

Cadm3 Cas9-KO Strategy

Designer: Xueting Zhang

Reviewer: Ruirui Zhang

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Overview

Target Gene Name

- Cadm3

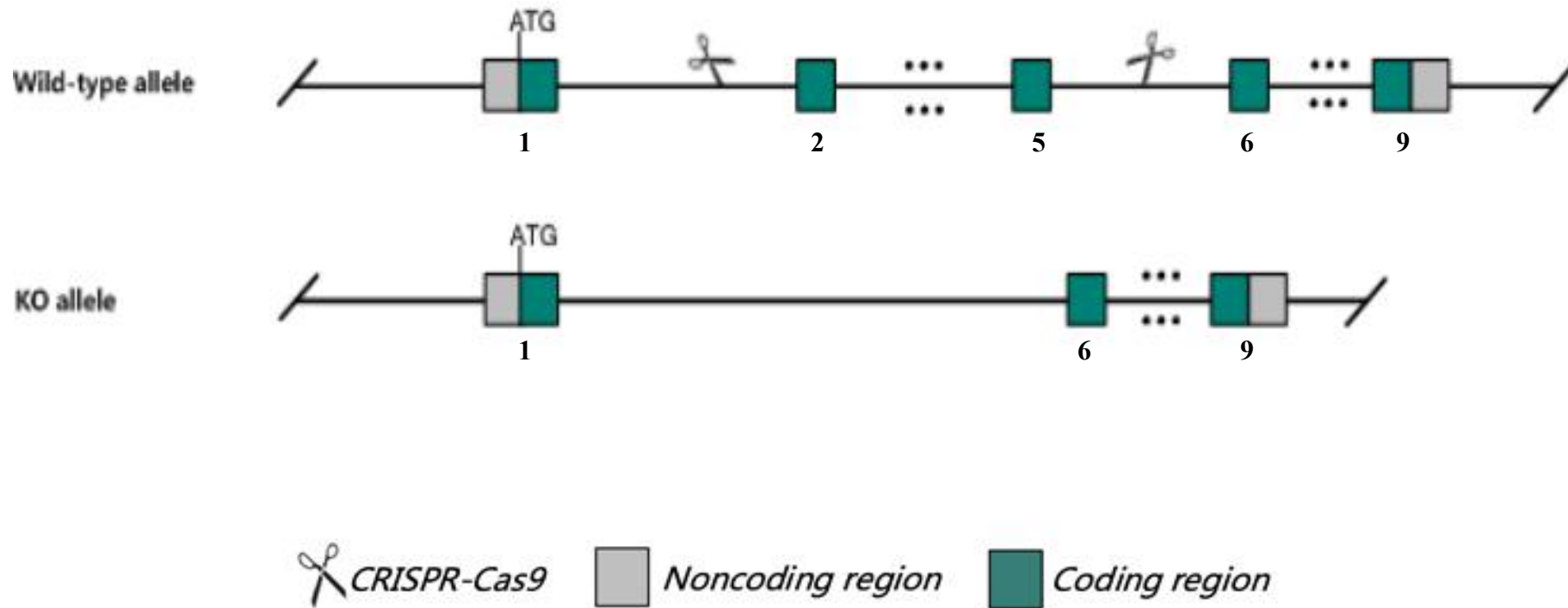
Project Type

- Cas9-KO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Technical Information

- The *Cadm3* gene has 5 transcripts. According to the structure of *Cadm3* gene, exon2-exon5 of *Cadm3-202* (ENSMUST00000111220.8) transcript is recommended as the knockout region. The region contains 603bp coding sequence. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Cadm3* gene. The brief process is as follows: gRNAs were transcribed in vitro. Cas9 and gRNAs 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.

Gene Information

Cadm3 cell adhesion molecule 3 [*Mus musculus* (house mouse)]

[Download Datasets](#)

Gene ID: 94332, updated on 7-Apr-2025

Summary

Official Symbol	Cadm3 provided by MGI
Official Full Name	cell adhesion molecule 3 provided by MGI
Primary source	MGI:MGI:2137858
See related	Ensembl:ENSMUSG00000005338 AllianceGenome:MGI:2137858
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	BlgR; Necl1; Tsl1; Igsf4b; Necl-1; SynCAM3
Summary	Enables protein homodimerization activity. Involved in heterophilic cell-cell adhesion via plasma membrane cell adhesion molecules and homophilic cell adhesion via plasma membrane adhesion molecules. Acts upstream of or within protein localization. Located in cell-cell junction. Is active in parallel fiber to Purkinje cell synapse and presynaptic membrane. Is expressed in several structures, including intestine; liver; nervous system; neural retina; and olfactory epithelium. Human ortholog(s) of this gene implicated in Charcot-Marie-Tooth disease. Orthologous to human CADM3 (cell adhesion molecule 3). [provided by Alliance of Genome Resources, Apr 2025]
Expression	Biased expression in cerebellum adult (RPKM 149.0), frontal lobe adult (RPKM 64.2) and 7 other tissues See more
Orthologs	human all
NEW	Try the new Gene table Try the new Transcript table

