

Mip Cas9-CKO Strategy

Designer: Huan Wang

Reviewer: Yumeng Wang

Design Date: 2021-7-27

Project Overview

Project Name

Mip

Project type

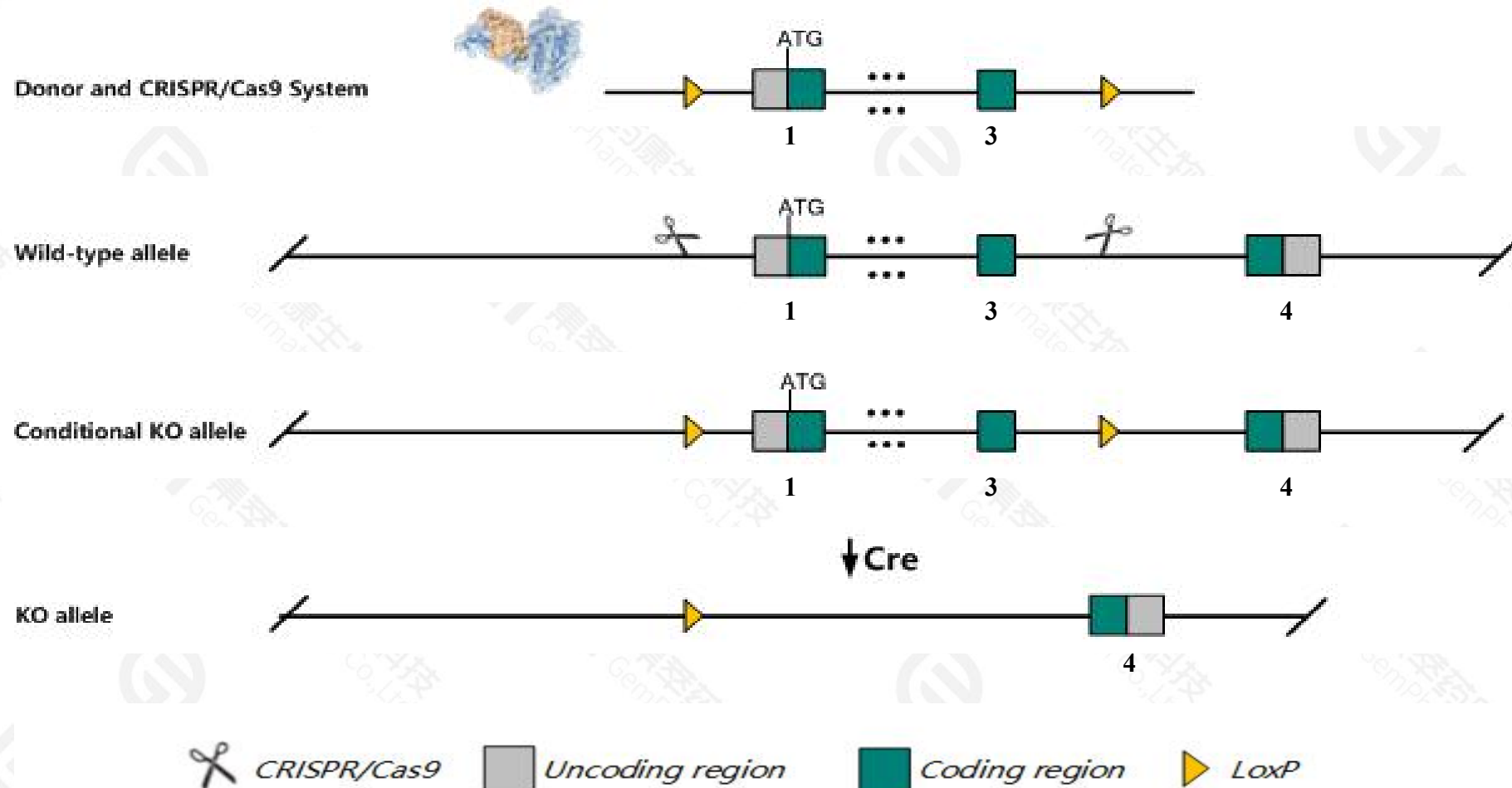
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

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



- The *Mip* gene has 1 transcript. According to the structure of *Mip* gene, exon1-exon3 of *Mip-201*(ENSMUST00000026455.8) transcript is recommended as the knockout region. The region contains start codon ATG. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Mip* 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 sequencing. A stable F1 generation mouse model was obtained by mating positive F0 generation mice with C57BL/6JGpt mice.
- The flox mice was 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.

