GemPharmatech™

Mpzl3 Cas9-KO Strategy

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Reviewer: Jinling Wang

Design Date: 2024-05-06

Overview

Target Gene Name

- Mpzl3

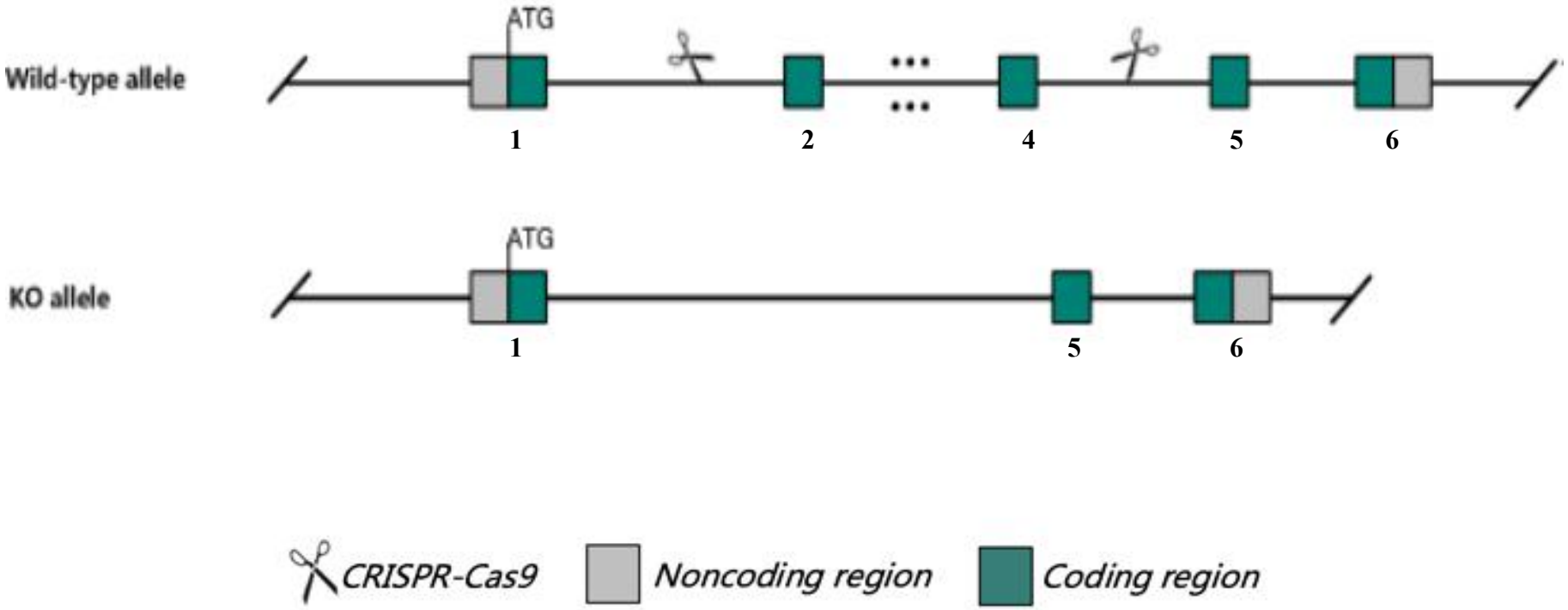
Project Type

- Cas9-KO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Technical Information

- The *Mpzl3* gene has 5 transcripts. According to the structure of *Mpzl3* gene, exon2-exon4 of *Mpzl3*-203 (ENSMUST00000114664.8) transcript is recommended as the knockout region. The region contains 544bp coding sequence. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Mpzl3* 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

Mpzl3 myelin protein zero-like 3 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 319742, updated on 2-May-2024

Summary

Official Symbol	Mpzl3 provided by MGI
Official Full Name	myelin protein zero-like 3 provided by MGI
Primary source	MGI:MGI:2442647
See related	Ensembl:ENSMUSG00000070305 AllianceGenome:MGI:2442647
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	rc; ruf; 5430427F17Rik; A530065I17Rik
Summary	Acts upstream of or within extracellular matrix organization and hair cycle. Predicted to be located in membrane. Predicted to be integral component of membrane. Predicted to be active in plasma membrane. Orthologous to human MPZL3 (myelin protein zero like 3). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Ubiquitous expression in colon adult (RPKM 4.2), small intestine adult (RPKM 3.4) and 27 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/