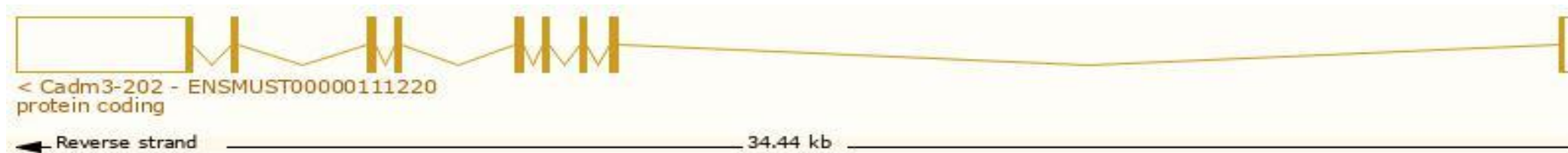
Source: <https://www.ncbi.nlm.nih.gov/>

Transcript Information

The gene has 5 transcripts, all transcripts are shown below:

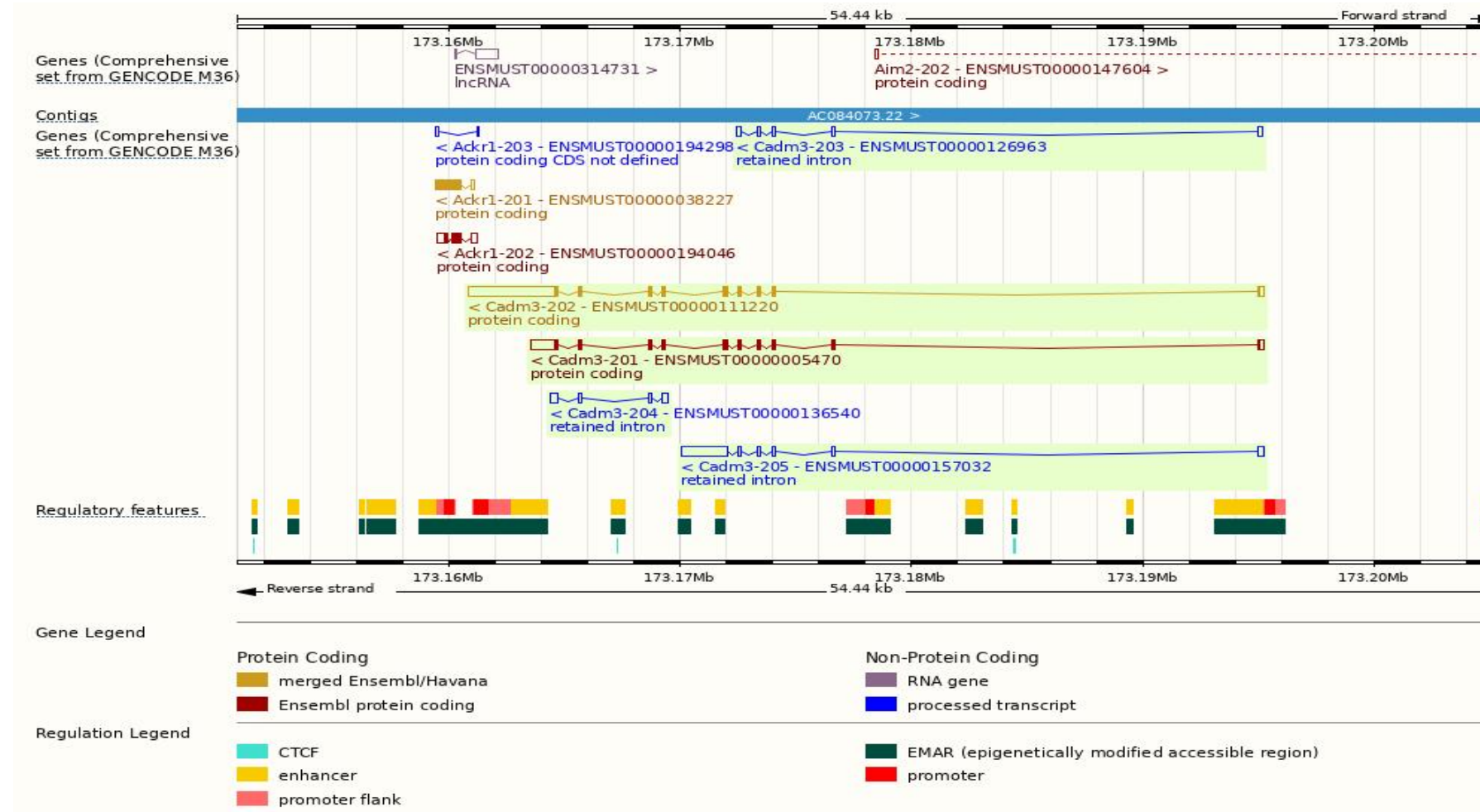
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000005470.5	Cadm3-201	2518	430aa	Protein coding		K4DI58	Ensembl Canonical GENCODE Basic APPRIS ALT1 TSL:5
ENSMUST00000111220.8	Cadm3-202	5155	396aa	Protein coding	CCDS15528	Q99N28	GENCODE Basic APPRIS P2 TSL:1
ENSMUST00000157032.9	Cadm3-205	2746	No protein	Retained intron		-	TSL:1
ENSMUST00000136540.2	Cadm3-204	855	No protein	Retained intron		-	TSL:1
ENSMUST00000126963.2	Cadm3-203	774	No protein	Retained intron		-	TSL:3

