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Ptpn5 Cas9-CKO Strategy

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Overview

Target Gene Name

- Ptpn5

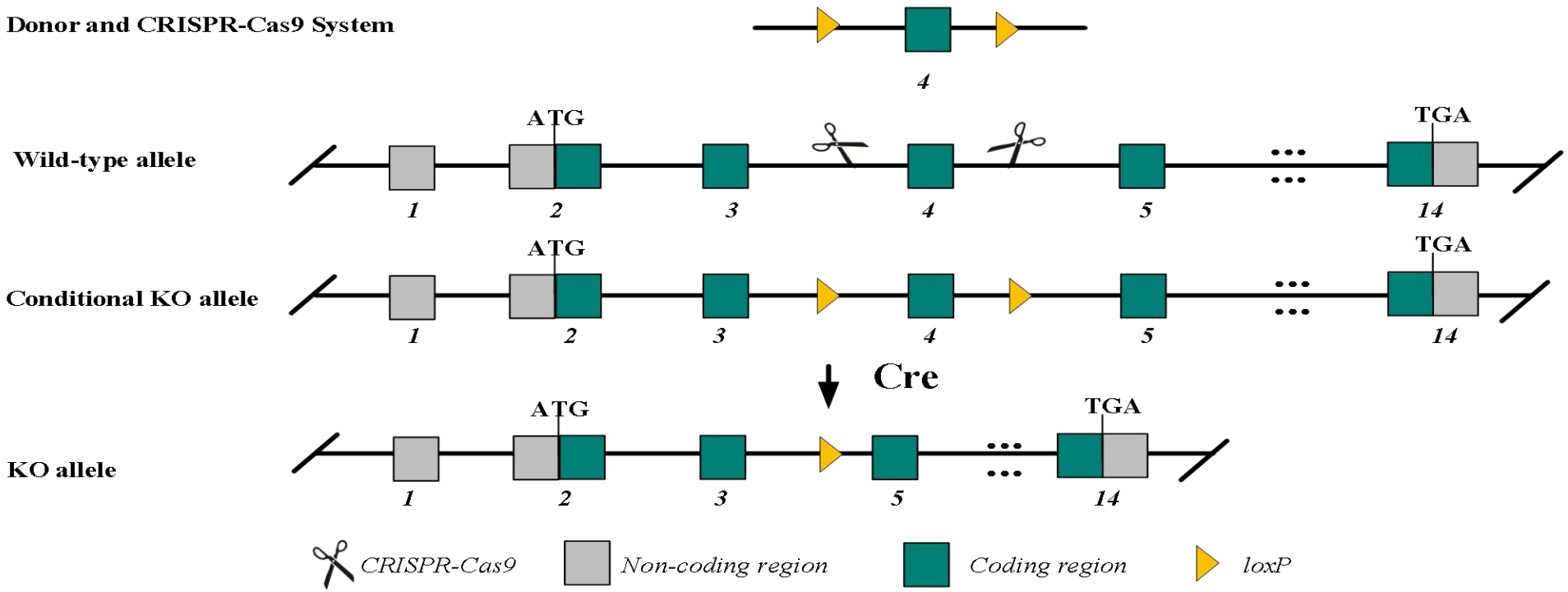
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Ptpn5* gene.

Technical Information

- The *Ptpn5* gene has 11 transcripts. According to the structure of *Ptpn5* gene, exon 4 of *Ptpn5*-201 (ENSMUST00000033142.13) transcript is recommended as the knockout region. The region contains 108 bp coding sequence.
- In this project we use CRISPR-Cas9 technology to modify *Ptpn5* 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 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.
- 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.

Gene Information

Ptpn5 protein tyrosine phosphatase, non-receptor type 5 [Mus musculus (house mouse)]

Gene ID: 19259, updated on 31-May-2023

Summary

Official Symbol	Ptpn5 provided by MGI
Official Full Name	protein tyrosine phosphatase, non-receptor type 5 provided by MGI
Primary source	MGI:MGI:97807
See related	Ensembl:ENSMUSG00000030854
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	Step
Summary	Enables protein tyrosine phosphatase activity. Acts upstream of or within protein dephosphorylation. Predicted to be located in several cellular components, including perikaryon; proximal dendrite; and synaptic vesicle. Is expressed in several structures, including central nervous system; dorsal root ganglion; reproductive system; retina; and submandibular gland. Orthologous to human PTPN5 (protein tyrosine phosphatase non-receptor type 5). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Biased expression in CNS E18 (RPKM 44.4), whole brain E14.5 (RPKM 40.6) and 9 other tissues See more
Orthologs	human all

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

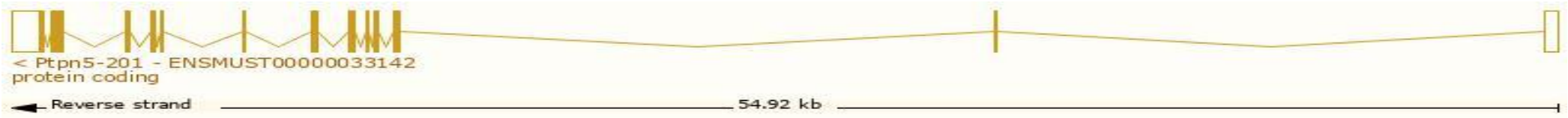
Transcript Information

The gene has 11 transcripts,all transcripts are shown below:

Show/hide columns (1 hidden) Filter

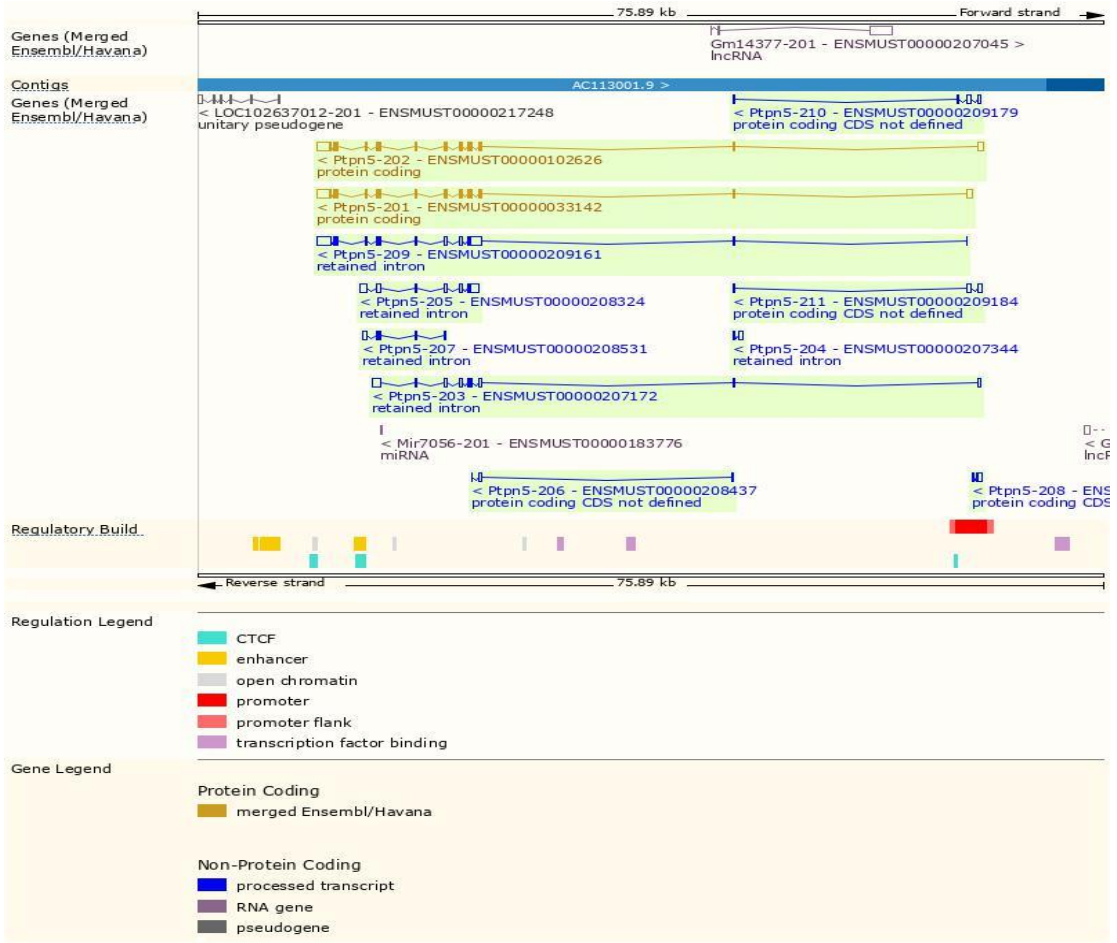
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000033142.13	Ptpn5-201	3145	541aa	Protein coding	CCDS21294	P54830	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
ENSMUST00000102626.10	Ptpn5-202	3137	541aa	Protein coding	CCDS21294	P54830	GENCODE basic APPRIS P1 TSL:1
ENSMUST00000207172.2	Ptpn5-203	1874	No protein	Retained intron		-	TSL:2
ENSMUST00000207344.2	Ptpn5-204	393	No protein	Retained intron		-	TSL:3
ENSMUST00000208324.2	Ptpn5-205	2165	No protein	Retained intron		-	TSL:1
ENSMUST00000208437.2	Ptpn5-206	348	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000208531.2	Ptpn5-207	694	No protein	Retained intron		-	TSL:3
ENSMUST00000209057.2	Ptpn5-208	589	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000209161.2	Ptpn5-209	3296	No protein	Retained intron		-	TSL:2
ENSMUST00000209179.2	Ptpn5-210	673	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000209184.2	Ptpn5-211	765	No protein	Protein coding CDS not defined		-	TSL:3

The strategy is based on the design of *Ptpn5*-201 transcript, the transcription is shown below:



Source: https://www.ensembl.org

Genomic Information



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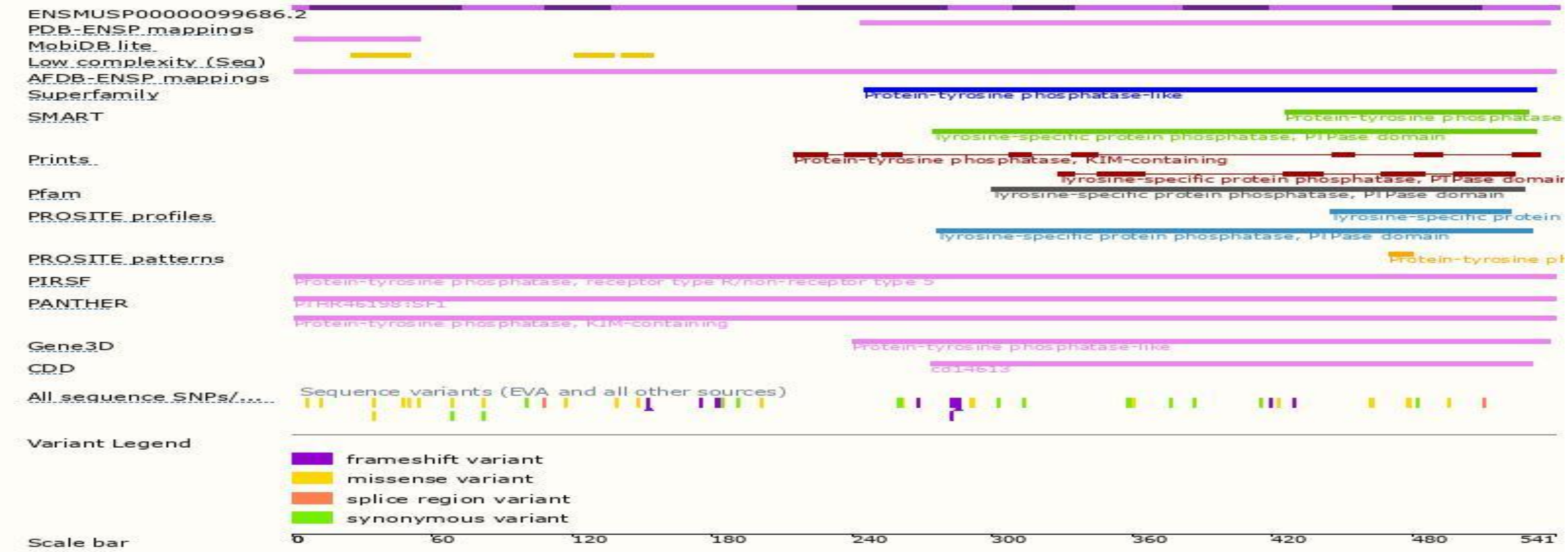
Source: : https://www.ensembl.org

Protein Information



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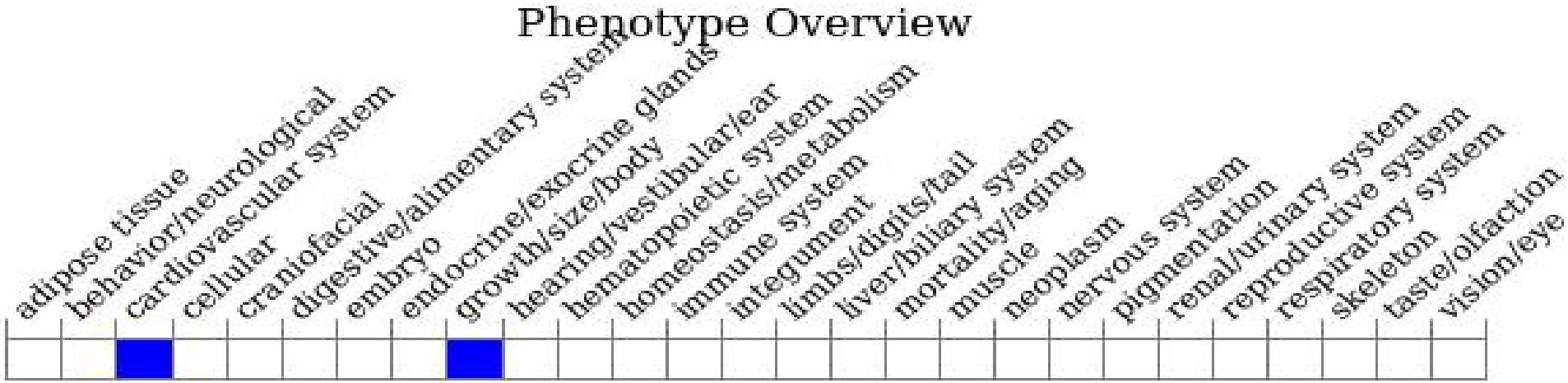
Source: : https://www.ensembl.org

Mouse Phenotype Information (MGI)



- Mice homozygous for a null allele exhibit normal brain development.

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

Important Information

- According to the existing MGI data, mice homozygous for a null allele exhibit normal brain development.
- The KO region does not result in frameshift，and may result in abnormal transcript.
- The intron 3-4 and intron 4-5 are only 542 bp and 222 bp，loxp insertion may affect mRNA splicing.
- *Ptpn5* is located on Chr7. 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 risk of loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.