- According to the existing MGI data, homozygotes have microphthalmia and lens opacity. Other defects may include degeneration of lens fiber cells, vacuolization of lens fibers and reduced gamma:alpha crystallin ratio. Heterozygotes have less severe forms of lens cataract and microphthalmia.
- The *Mip* gene is located on the Chr10. 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information (NCBI)

Mip major intrinsic protein of lens fiber [Mus musculus (house mouse)]

Gene ID: 17339, updated on 13-Mar-2020

Summary



Official Symbol Mip provided by [MGI](#)

Official Full Name major intrinsic protein of lens fiber provided by [MGI](#)

Primary source [MGI:MGI:96990](#)

See related [Ensembl:ENSMUSG00000025389](#)

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 Aqp0, Cat, Cts, Hfi, Lop, MIP26, MP26, Svl, shrivelled

Expression Low expression observed in reference dataset [See more](#)

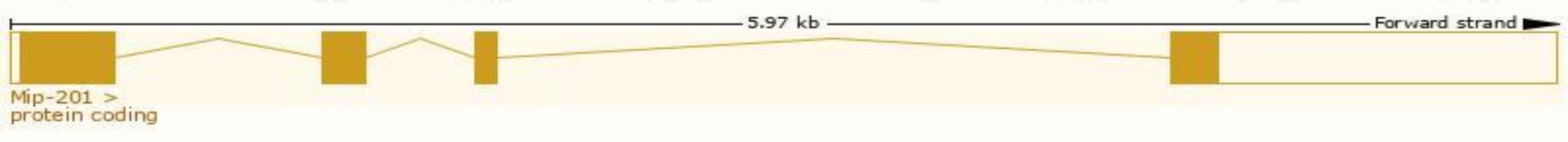
Orthologs [human](#) [all](#)

Transcript information (Ensembl)

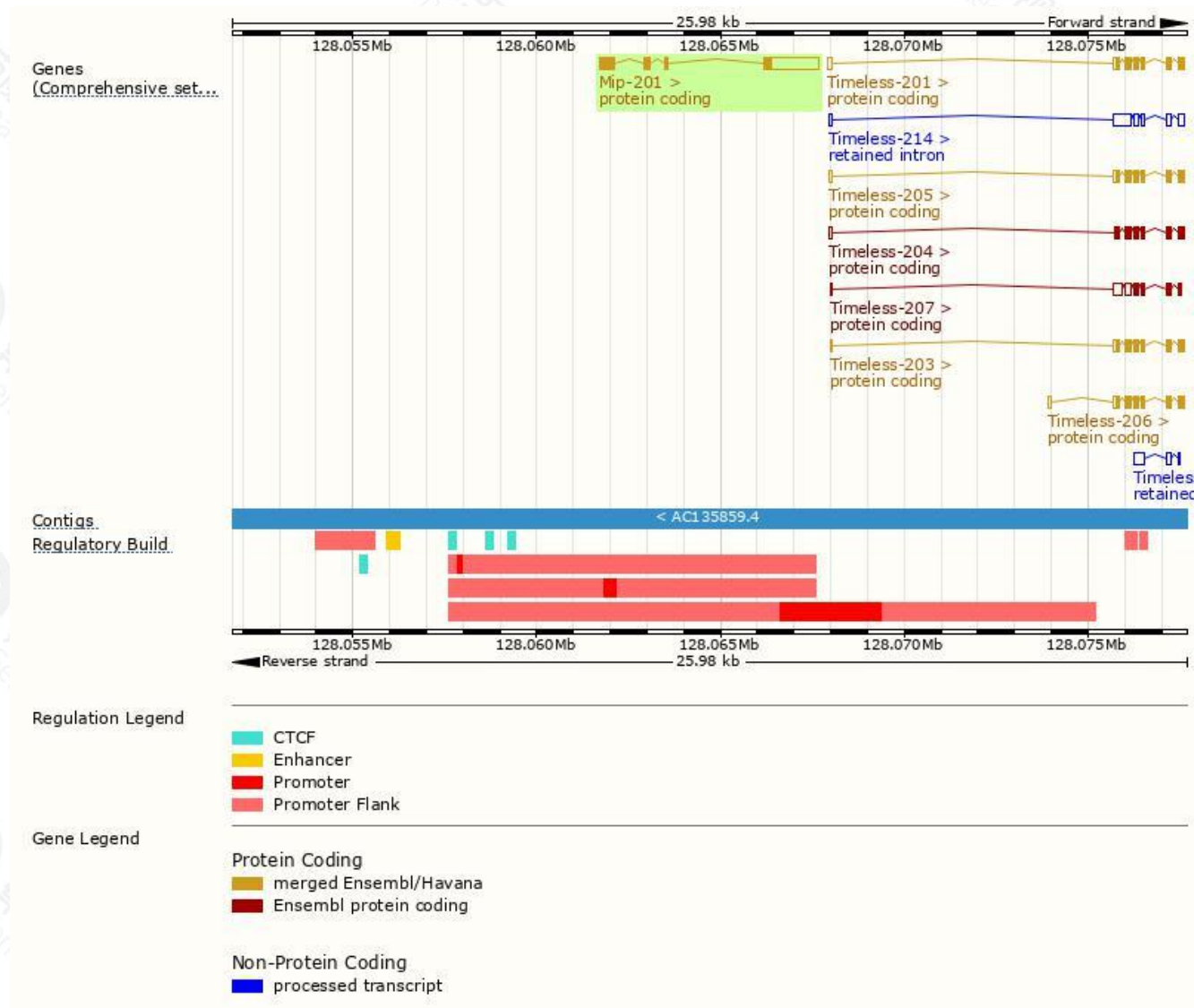
The gene has 1 transcript, and the transcript is shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Mip-201	ENSMUST00000026455.7	2144	263aa	Protein coding	CCDS24265	P51180	TSL:1 GENCODE basic APPRIS is a system to annotate alternatively spliced transcripts based on a range of computational methods to identify the most functionally important transcript(s) of a gene. APPRIS P1