The strategy is based on the design of *Cadm3-202* transcript, the transcription is shown below:

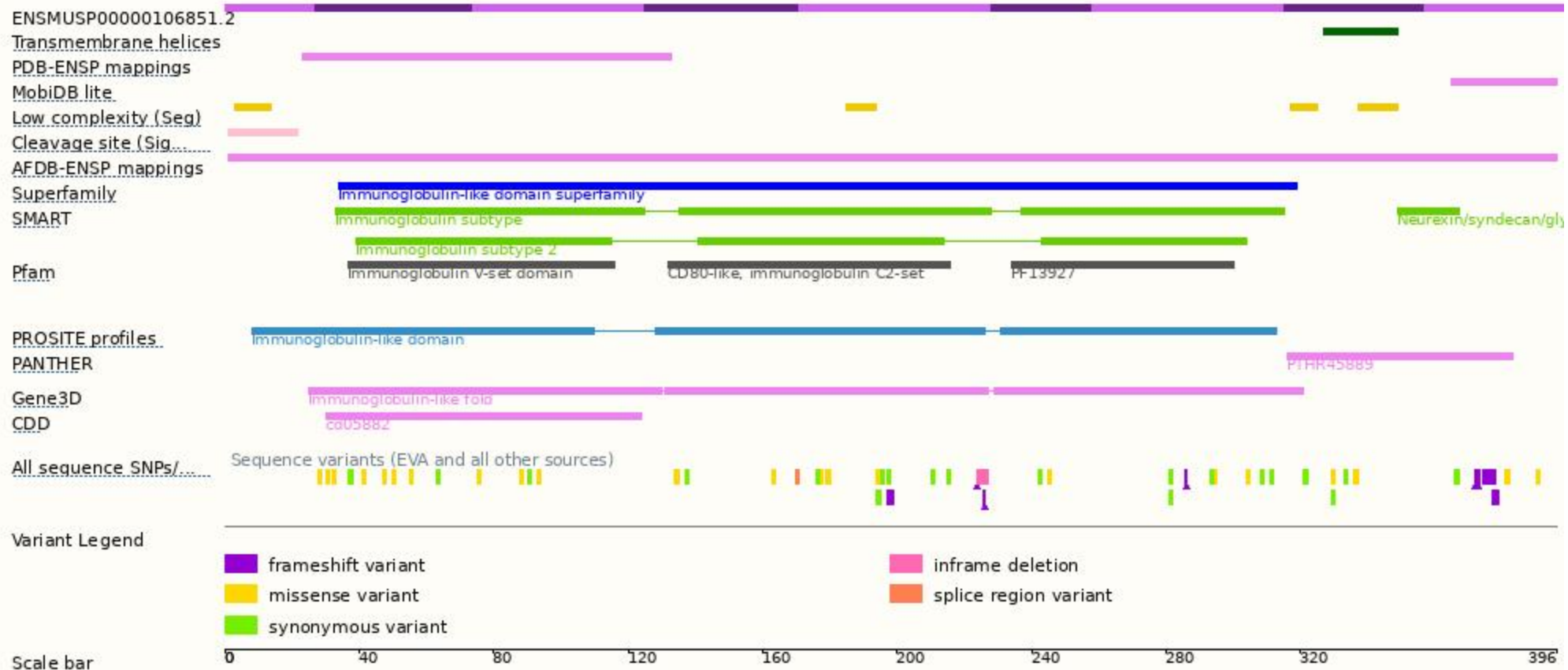


