

Dlg2 Cas9-CKO Strategy

Designer: Jing Chen

Reviewer: Xiangli Bian

Design Date: 2024-4-2

Overview

Target Gene Name

- Dlg2

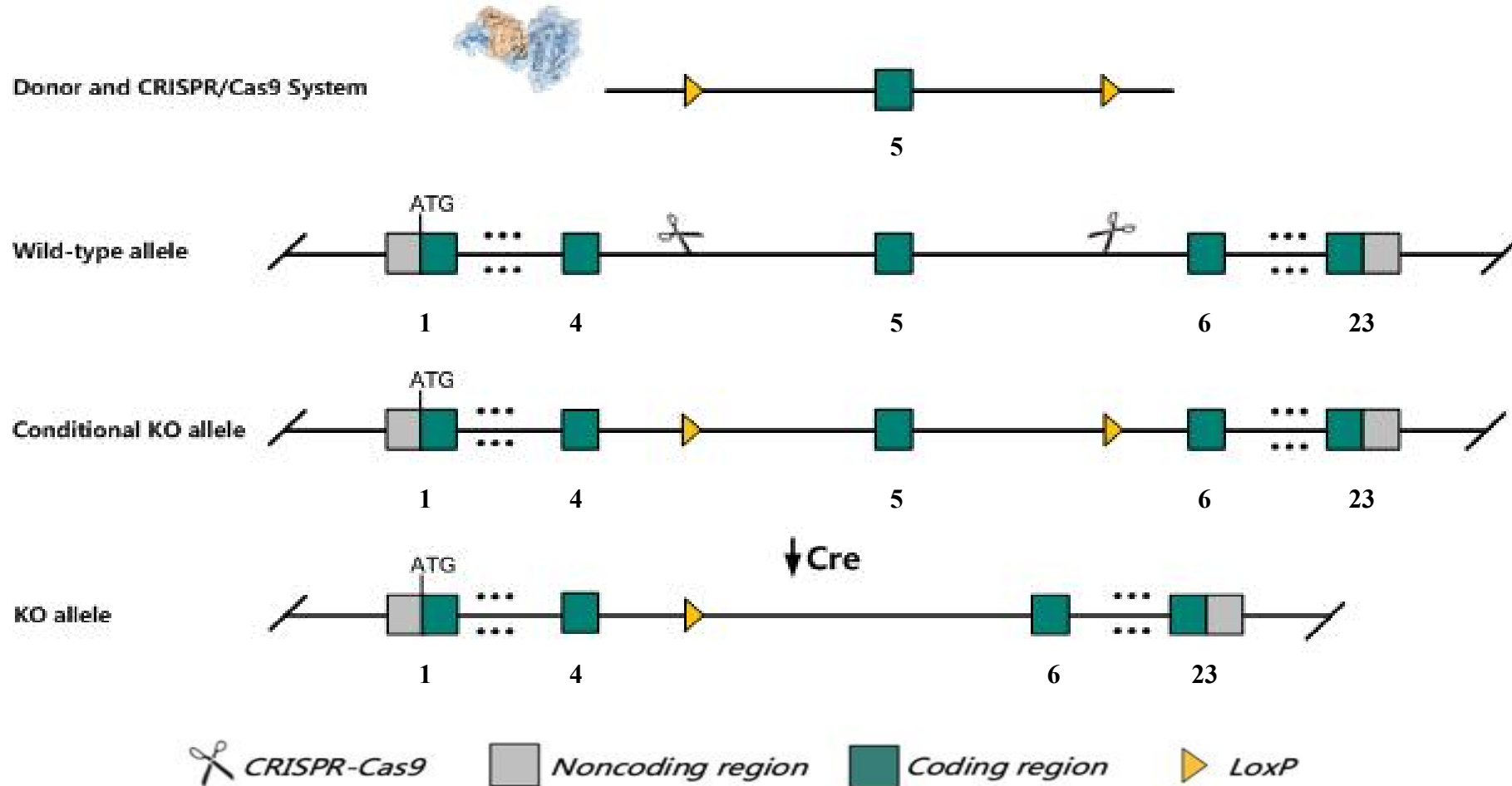
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Dlg2* gene.

