

Mab2112 Cas9-CKO Strategy

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Overview

Target Gene Name

- Mab2112

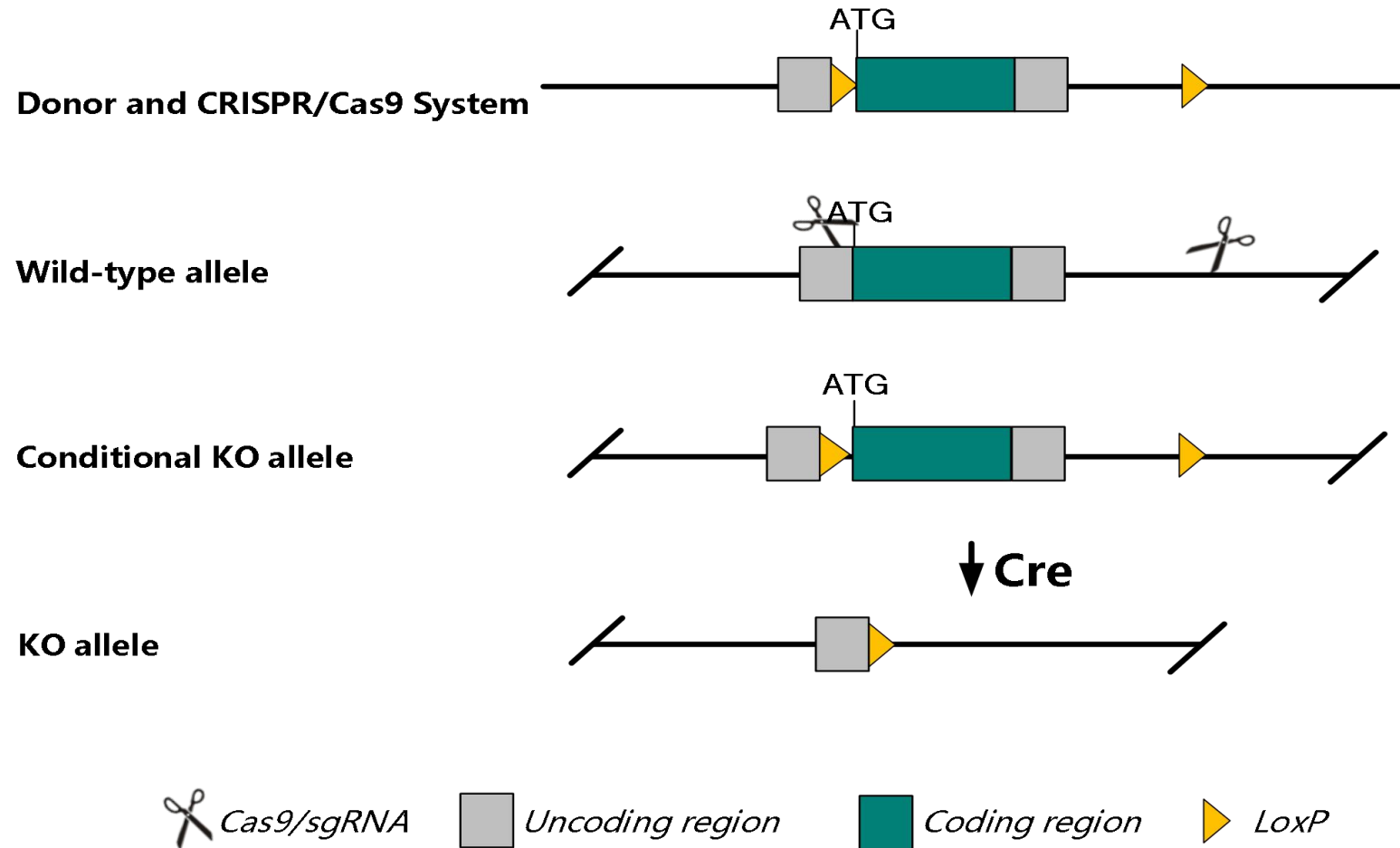
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Mab21l2* gene.