Source: <https://www.ensembl.org>

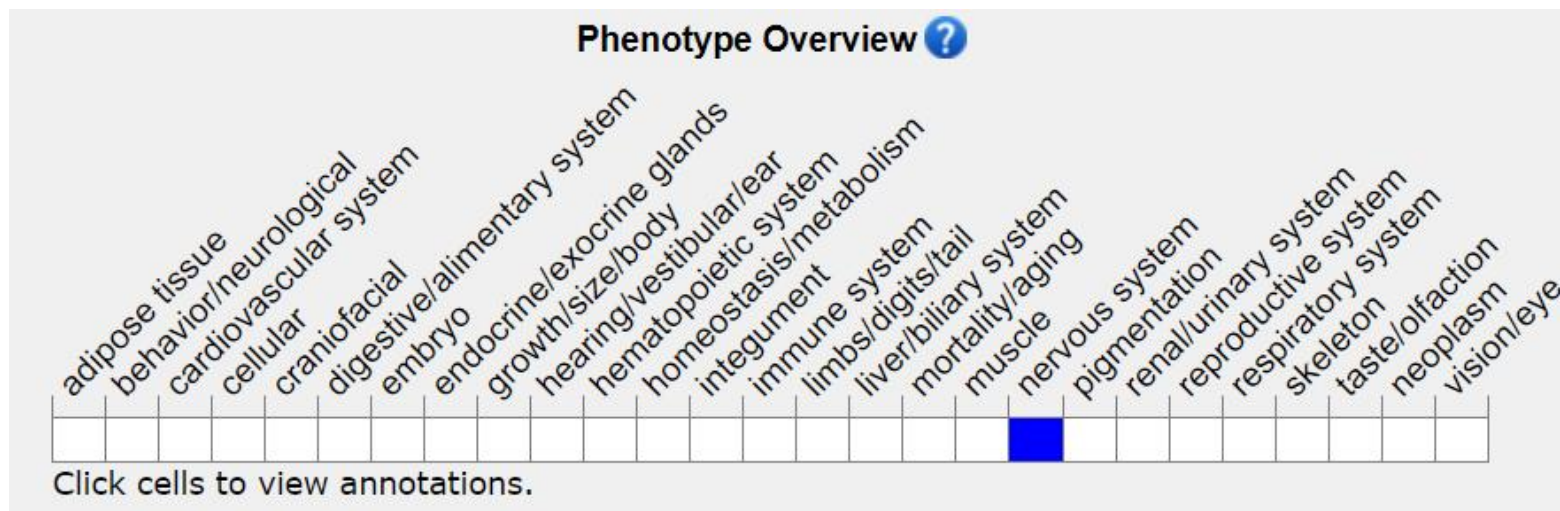
Genomic Information



Protein Information



Mouse Phenotype Information (MGI)