Technical Information

- The *Dlg2* gene has 22 transcripts. According to the structure of *Dlg2* gene, exon5 of *Dlg2*-204 (ENSMUST00000107196.10) transcript is recommended as the knockout region. The region contains 125bp coding sequence. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Dlg2* gene. The brief process is as follows: CRISPR-Cas9 system and Donor 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 on-target amplicon sequencing. A stable F1-generation mouse strain was obtained by mating positive F0-generation mice with C57BL/6JGpt mice and confirmation of the desired mutant allele was carried out by PCR and on-target amplicon sequencing.
- The flox mice will be knocked out after mating with mice expressing Cre recombinase, resulting in the loss of function of the target gene in specific tissues and cell types.

Gene Information

Dlg2 discs large MAGUK scaffold protein 2 [*Mus musculus* (house mouse)]

Gene ID: 23859, updated on 5-Mar-2024

Download Datasets

Summary

Official Symbol

Dlg2 provided by MGI

Official Full Name

discs large MAGUK scaffold protein 2 provided by MGI

Primary source

MGI:MGI:1344351

See related

Ensembl:ENSMUSG00000052572 AllianceGenome:MGI:1344351

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

Dlgh2; PSD93; Gm1197; Gm21505; A330103J02Rik; B230218P12Rik; B330007M19Rik

Summary

A structural constituent of postsynaptic density. Involved in several processes, including axo-dendritic protein transport; clustering of voltage-gated potassium channels; and neurotransmitter receptor localization to postsynaptic specialization membrane. Acts upstream of or within chemical synaptic transmission and sensory perception of pain. Located in several cellular components, including main axon; postsynaptic density; and synaptic vesicle membrane. Is active in glutamatergic synapse. Is expressed in jaw bone; nervous system; and retina. Orthologous to human DLG2 (discs large MAGUK scaffold protein 2). [provided by Alliance of Genome Resources, Apr 2022]

Expression

Biased expression in frontal lobe adult (RPKM 12.3), cortex adult (RPKM 11.4) and 5 other tissues [See more](#)

Orthologs

human

all

NEW

Try the new [Gene table](#)

Try the new [Transcript table](#)

Genomic context

Location:

7 E1; 7 51.07 cM

See Dlg2 in [Genome Data Viewer](#)

Exon count:

40

Annotation release	Status	Assembly	Chr	Location
RS_2024_02	current	GRCm39 (GCF_000001635.27)	7	NC_000073.7 (90125399..92098454)
108.20200622	previous assembly	GRCm38.p6 (GCF_000001635.26)	7	NC_000073.6 (90476188..92449246)

Source: <https://www.ncbi.nlm.nih.gov/>

Transcript Information

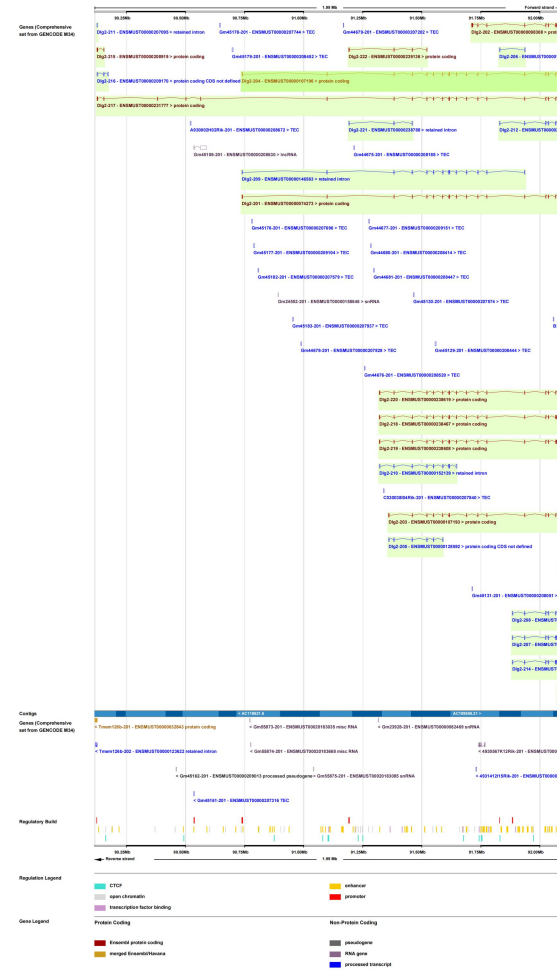
The gene has 22 transcripts, all transcripts are shown below:

Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000231777.3	Dlg2-217	7801	994aa	Protein coding		A0A338P6J0	Ensembl Canonical GENCODE basic APPRIS P1
ENSMUST00000238467.2	Dlg2-218	7573	919aa	Protein coding		A0A571BEZ4	GENCODE basic
ENSMUST00000238619.2	Dlg2-220	7559	887aa	Protein coding		Q91XM9-4	GENCODE basic
ENSMUST00000238608.2	Dlg2-219	7401	901aa	Protein coding		A0A571BEK3	GENCODE basic
ENSMUST0000074273.10	Dlg2-201	5278	870aa	Protein coding		E9Q2L2	GENCODE basic TSL:5
ENSMUST00000107193.8	Dlg2-203	4910	755aa	Protein coding		D3YU28	GENCODE basic TSL:5
ENSMUST00000239136.2	Dlg2-222	540	78aa	Protein coding		A0A5F8MQA2	CDS 3' incomplete
ENSMUST00000208919.2	Dlg2-215	396	47aa	Protein coding		A0A5F8MPY4	TSL:3 CDS 3' incomplete
ENSMUST00000138389.8	Dlg2-208	3218	No protein	Protein coding CDS not defined		-	TSL:1
ENSMUST00000209170.2	Dlg2-216	1057	No protein	Protein coding CDS not defined		-	TSL:2
ENSMUST00000135581.3	Dlg2-207	984	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000128592.3	Dlg2-205	922	No protein	Protein coding CDS not defined		-	TSL:5
ENSMUST00000207798.2	Dlg2-212	842	No protein	Protein coding CDS not defined		-	TSL:5
ENSMUST00000208377.2	Dlg2-214	872	No protein	Protein coding CDS not defined		-	TSL:5
ENSMUST00000146563.9	Dlg2-209	4236	No protein	Retained intron		-	TSL:5
ENSMUST00000162139.8	Dlg2-210	2934	No protein	Retained intron		-	TSL:1
ENSMUST00000207095.2	Dlg2-211	2397	No protein	Retained intron		-	TSL:NA
ENSMUST00000129818.2	Dlg2-206	2218	No protein	Retained intron		-	TSL:1
ENSMUST00000238788.2	Dlg2-221	1216	No protein	Retained intron		-	-
ENSMUST00000207891.2	Dlg2-213	448	No protein	Retained intron		-	TSL:3
ENSMUST00000107196.10	Dlg2-204	7490	852aa	Protein coding	CCDS40021	Q91XM9	GENCODE basic TSL:1
ENSMUST0000098308.4	Dlg2-202	2329	481aa	Protein coding	CCDS57562	D3YWU0	GENCODE basic TSL:1

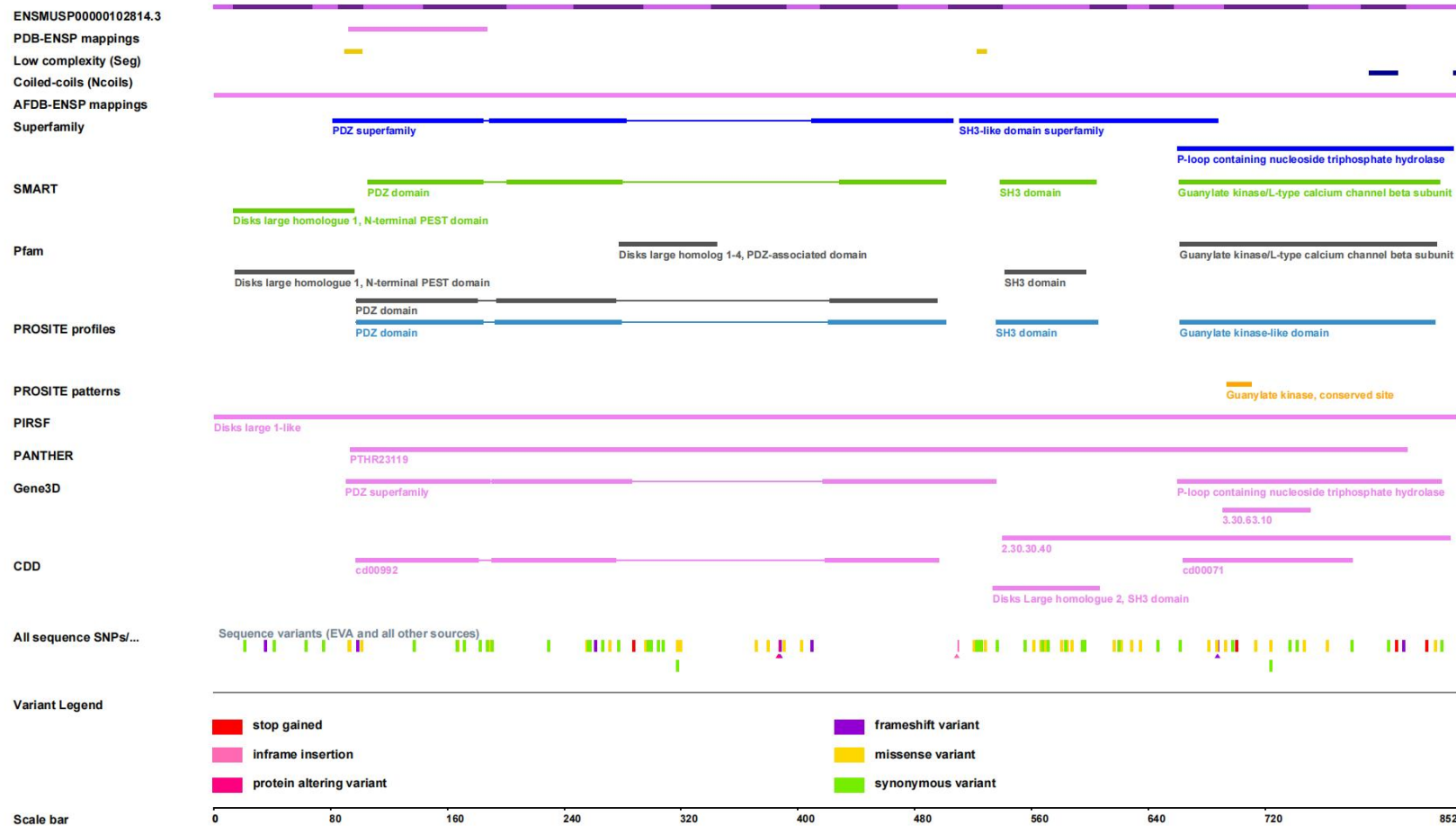
The strategy is based on the design of *Dlg2*-204 transcript, the transcription is shown below:



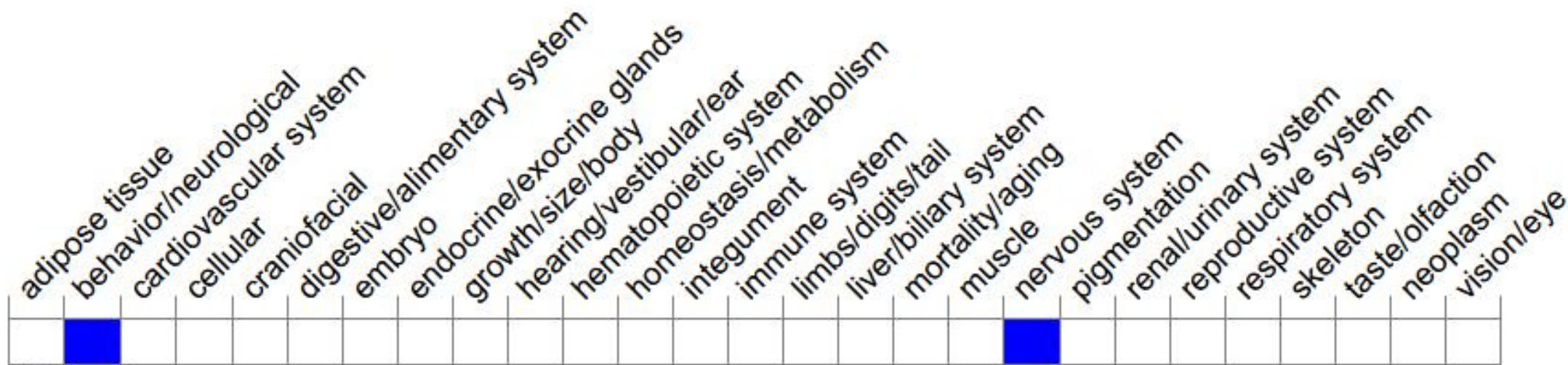
Genomic Information



Protein Information



Mouse Phenotype Information (MGI)



- Mice homozygous for a knock-out allele display lower surface expression of NMDA receptor (NMDAR) subunits NR2A and NR2B in dorsal horn neurons and significantly reduced NMDAR-mediated excitatory synaptic currents and NMDAR-dependent persistent inflammatory or nerve injury-induced neuropathic pain.

Important Information

- This strategy may not affect *Dlg2* -202 and *Dlg2* -205 coding transcript.
- A part of amino acid sequence (103 aa) will still remain at the N-terminal of *Dlg2* -204.
- *Dlg2* is located on Chr7. If the knockout mice are crossed with other mouse strains to obtain double homozygous mutant offspring, please avoid the situation that the second gene is 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.