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



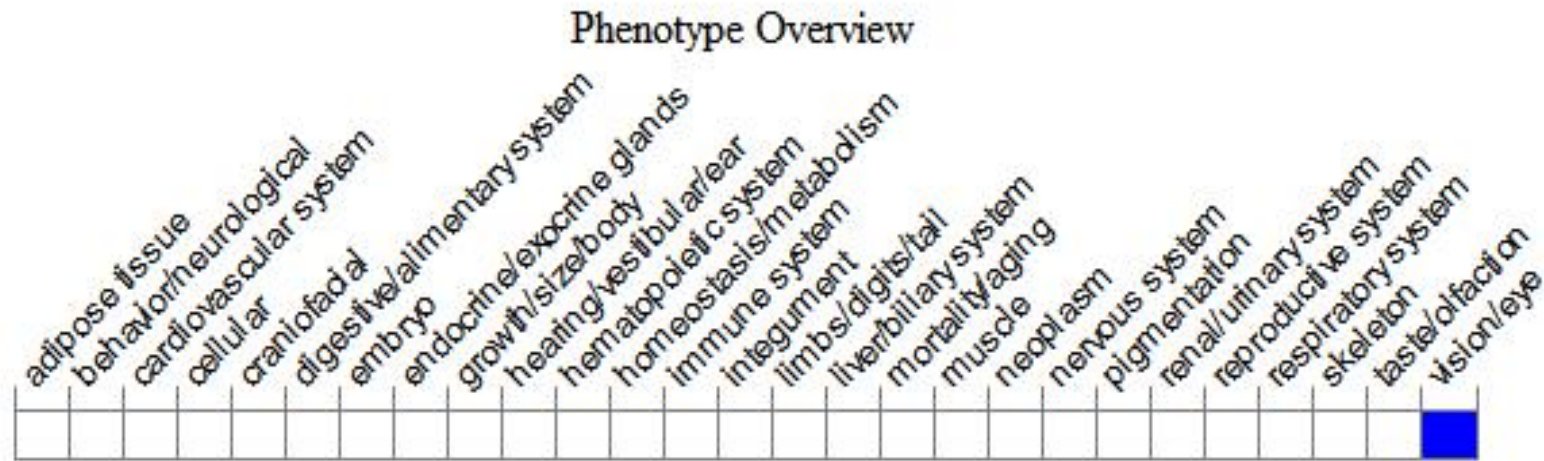
Genomic location distribution



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, homozygotes have microphthalmia and lens opacity. Other defects may include degeneration of lens fiber cells, vacuolization of lens fibers and reduced gamma:alpha crystallin ratio. Heterozygotes have less severe forms of lens cataract and microphthalmia.

If you have any questions, you are welcome to inquire.
Tel: 400-9660890