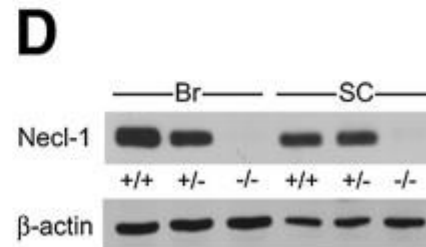
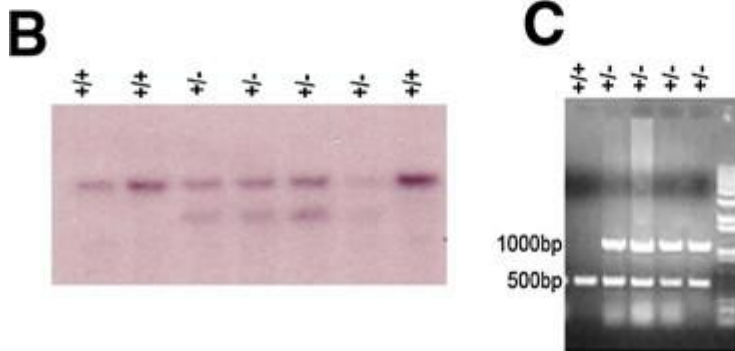
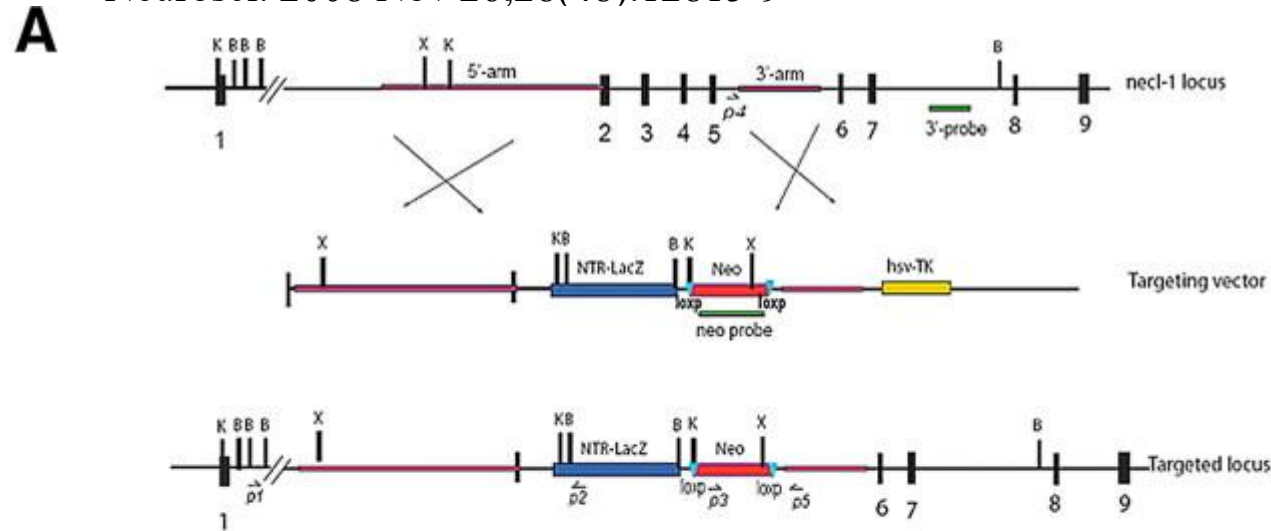
- Mice homozygous for a null allele exhibit delayed myelination. Other mice with ubiquitous conditional deletion of the gene do not display neurological abnormalities.

Important Information

- According to the MGI data, mice homozygous for a null allele exhibit delayed myelination. Other mice with ubiquitous conditional deletion of the gene do not display neurological abnormalities.
- The knockout region is near to the N-terminal of *Aim2* gene, this strategy may influence the regulatory function of the N-terminal of *Aim2* gene.
- The strategy selects exons 2-5 as the knockout region according to the reference, which is not frameshift.
- *Cadm3* is located on Chr1. 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 risks of the mutation on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

Reference

Park J, et al., Disruption of Nectin-like 1 cell adhesion molecule leads to delayed axonal myelination in the CNS. *J Neurosci.* 2008 Nov 26;28(48):12815-9



Gene targeting of *Necl-1*. **A**, The wild-type *Necl-1* genomic organization, targeting vector, and the targeted allele after the predicted homologous recombination event are shown. The 3' probe used for Southern blot analysis is shown below the wild-type genomic map. Primers (P3, P4 and P5) for genotyping are indicated. B, BamH1; C, *Clal*; E, *EcoRI*; X, *XhoI*. **B**, Genotyping of F1 animals by Southern blot analysis with the 3' probe. The wild-type allele is 10 kb and the mutant allele 8.0 kb. The genotype of each sample is indicated on top of the gel. **C**, Genotyping of F1 animals by PCR with three primers P3, P4 and P5 as indicated in **A**. **D**, Western immunoblotting of adult brain (Br) and spinal cord (SC) tissues with anti-Necl-1 polyclonal antibody. Genotypes of animals were indicated at the top of the lanes.

Gene targeting.

A BAC clone containing the *Necl-1* genomic DNA was purchased from Invitrogen. The gene targeting vector was constructed by replacing exons 2-5 with β -galactosidase reporter gene and the neomycin resistance gene. Targeting vector was subsequently linearized and introduced into ES cells by electroporation. Genomic DNA isolated from ES clones was digested with *Bam*HI and *Kpn*I before hybridization with the 3' flanking probe as indicated in [Figure 2A](#). The wild-type allele gave a band of 10 Kb, whereas the targeted allele produced a band of 6.0 Kb (see [Fig. 2B](#)). Mutant ES clones were characterized and injected into C-57BL blastocysts to produce chimeric mice or germline transmission. Homozygous mice derived from these two independent lines showed the same phenotype.