# *Mrtfb* Cas9-CKO Strategy


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**Design Date:** 2019-10-17

# Project Overview

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|---|---|
| **Project Name** | ***Mrtfb*** |
| **Project type** | **Cas9-CKO** |
| **Strain background** | **C57BL/6J** |

# Conditional Knockout strategy

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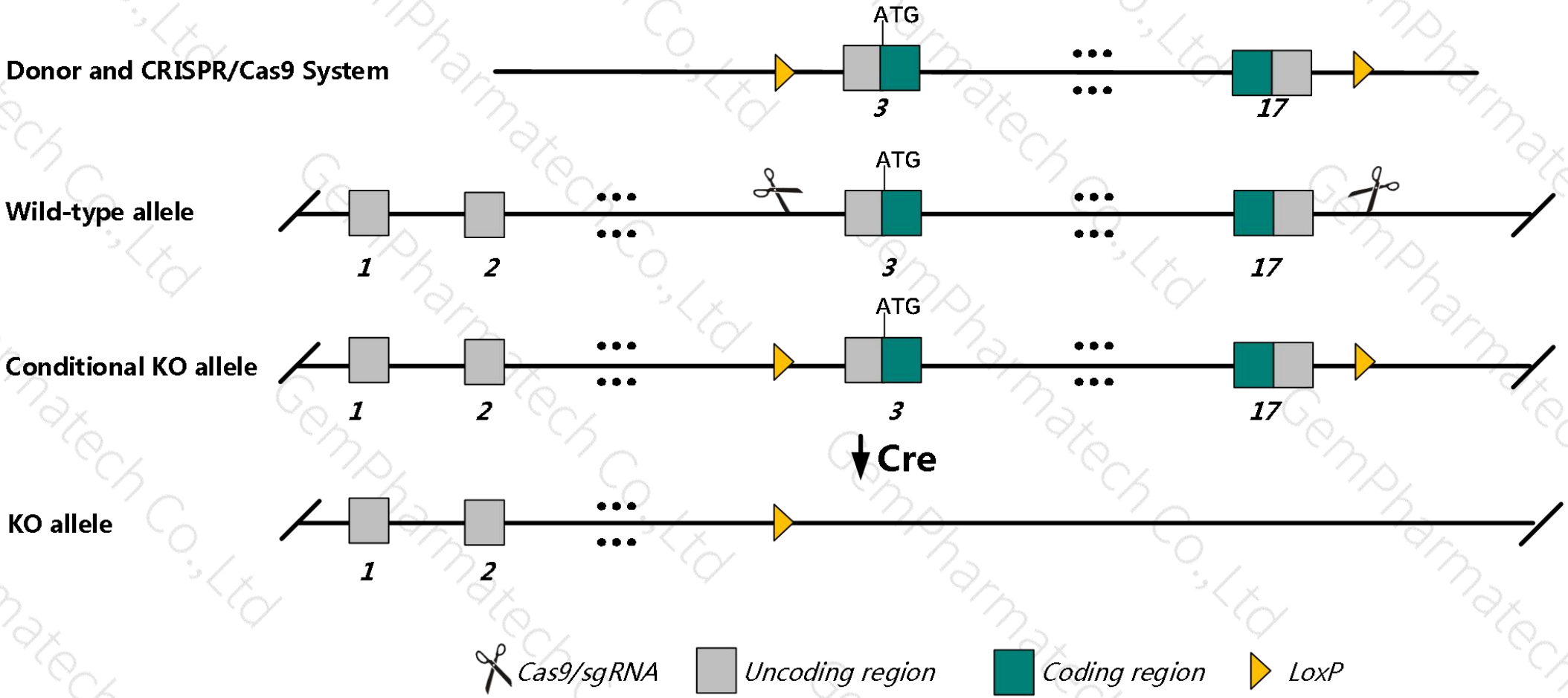
This model will use CRISPR/Cas9 technology to edit the *Mrtfb* gene. The schematic diagram is as follows:



# Technical routes

- The *Mrtfb* gene has 4 transcripts. According to the structure of *Mrtfb* gene, exon3-exon17 of *Mrtfb-201* (ENSMUST00000009713.13) transcript is recommended as the knockout region.The region contains all coding sequence. Knock out the region will result in disruption of protein function.