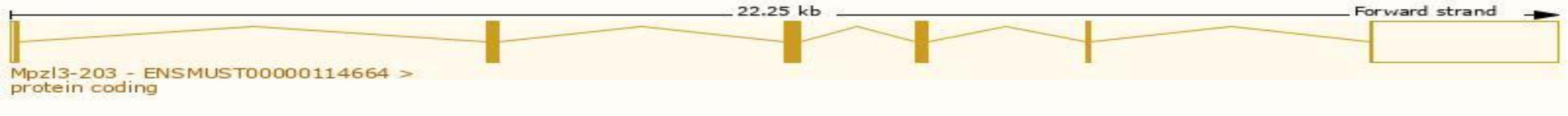
Transcript Information

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

Show/hide columns (1 hidden) Filter

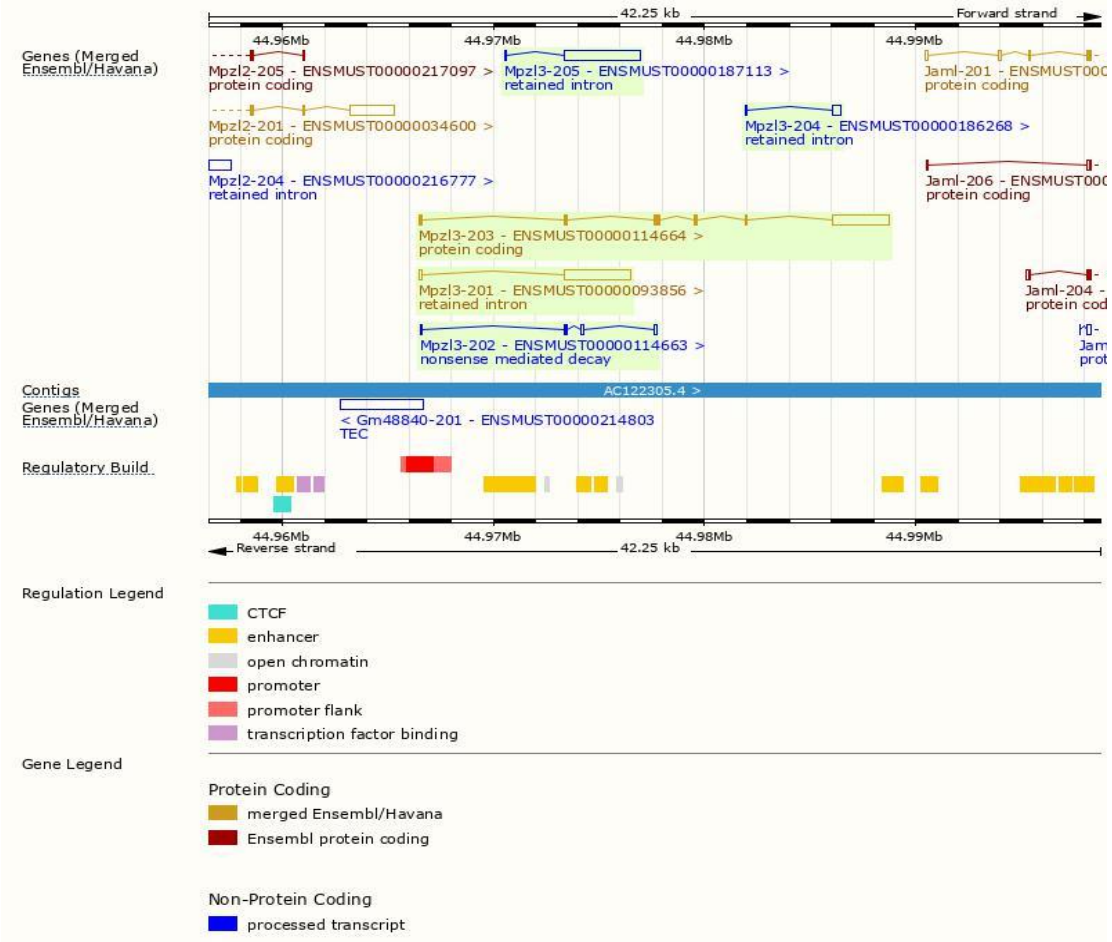
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match ▲	Flags
ENSMUST00000114663.4	Mpzl3-202	509	82aa	Nonsense mediated decay		A0A0A0MQE9	TSL:3
ENSMUST00000114664.8	Mpzl3-203	3424	237aa	Protein coding	CCDS52781	Q3V3F6	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
ENSMUST00000187113.2	Mpzl3-205	3679	No protein	Retained intron		-	TSL:1
ENSMUST00000093856.4	Mpzl3-201	3260	No protein	Retained intron		-	TSL:1
ENSMUST00000186268.2	Mpzl3-204	522	No protein	Retained intron		-	TSL:2