Technical Information

- The *Mab21l2* gene has 2 transcripts. According to the structure of *Mab21l2* gene, exon1 of *Mab21l2*-201 (ENSMUST00000077524.4) transcript is recommended as the knockout region. The region contains all of the coding sequence. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Mab21l2* 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

Mab21l2 mab-21-like 2 [*Mus musculus* (house mouse)]

Gene ID: 23937, updated on 18-Apr-2024

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Summary

Official Symbol	Mab21l2 provided by MGI
Official Full Name	mab-21-like 2 provided by MGI
Primary source	MGI:MGI:1346022
See related	Ensembl:ENSMUSG00000057777 AllianceGenome:MGI:1346022
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
Summary	Acts upstream of or within camera-type eye development; embryonic body morphogenesis; and positive regulation of cell population proliferation. Located in nucleus. Is expressed in several structures, including branchial arch; central nervous system; embryo mesenchyme; limb; and sensory organ. Human ortholog(s) of this gene implicated in coloboma and syndromic microphthalmia 14. Orthologous to human MAB21L2 (mab-21 like 2). [provided by Alliance of Genome Resources, Apr 2022]
Orthologs	human all
NEW	Try the new Gene table Try the new Transcript table

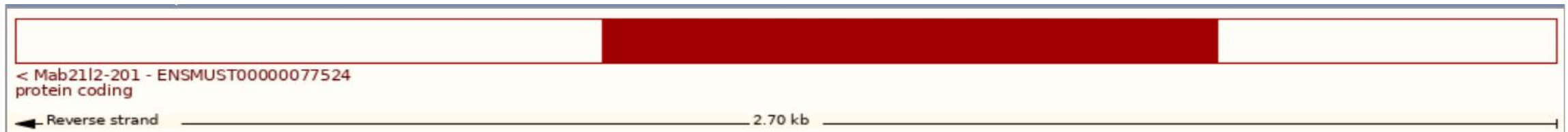
Source: <https://www.ncbi.nlm.nih.gov/>

Transcript Information

The gene has 2 transcripts, all transcripts are shown below:

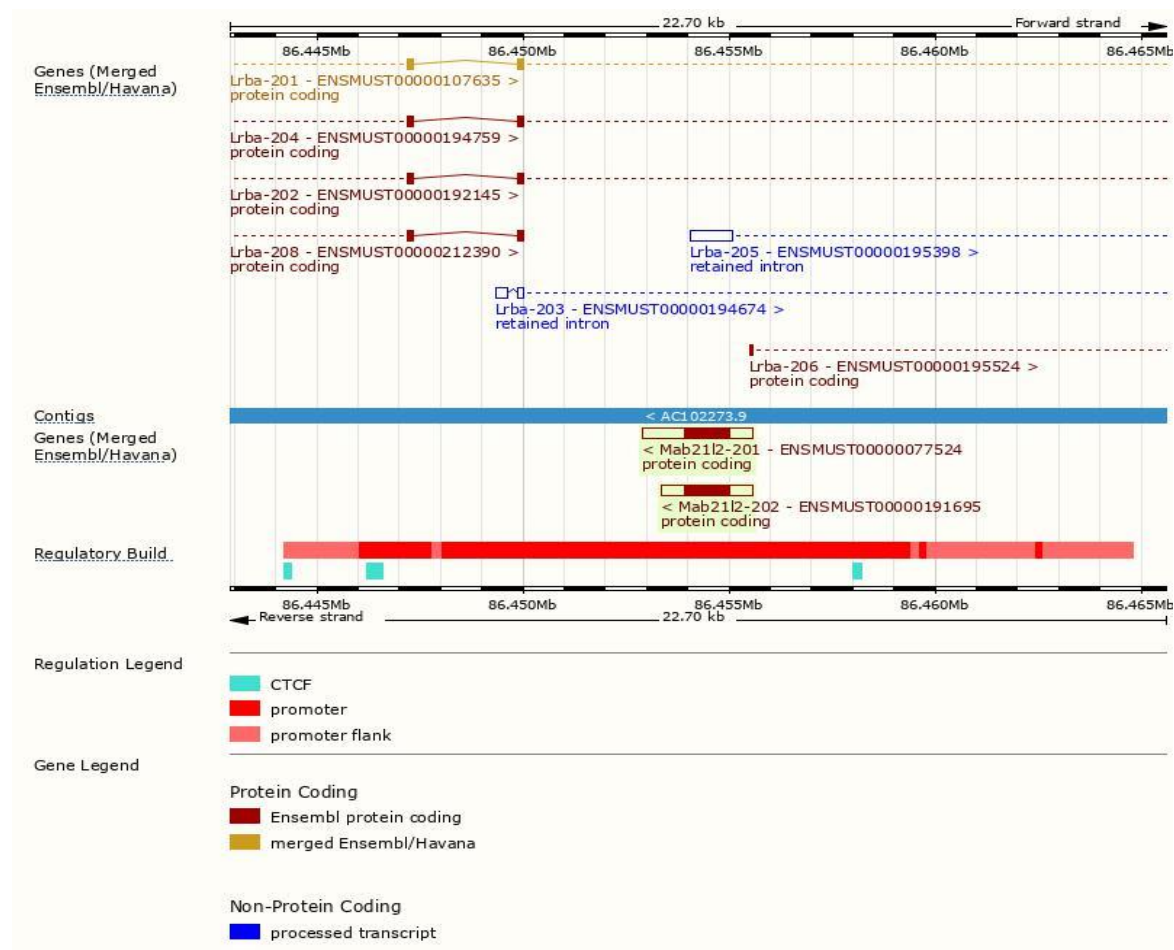
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000077524.4	Mab21l2-201	2703	359aa	Protein coding	CCDS17447	Q8BPP1	Ensembl Canonical GENCODE basic APPRIS P1 TSL:NA
ENSMUST00000191695.3	Mab21l2-202	2234	359aa	Protein coding	CCDS17447	Q8BPP1	GENCODE basic APPRIS P1 TSL:NA