- In this project we use CRISPR/Cas9 technology to modify *Mrtfb* gene. The brief process is as follows:sgRNA was transcribed in vitro, donor vector was constructed.Cas9, sgRNA and Donor were microinjected into the fertilized eggs of C57BL/6J 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/6J 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.

# Notice

- According to the existing MGI data,Mice homozygous for knock-out alleles exhibit prenatal lethality with widespread hemorrhaging, cardiovascular defects, and craniofacial anomalies. Mice homozygous for a gene trap allele exhibit fetal lethality due to cardiac outflow tractdefects.
- The flox region overlaps with lncRNA *Gm15738* and this strategy will destroy the gene.
- The *Mrtfb* gene is located on the Chr16. 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）

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## Mrtfb myocardin related transcription factor B [ *Mus musculus* (house mouse) ]

Gene ID: 239719, updated on 8-Oct-2019

### Summary

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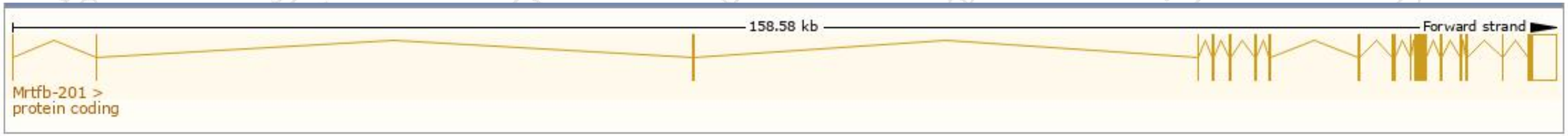
|---|---|
| **Official Symbol** | Mrtfb provided by MGI |
| **Official Full Name** | myocardin related transcription factor B provided by MGI |
| **Primary source** | MGI:MGI:3050795 |
| **See related** | Ensembl:ENSMUSG00000009569 |
| **Gene type** | protein coding |
| **RefSeq status** | VALIDATED |
| **Organism** | Mus musculus |
| **Lineage** | Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus |
| **Also known as** | Mkl2; Gt4-1; MRTF-B; mKIAA1243 |
| **Expression** | Ubiquitous expression in frontal lobe adult (RPKM 9.3), cortex adult (RPKM 9.3) and 28 other tissues See more |
| **Orthologs** | human all |

# Transcript information（Ensembl）

The gene has 4 transcripts,all transcripts are shown below:

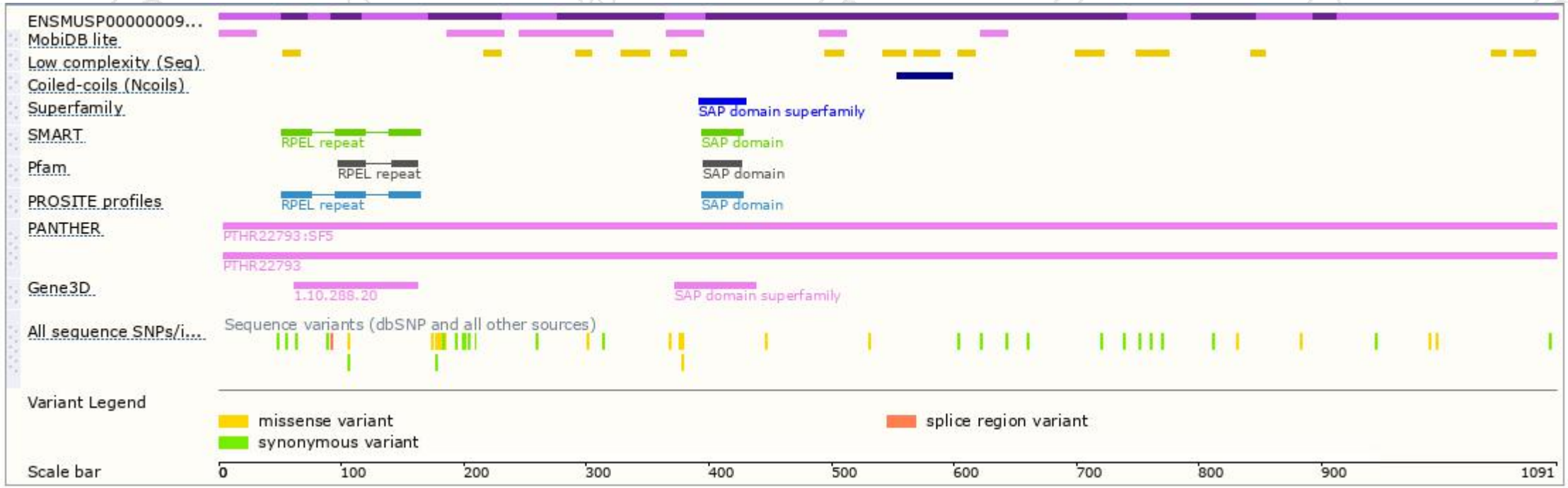
| Name | Transcript ID | bp | Protein | Biotype | CCDS | UniProt | Flags |
|---|---|---|---|---|---|---|---|
| Mrtfb-204 | ENSMUST00000149359.1 | 8295 | 1080aa | Protein coding | CCDS37258 | Q5DTZ3 | TSL:1 GENCODE basic APPRIS P3 |
| Mrtfb-201 | ENSMUST00000009713.13 | 5815 | 1091aa | Protein coding | CCDS49768 | G3X8R8 | TSL:5 GENCODE basic APPRIS ALT2 |
| Mrtfb-203 | ENSMUST00000115809.7 | 667 | 102aa | Protein coding | CCDS37257 | Q8R2L3 | TSL:2 GENCODE basic |
| Mrtfb-202 | ENSMUST00000056715.6 | 618 | 102aa | Protein coding | CCDS37257 | Q8R2L3 | TSL:1 GENCODE basic |

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

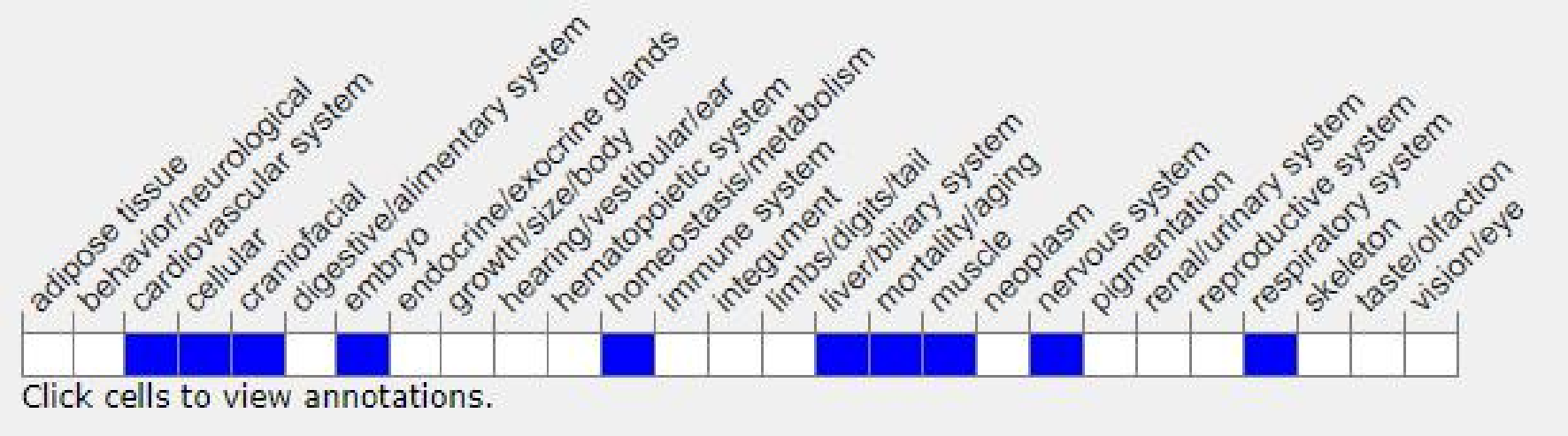


# Genomic location distribution

# 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/).*

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If you have any questions, you are welcome to inquire.

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