Mpc2 Cas9-CKO Strategy

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Project Overview

Project Name	***Mpc2***
Project type	**Cas9-CKO**
Strain background	**C57BL/6JGpt**

Conditional Knockout strategy

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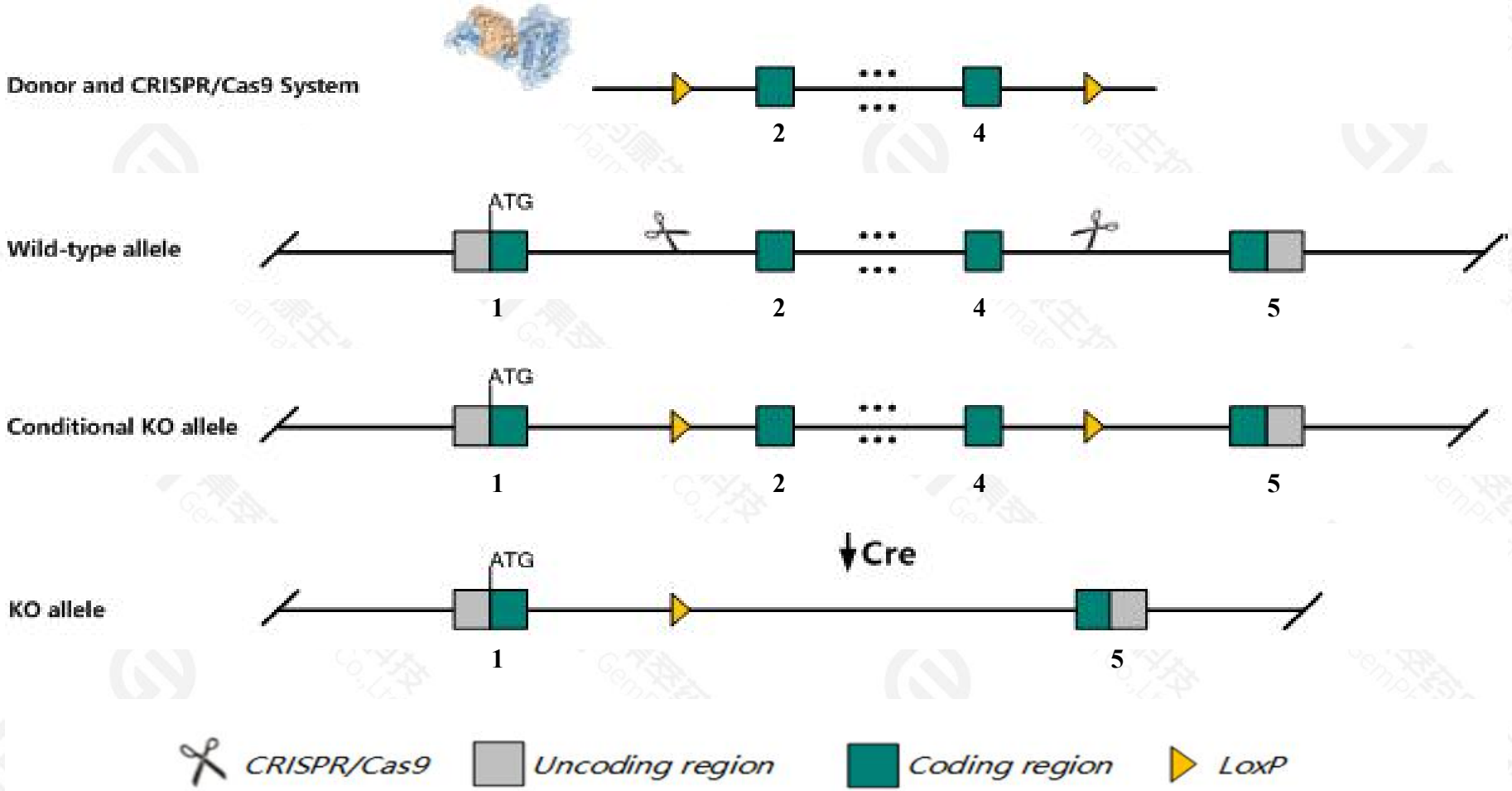
This model will use CRISPR/Cas9 technology to edit the *Mpc2* gene. The schematic diagram is as follows:



Technical routes

➢ The *Mpc2* gene has 5 transcripts. According to the structure of *Mpc2* gene, exon2-exon4 of *Mpc2-201*(ENSMUST00000027853.6) transcript is recommended as the knockout region.The region contains 238bp coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Mpc2* 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 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.

Notice

➢ According to the existing MGI data,mice homozygous for a null allele die during organogenesis. Mice homozygous for a truncated allele display defects in mitochondrial physiology and impaired glucose-stimulated insulin secretion.

➢ Transcript *Mpc2-205* may be unaffected.