The strategy is based on the design of *Mpzl3*-203 transcript, the transcription is shown below:



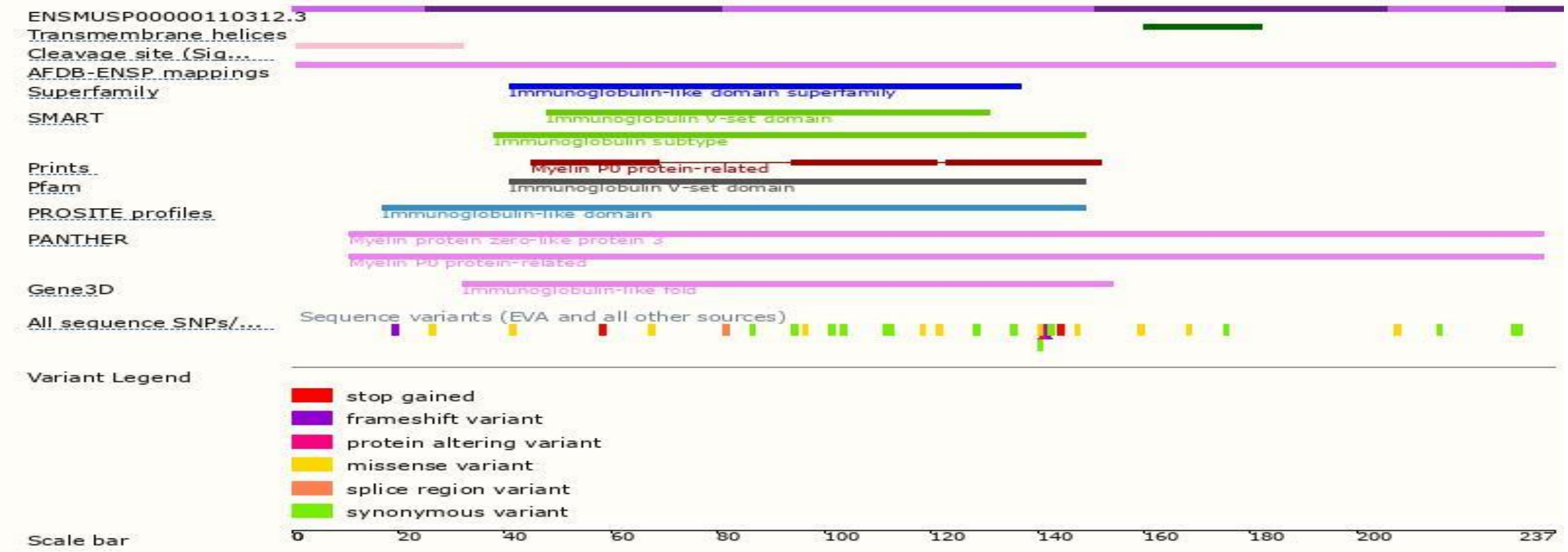
Source: https://www.ensembl.org

Genomic Information



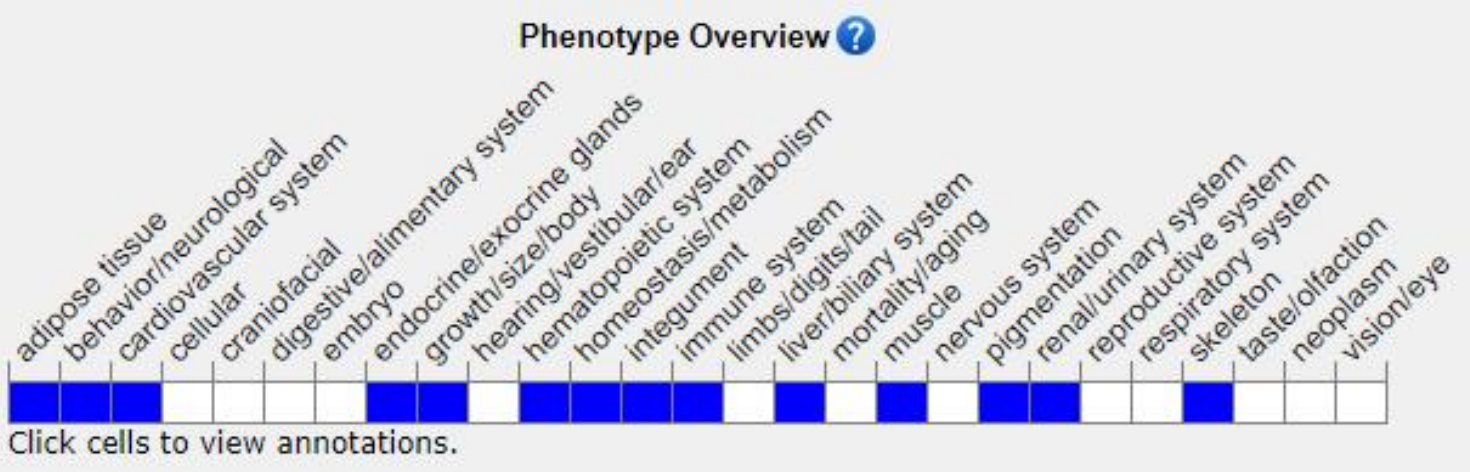
Source: : https://www.ensembl.org

Protein Information



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

Mouse Phenotype Information (MGI)



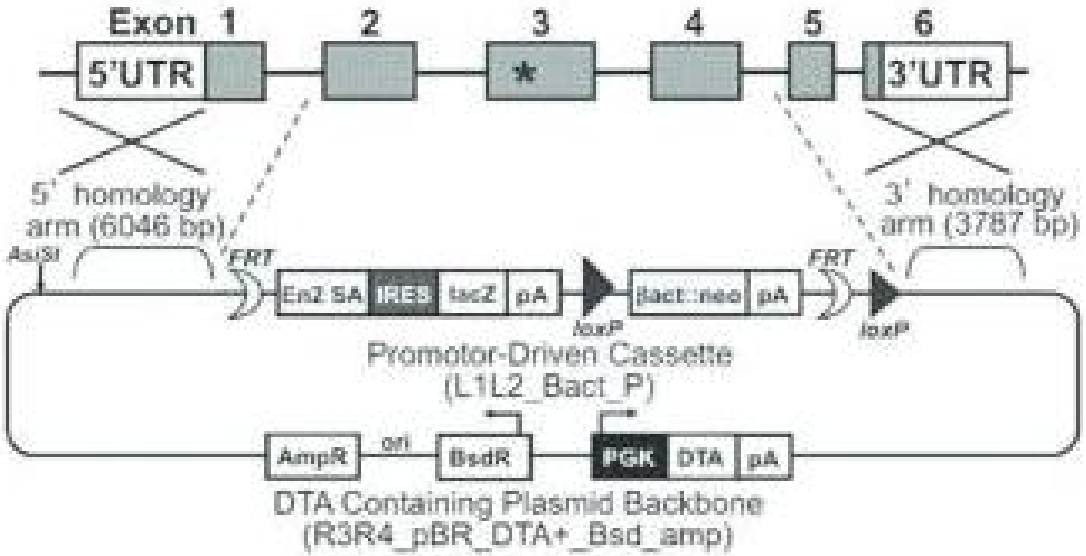
- Mice homozygous for a spontaneous allele have a rough coat that becomes brittle and oily with age, and display stunted growth, cyclic and progressive hair loss, hyperplastic epidermis, abnormal hair follicles, myocardial degeneration, and reduced collagen and elastin content in the skin and heart.

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

Important Information

- According to the existing MGI data，mice homozygous for a spontaneous allele have a rough coat that becomes brittle and oily with age, and display stunted growth, cyclic and progressive hair loss, hyperplastic epidermis, abnormal hair follicles, myocardial degeneration, and reduced collagen and elastin content in the skin and heart.
- *Mpzl3* is located on Chr9. 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



Mutation details: The insertion of the L1L2_Bact_P cassette created a deletion of size 6431 starting at position 44973303 and ending at position 44979734 of Chromosome 9 (Genome Build GRCm39). This deletion results in the removal of functionally critical exon(s). The cassette is composed of an FRT site followed by lacZ sequence and a loxP site. This first loxP site is followed by a neomycin resistance gene under the control of the human beta-actin promoter, SV40 polyA, a second FRT site and a second loxP site. Further information on targeting strategies used for this and other IKMC alleles can be found at http://www.informatics.jax.org/mgihome/nomen/IKMC_schematics.shtml (*J:157064, J:210832*)