

Ptp4a1 Cas9-KO Strategy

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Reviewer:

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Project Overview



Project Name

Ptp4a1

Project type

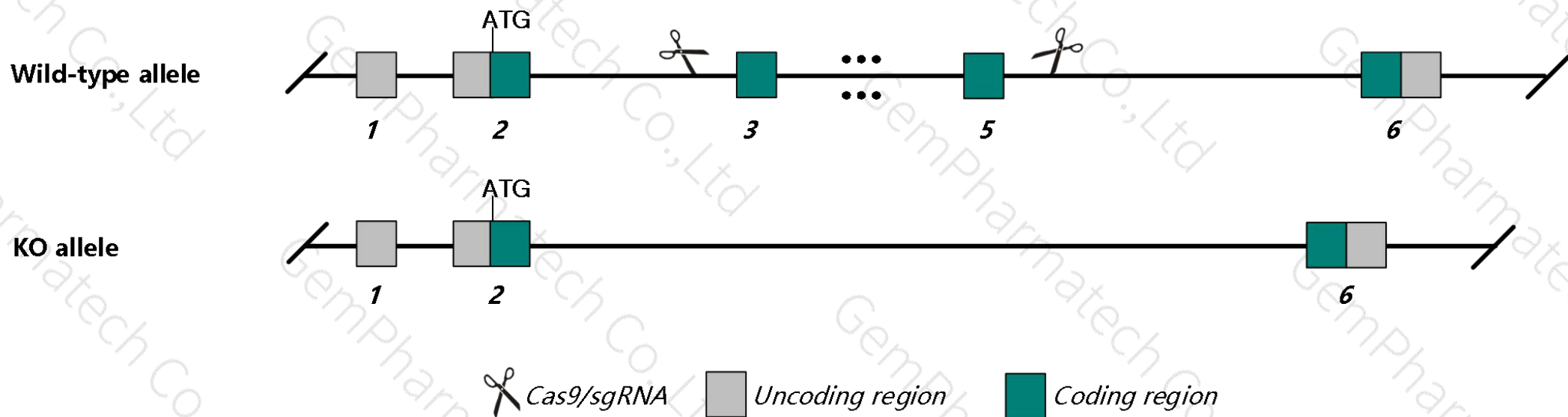
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Ptp4a1* gene. The schematic diagram is as follows:



Technical routes

- The *Ptp4a1* gene has 6 transcripts. According to the structure of *Ptp4a1* gene, exon3-exon5 of *Ptp4a1-203* (ENSMUST00000232841.1) transcript is recommended as the knockout region. The region contains 299bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Ptp4a1* gene. The brief process is as follows: CRISPR/Cas9 system 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.

- According to the existing MGI data, A homozygous null mutation leads to an increase in preweaning lethality. Homozygous KO in combination with homozygous KO of *Ptp4a2* is embryonic lethal. Heterozygous-homozygous and homozygous-heterozygous KO combinations lead to reduced male fertility, with the het-hom combination exacerbating the phenotype of single homozygous *Ptp4a2* KO.
- The *Ptp4a1* 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 gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information (NCBI)

Ptp4a1 protein tyrosine phosphatase 4a1 [Mus musculus (house mouse)]

Gene ID: 19243, updated on 31-Jan-2019

Summary



Official Symbol	Ptp4a1 provided by MGI
Official Full Name	protein tyrosine phosphatase 4a1 provided by MGI
Primary source	MGI:MGI:1277096
See related	Ensembl:ENSMUSG00000026064 Ensembl:ENSMUSG00000117310
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	AA415290, AU019864, C130021B01, Pri-1
Expression	Ubiquitous expression in CNS E18 (RPKM 22.3), subcutaneous fat pad adult (RPKM 22.2) and 28 other tissues See more
Orthologs	human all

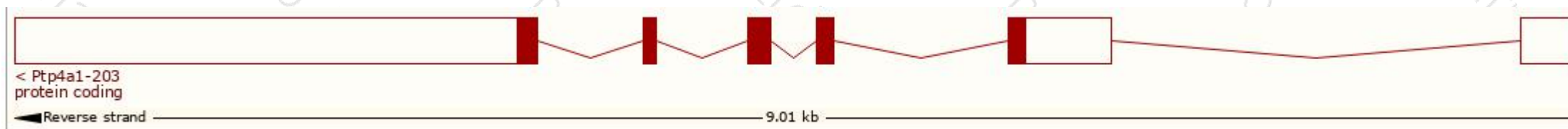
Transcript information (Ensembl)

The gene has 6 transcripts, all transcripts are shown below:

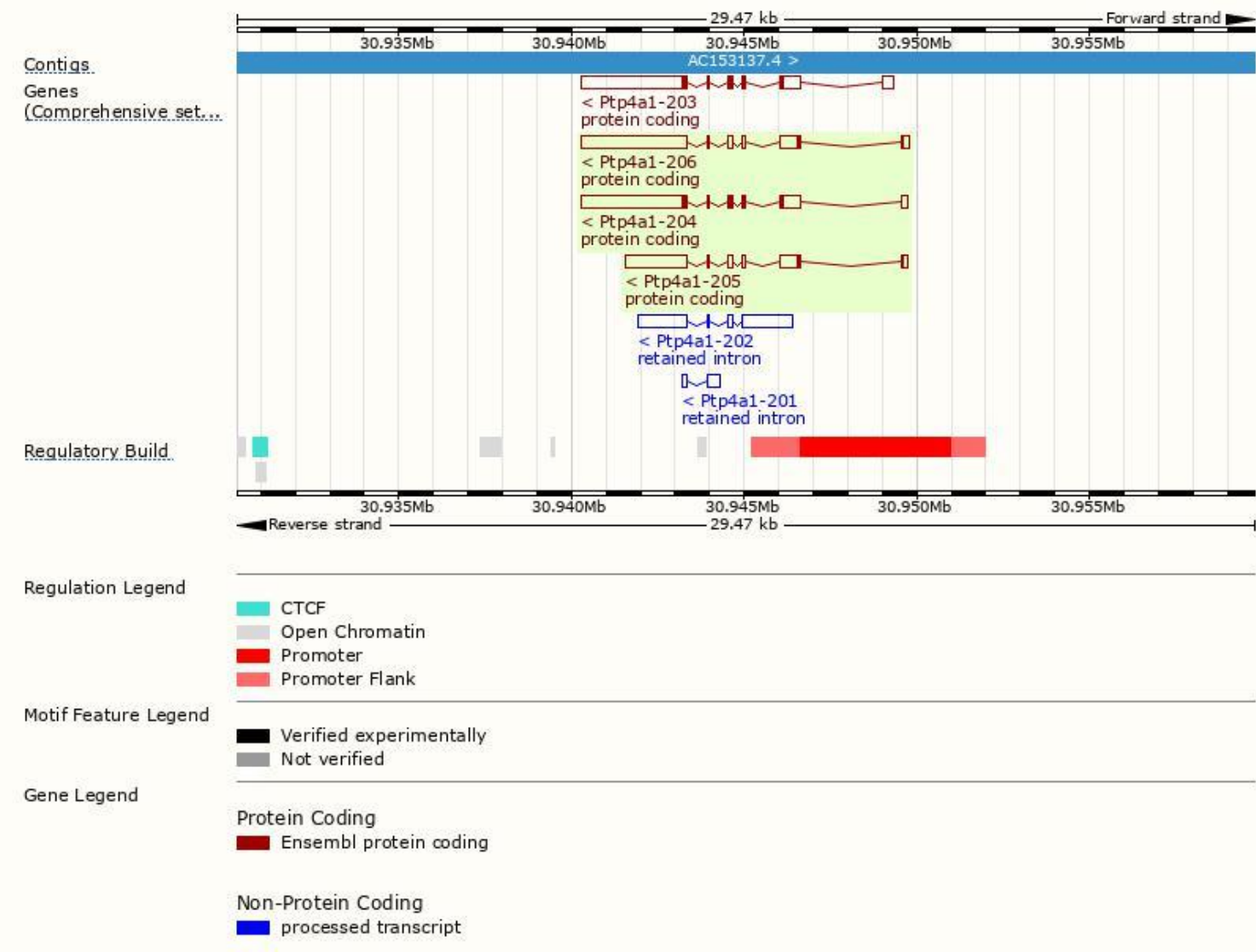
Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Ptp4a1-203	ENSMUST00000232841.1	4236	173aa	Protein coding	CCDS14858	B9EKL6 Q63739	GENCODE basic APPRIS P1
Ptp4a1-202	ENSMUST00000153681.1	3072	No protein	Retained intron	-	-	TSL:1
Ptp4a1-201	ENSMUST00000130934.1	476	No protein	Retained intron	-	-	TSL:2

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Ptp4a1-204	ENSMUST00000027232.14	4129	173aa	Protein coding	CCDS14858	B9EKL6 Q63739	TSL:1 GENCODE basic APPRIS P1
Ptp4a1-206	ENSMUST00000233506.1	4145	44aa	Protein coding	-	A0A3B2W3H6	GENCODE basic
Ptp4a1-205	ENSMUST00000076587.5	2851	43aa	Protein coding	-	A0A3F2YNM1	TSL:1 GENCODE basic