➢ The *Mpc2* gene is located on the Chr1. 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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Mpc2 mitochondrial pyruvate carrier 2 [Mus musculus (house mouse)]

Gene ID: 70456, updated on 3-Jan-2021

Summary

Official Symbol	Mpc2 provided by MGI
Official Full Name	mitochondrial pyruvate carrier 2 provided by MGI
Primary source	MGI:MGI:1917706
See related	Ensembl:ENSMUSG00000026568
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	0610006C01Rik, 2010002I07Rik, 2610205H19Rik, AA108335, Brp, Brp44, ESTM4, ESTM43
Expression	Ubiquitous expression in adrenal adult (RPKM 132.5), testis adult (RPKM 127.7) and 28 other tissues See more
Orthologs	human all

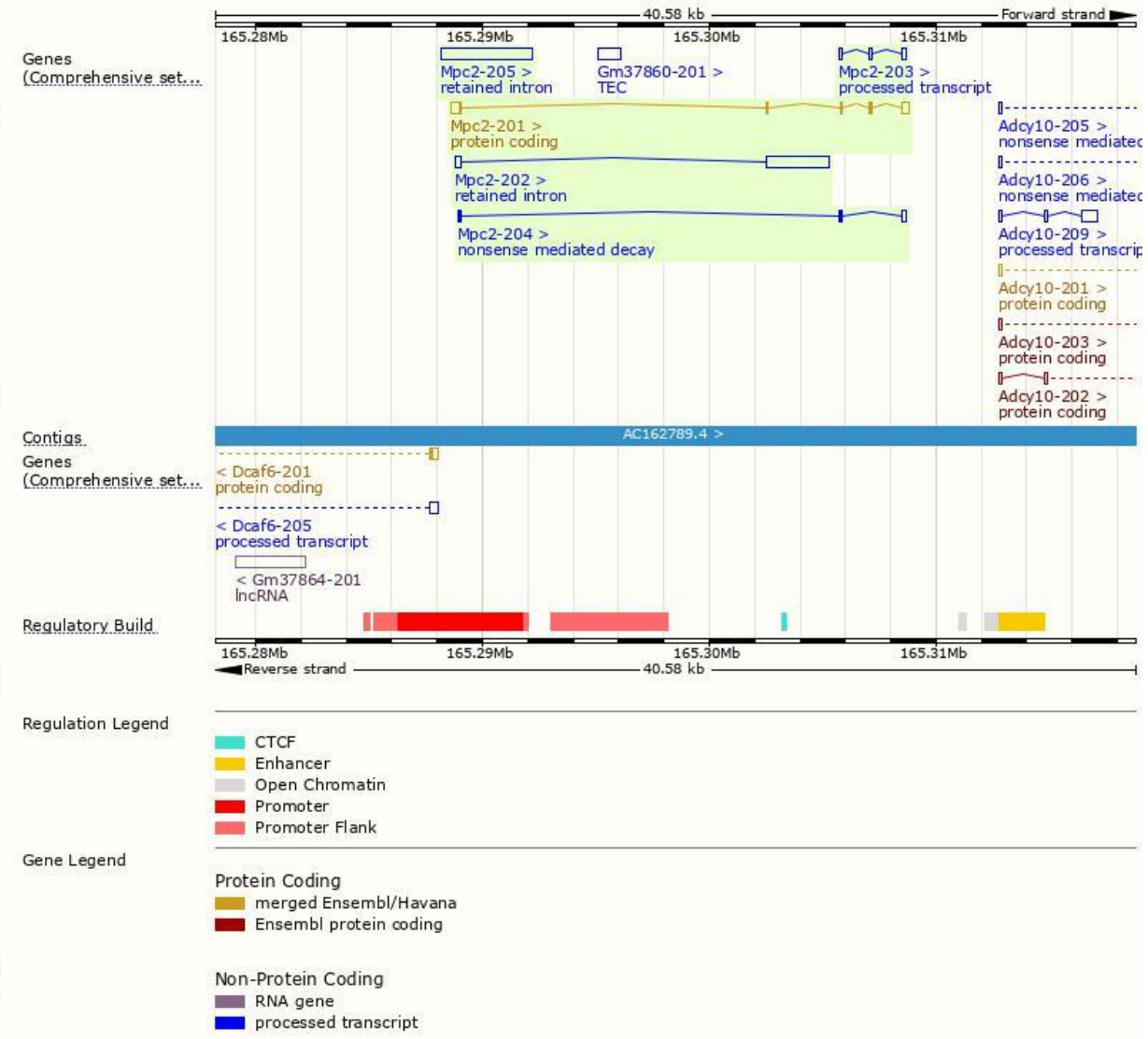
Transcript information（Ensembl）

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

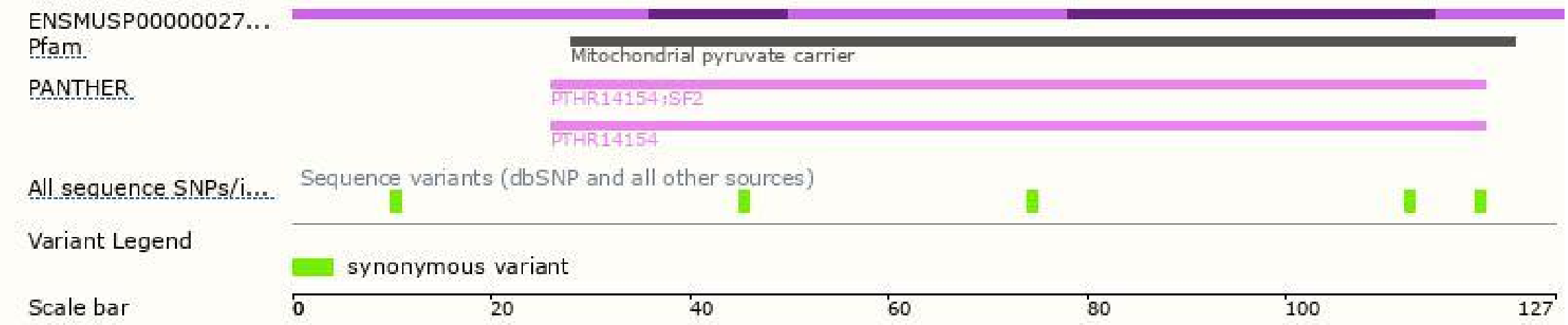
Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Mpc2-201	ENSMUST00000027853.6	1025	127aa	Protein coding	CCDS15442		TSL:1 , GENCODE basic , APPRIS P1 ,
Mpc2-204	ENSMUST00000193575.2	468	41aa	Nonsense mediated decay	-		TSL:5 ,
Mpc2-203	ENSMUST00000138999.2	493	No protein	Processed transcript	-		TSL:2 ,
Mpc2-205	ENSMUST00000195026.2	4015	No protein	Retained intron	-		TSL:NA ,
Mpc2-202	ENSMUST00000128633.2	3029	No protein	Retained intron	-		TSL:1 ,

The strategy is based on the design of *Mpc2-201* transcript,the transcription is shown below:

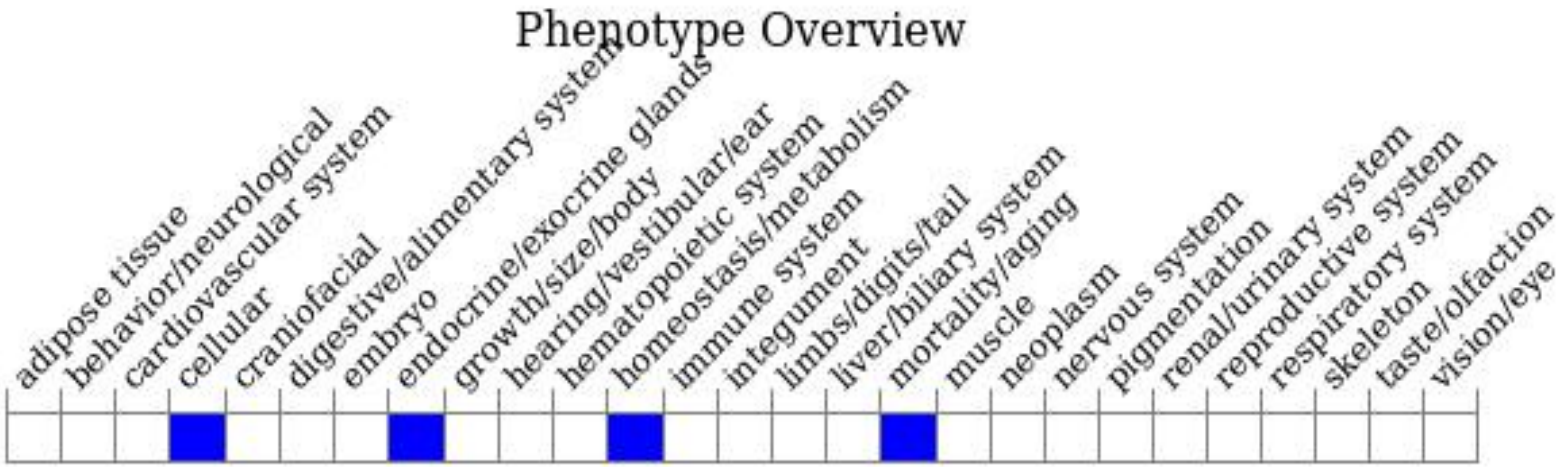
Genomic location distribution



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,mice homozygous for a null allele die during organogenesis. Mice homozygous for a truncated allele display defects in mitochondrial physiology and impaired glucose-stimulated insulin secretion.

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