The strategy is based on the design of *Mab21l2*-201 transcript, the transcription is shown below:



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

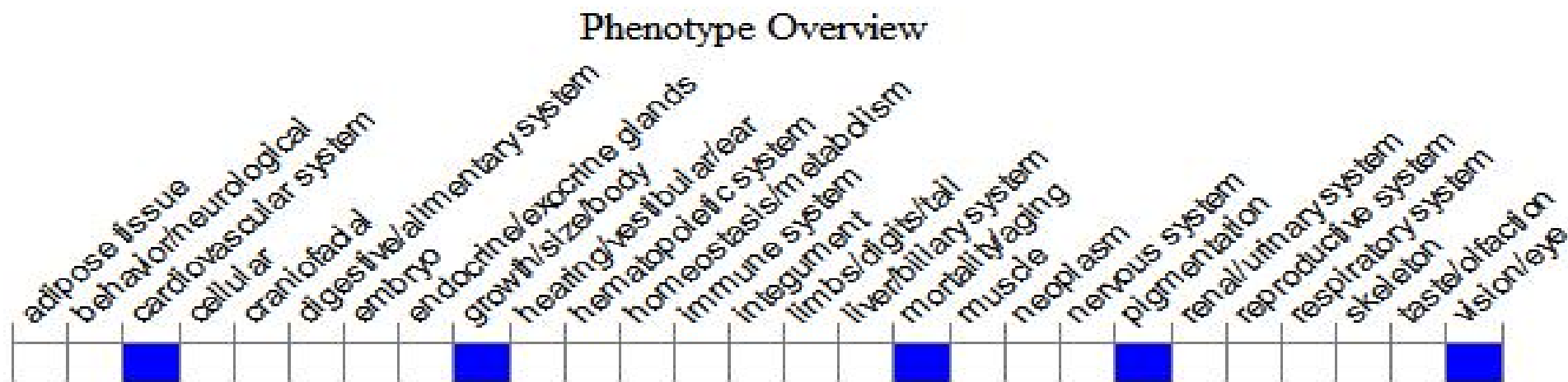
Genomic Information



Protein Information



Mouse Phenotype Information (MGI)

