_000001635.26)	3	NC_000069.6 (126595487..126846326)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	3	NC_000069.5 (126299891..126547972)

Transcript information（Ensembl）

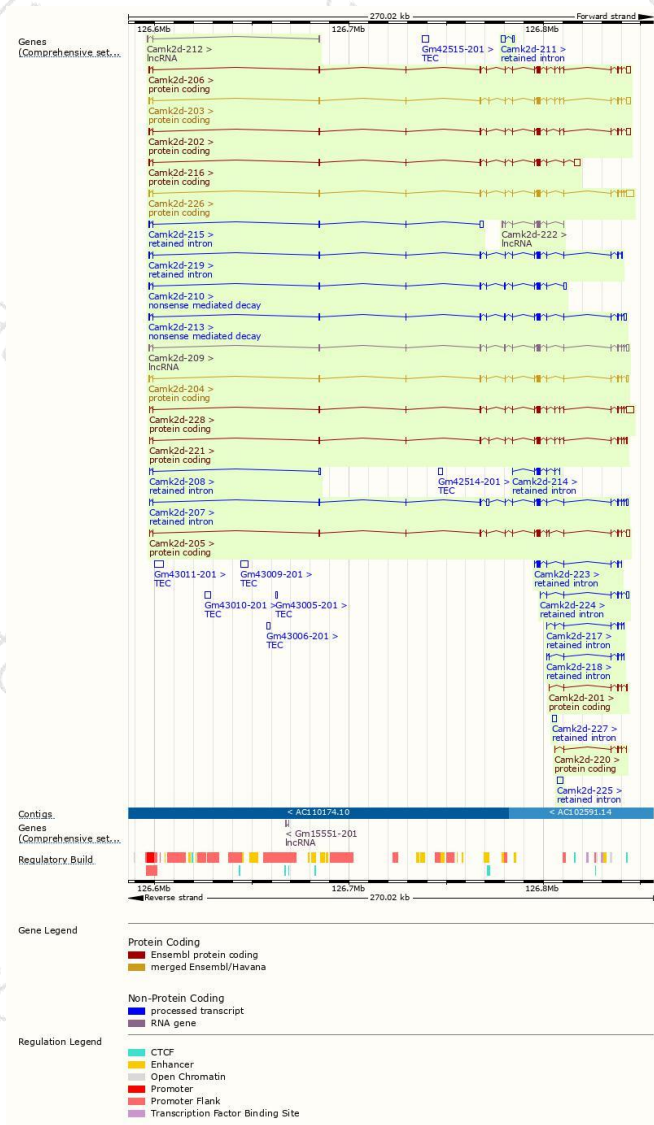
The gene has 28 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Camk2d-226	ENSMUST00000199300.4	5524	499aa	Protein coding	CCDS17823	Q6PHZ2	TSL1 GENCODE basic APPRIS P3
Camk2d-228	ENSMUST00000200171.4	5996	533aa	Protein coding	CCDS84670	A0A0G2JGS4	TSL5 GENCODE basic APPRIS ALT1
Camk2d-216	ENSMUST00000163226.7	4204	361aa	Protein coding	CCDS80017	Q8CCM0	TSL1 GENCODE basic
Camk2d-206	ENSMUST00000106402.7	4180	512aa	Protein coding	CCDS80015	Q6PHZ2	TSL1 GENCODE basic
Camk2d-203	ENSMUST00000106399.7	4169	512aa	Protein coding	CCDS38624	E9Q1W0	TSL1 GENCODE basic
Camk2d-202	ENSMUST00000066466.12	4075	492aa	Protein coding	CCDS80016	Q6PHZ2	TSL1 GENCODE basic
Camk2d-204	ENSMUST00000106400.8	2722	478aa	Protein coding	CCDS51065	Q6PHZ2	TSL1 GENCODE basic
Camk2d-221	ENSMUST00000171269.7	2217	533aa	Protein coding	CCDS84671	E9Q1T1	TSL5 GENCODE basic APPRIS ALT1
Camk2d-205	ENSMUST00000106401.7	3059	499aa	Protein coding	-	E9Q1V9	TSL5 GENCODE basic
Camk2d-201	ENSMUST00000066452.13	896	160aa	Protein coding	-	E9PXV3	CDS 5' incomplete TSL5
Camk2d-220	ENSMUST00000170149.1	640	169aa	Protein coding	-	E6RWZ9	CDS 5' incomplete TSL3
Camk2d-213	ENSMUST00000145454.7	3178	142aa	Nonsense mediated decay	-	E9QAJ4	TSL2
Camk2d-210	ENSMUST00000134466.7	2708	147aa	Nonsense mediated decay	-	D6RDO8	TSL2
Camk2d-207	ENSMUST00000129293.7	3479	No protein	Retained intron	-	-	TSL1
Camk2d-211	ENSMUST00000134987.2	3114	No protein	Retained intron	-	-	TSL1
Camk2d-225	ENSMUST00000198637.1	3088	No protein	Retained intron	-	-	TSLNA
Camk2d-227	ENSMUST00000200010.1	2369	No protein	Retained intron	-	-	TSLNA
Camk2d-215	ENSMUST00000149311.7	2328	No protein	Retained intron	-	-	TSL2
Camk2d-219	ENSMUST00000169051.7	1960	No protein	Retained intron	-	-	TSL2
Camk2d-224	ENSMUST00000198487.4	1844	No protein	Retained intron	-	-	TSL5
Camk2d-208	ENSMUST00000131156.7	992	No protein	Retained intron	-	-	TSL2
Camk2d-214	ENSMUST00000147043.5	746	No protein	Retained intron	-	-	TSL2
Camk2d-223	ENSMUST00000197660.4	744	No protein	Retained intron	-	-	TSL2
Camk2d-217	ENSMUST00000167417.4	618	No protein	Retained intron	-	-	TSL5
Camk2d-218	ENSMUST00000167985.7	591	No protein	Retained intron	-	-	TSL5
Camk2d-209	ENSMUST00000131869.7	2993	No protein	lncRNA	-	-	TSL1
Camk2d-222	ENSMUST00000171950.7	734	No protein	lncRNA	-	-	TSL5
Camk2d-212	ENSMUST00000143383.7	206	No protein	lncRNA	-	-	TSL5

