GemPharmatech™

Mafb Cas9-KO Strategy

Designer: Yanhua Shen

Reviewer: Jia Yu

Design Date: 2023-04-19

Overview

Target Gene Name

- Mafb

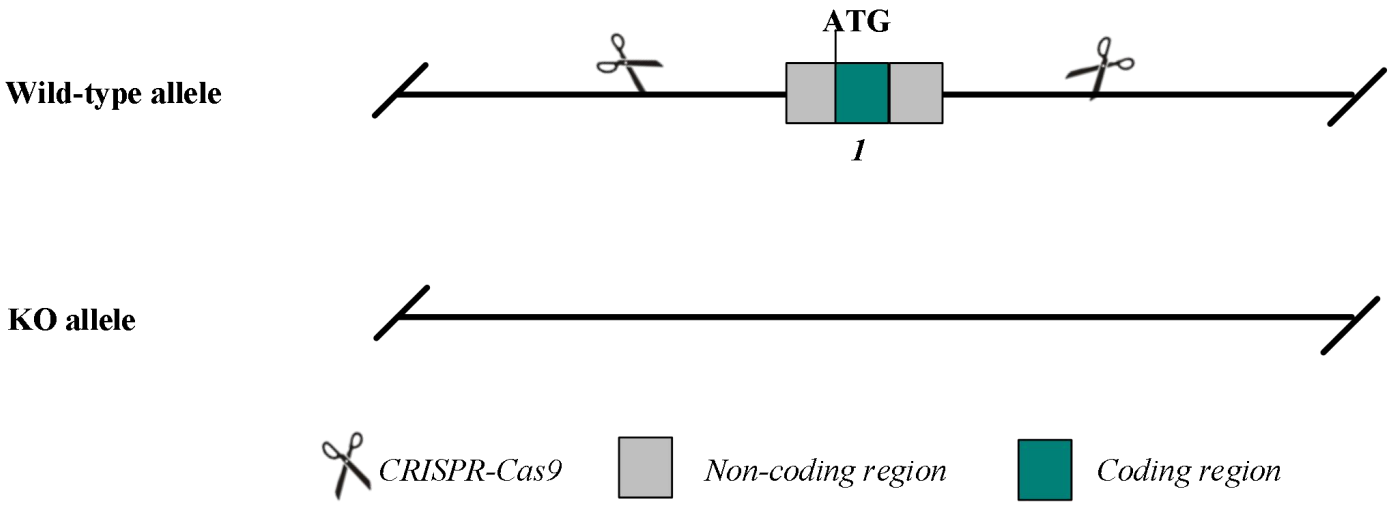
Project Type

- Cas9-KO

Genetic Background

- C57BL/6JGpt

Strain Strategy



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

Technical Information

- The *Mafb* gene has 1 transcript. According to the structure of *Mafb* gene, exon1 of *Mafb*-201 (ENSMUST00000099126.5) transcript is recommended as the knockout region. The region contains 116bp of coding sequences. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Mafb* 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

Mafb MAF bZIP transcription factor B [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 16658, updated on 12-Apr-2023

Summary

Official Symbol	Mafb provided by MGI
Official Full Name	MAF bZIP transcription factor B provided by MGI
Primary source	MGI:MGI:104555
See related	Ensembl:ENSMUSG00000074622 AllianceGenome:MGI:104555
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	kr; Krml; Krml1; Kreisler
Summary	Enables DNA-binding transcription activator activity, RNA polymerase II-specific and RNA polymerase II cis-regulatory region sequence-specific DNA binding activity. Involved in abducens nerve formation; negative regulation of osteoclast differentiation; and positive regulation of transcription, DNA-templated. Acts upstream of or within several processes, including animal organ development; positive regulation of transcription by RNA polymerase II; and respiratory gaseous exchange by respiratory system. Located in nucleus. Part of transcription regulator complex. Is expressed in several structures, including alimentary system; central nervous system; limb; sensory organ; and urinary system. Used to study Duane retraction syndrome and multicentric carpotarsal osteolysis syndrome. Human ortholog(s) of this gene implicated in Duane retraction syndrome and multicentric carpotarsal osteolysis syndrome. Orthologous to human MAFB (MAF bZIP transcription factor B). [provided by Alliance of Genome Resources, Apr 2022]
Orthologs	human all