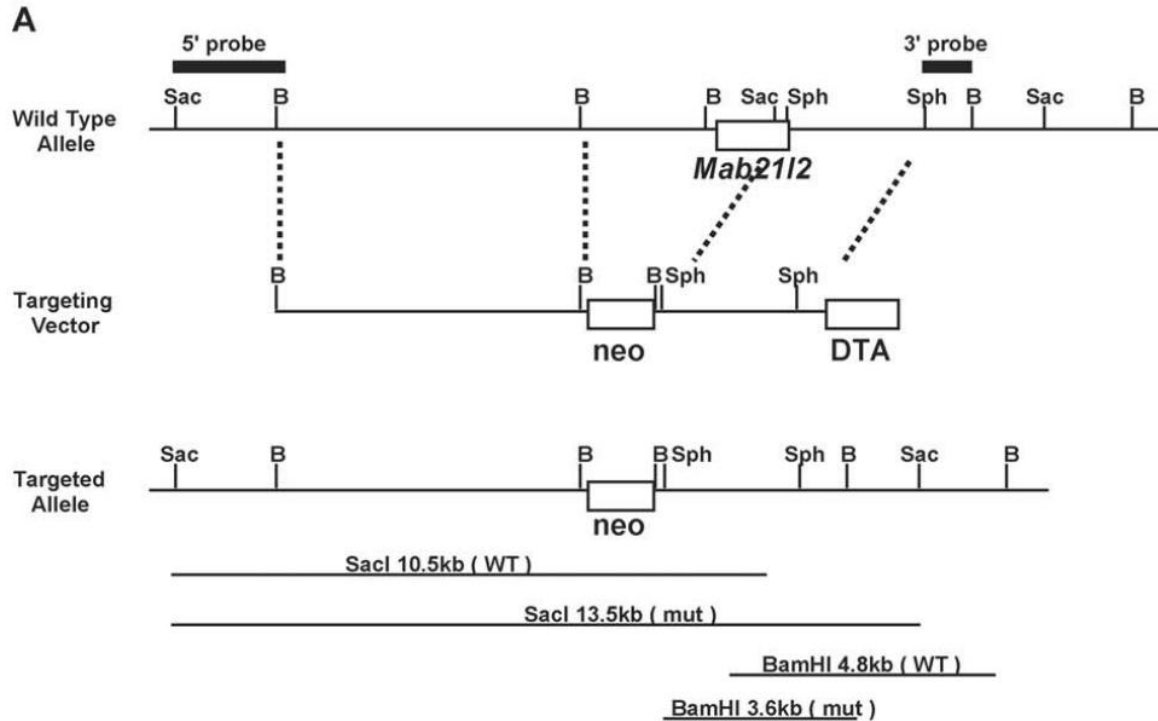


- Homozygous mutation of this gene results in omphalocele and defects in ventral body wall formation resulting in death at mid-gestation. Mutants have impaired development of the retina and lens.

Important Information

- According to MGI information, homozygous mutation of this gene results in omphalocele and defects in ventral body wall formation resulting in death at mid-gestation. Mutants have impaired development of the retina and lens.
- The insertion of 5'Loxp may affect the regulatory function of *Mab21l2* gene.
- The flox region is in the intron of *Lrba*-201&202&203&204, this strategy may affect the regulation of *Lrba* gene.
- The flox region is about ~2.3kb and ~0.5kb away from *Lrba*-208 and *Lrba*-206, this strategy may affect the regulation of *Lrba* gene.
- The *Lrba*-205 will be directly destroyed.
- *Mab21l2* is located on Chr3. 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.

References



5.6-kilobase (kb) 5' homologous region (*Bam*HI–*Bam*HI fragment) and a 2.8-kb 3' homologous region (*Sph*I–*Sph*I fragment) as shown in Fig. 1A. The coding region was replaced with a *Neo^r* gene cassette from the pMC1neo PolyA vector (Stratagene). For negative selection, a MC1-DTA (diphtheria toxin A) cassette (Palmiter et al., 1987; Thomas and Capecchi, 1987) was placed at the end of the 3' homology region.

Yamada R, Mizutani-Koseki Y, Koseki H, Takahashi N. Requirement for Mab2112 during development of murine retina and ventral body wall. *Dev Biol*. 2004 Oct 15;274(2):295-307. doi: 10.1016/j.ydbio.2004.07.016. PMID: 15385160.