The strategy is based on the design of *Camk2d-226* transcript,The transcription is shown below



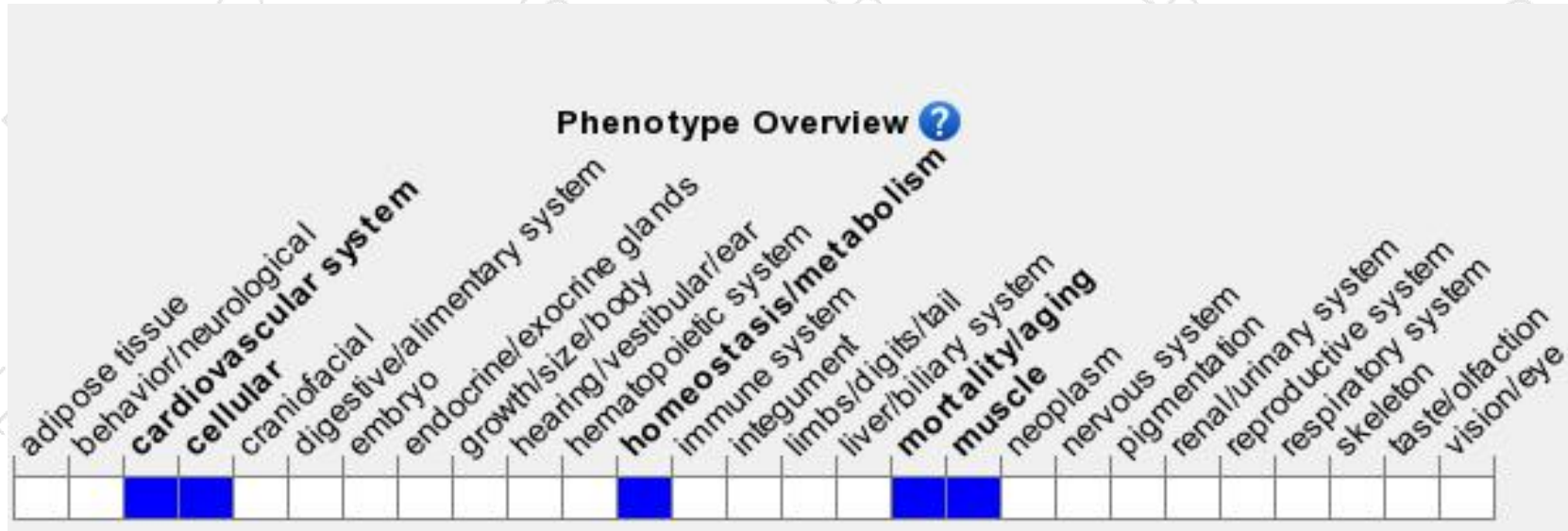
Genomic location distribution



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 a knock-out allele exhibit reduced response to heart induced stress. Mice homozygous for an allele that produces an oxidant-resistant product exhibit reduced response to myocardial infarction in a diabetic model.

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

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