NEW Try the new Gene table
Try the new Transcript table

Genomic context

Location: 2 H2; 2 80.92 cM — See Mafb in Genome Data Viewer

Exon count: 1

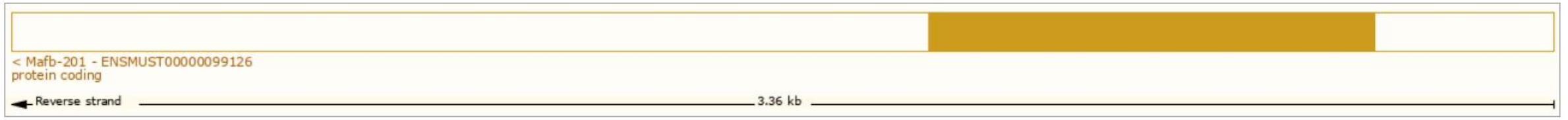
Source: https://www.ncbi.nlm.nih.gov/

Transcript Information

The gene has 1 transcript, all transcripts are shown below:

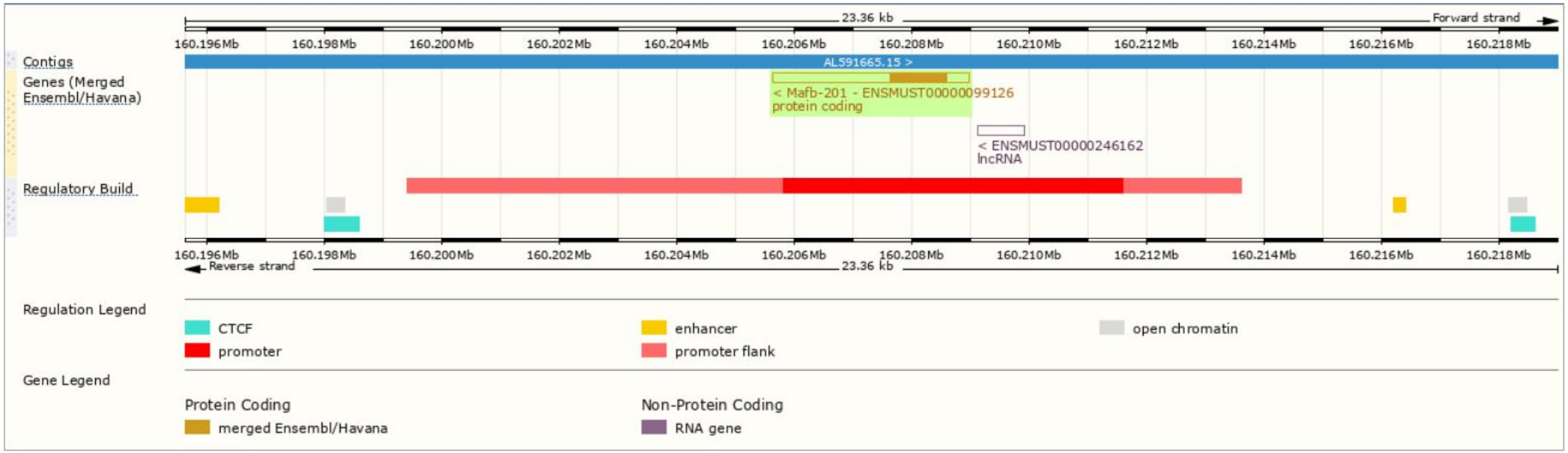
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000099126.5	Mafb-201	3363	323aa	Protein coding	CCDS16994	P54841	Ensembl Canonical, GENCODE basic, APPRIS P1, TSL:NA