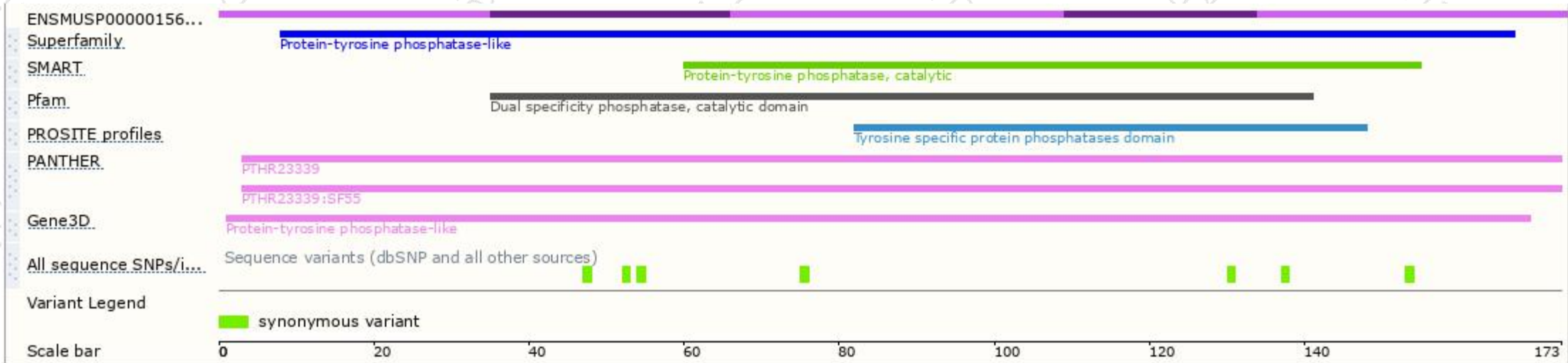
The strategy is based on the design of *Ptp4a1-203* transcript, The transcription is shown below



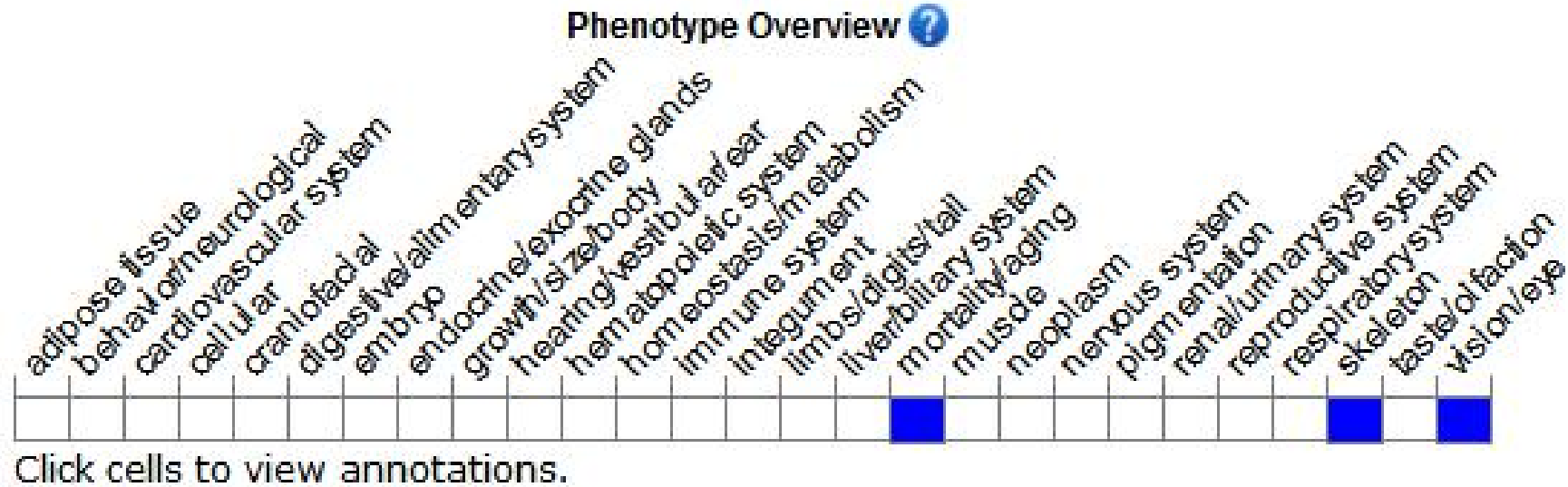
Genomic location distribution



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, A homozygous null mutation leads to an increase in preweaning lethality. Homozygous KO in combination with homozygous KO of Ptp4a2 is embryonic lethal. Heterozygous-homozygous and homozygous-heterozygous KO combinations lead to reduced male fertility, with the het-hom combination exacerbating the phenotype of single homozygous Ptp4a2 KO.

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

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