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



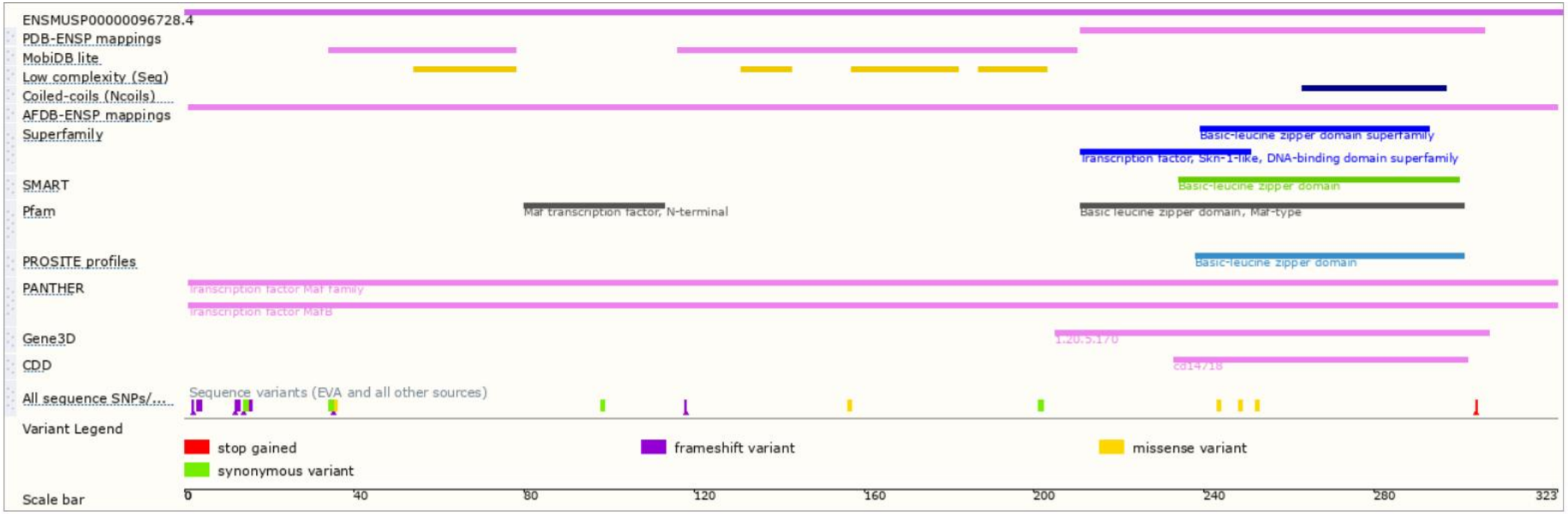
Source: https://www.ensembl.org

Genomic Information



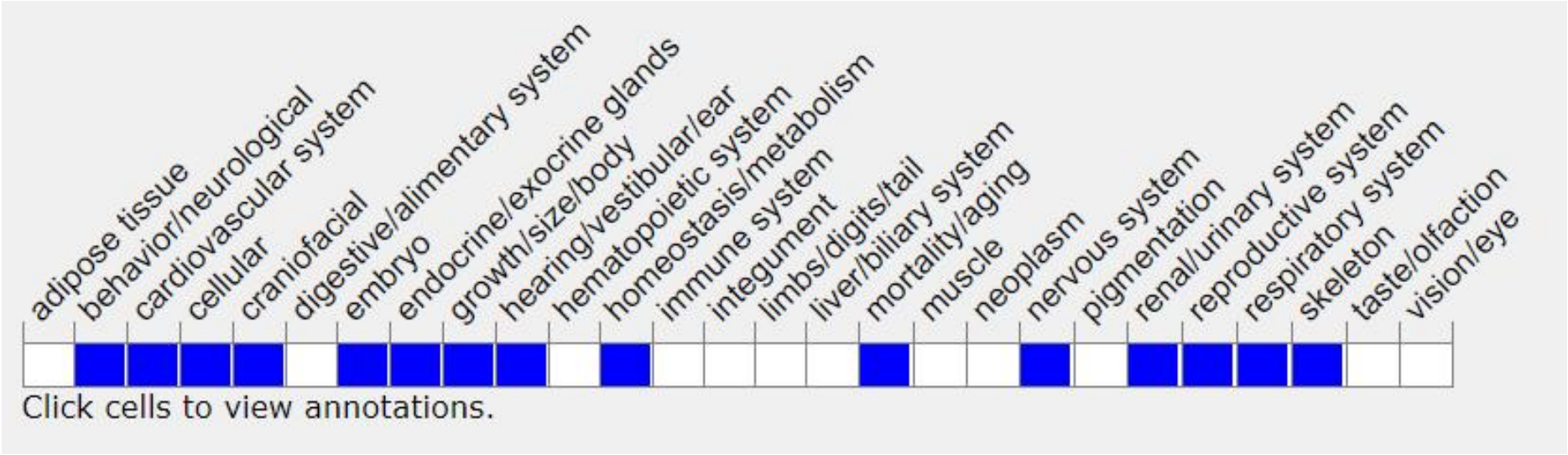
Source: : https://www.ensembl.org

Protein Information



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

Mouse Phenotype Information (MGI)



- Mutant homozygotes exhibit segmentation defects in the caudal hindbrain, loss of facial motor neurons, impaired inner ear development, arrested maturation of kidney podocytes, reduced fertility, and, in some cases, lethality at birth from apnea. Homozygous KO mice die shortly after birth.

Source: https://www.informatics.jax.org

Important Information

- According to the existing MGI data,Mutant homozygotes exhibit segmentation defects in the caudal hindbrain, loss of facial motor neurons, impaired inner ear development, arrested maturation of kidney podocytes, reduced fertility, and, in some cases, lethality at birth from apnea. Homozygous KO mice die shortly after birth.
- The effect of ENSMUST00000246162.1 gene is unknown.
- *Mafb* is located on Chr4. 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.