

Paics Cas9-CKO Strategy

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Overview

Target Gene Name

- *Paics*

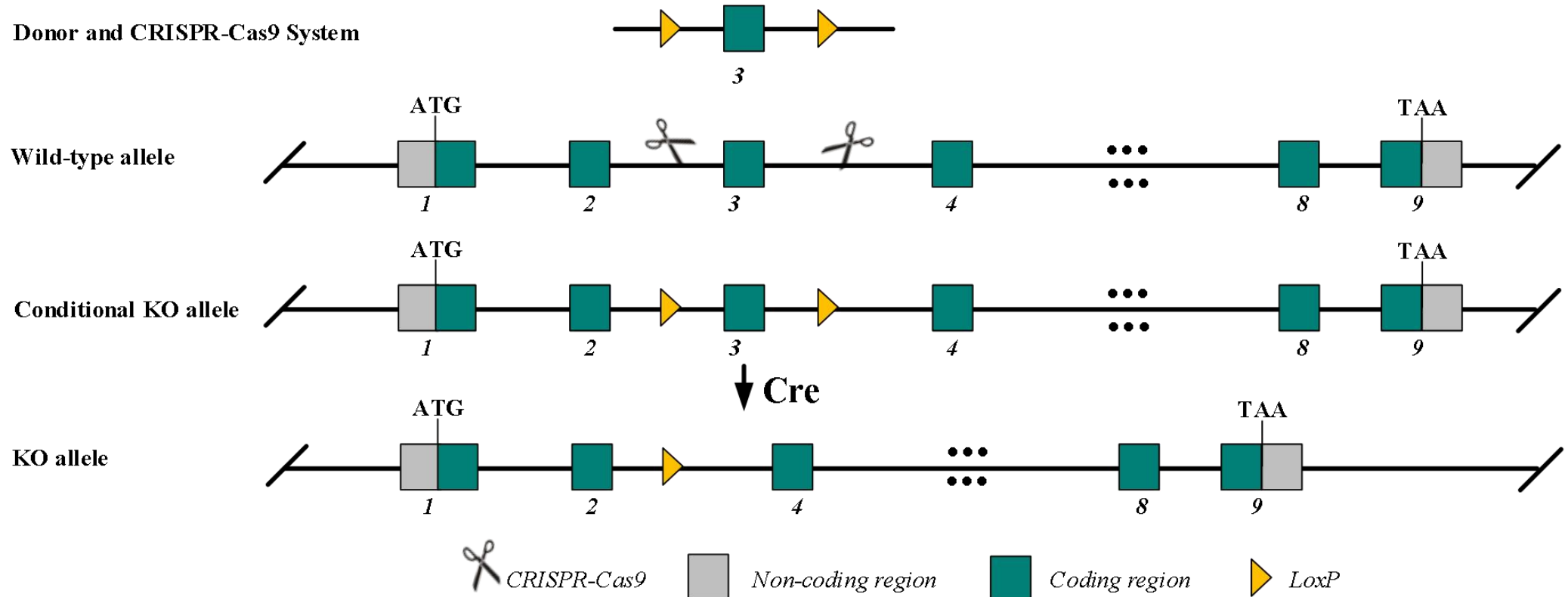
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



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

Technical Information

- The *Paics* gene has 7 transcripts. According to the structure of *Paics* gene, exon3 of *Paics*-201 (ENSMUST00000031160.16) transcript is recommended as the knockout region. The region contains 179bp of coding sequences. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Paics* 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

Paics phosphoribosylaminoimidazole carboxylase, phosphoribosylaminoribosylaminoimidazole, succinocarboxamide synthetase [*Mus musculus* (house mouse)]

Gene ID: 67054, updated on 7-Sep-2023

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Summary

Official Symbol	Paics provided by MGI
Official Full Name	phosphoribosylaminoimidazole carboxylase, phosphoribosylaminoribosylaminoimidazole, succinocarboxamide synthetase provided by MGI
Primary source	MGI:MGI:1914304
See related	Ensembl:ENSMUSG00000029247 AllianceGenome:MGI:1914304
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	AIRC; PAIS; ADE2H1; 2610511I09Rik
Summary	Predicted to enable identical protein binding activity; phosphoribosylaminoimidazole carboxylase activity; and phosphoribosylaminoimidazolesuccinocarboxamide synthase activity. Predicted to be involved in purine ribonucleoside monophosphate biosynthetic process. Predicted to act upstream of or within purine nucleotide biosynthetic process. Predicted to be located in cytoplasm. Predicted to be active in cytosol. Is expressed in several structures, including alimentary system; genitourinary system; nervous system; respiratory system; and sensory organ. Human ortholog(s) of this gene implicated in schizophrenia. Orthologous to human PAICS (phosphoribosylaminoimidazole carboxylase and phosphoribosylaminoimidazolesuccinocarboxamide synthase). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Ubiquitous expression in CNS E11.5 (RPKM 67.7), placenta adult (RPKM 55.6) and 26 other tissues See more
NEW	Try the new Gene table Try the new Transcript table

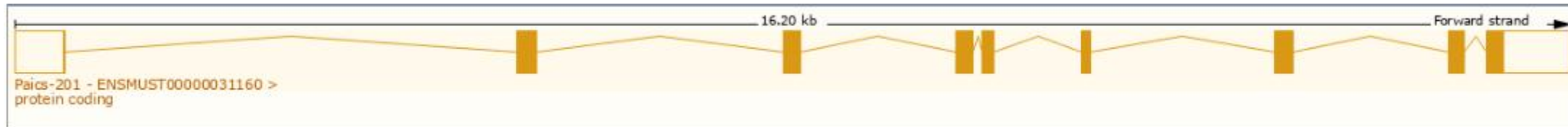
Source: <https://www.ncbi.nlm.nih.gov/gene/67054>

Transcript Information

The gene has 7 transcripts, all transcripts are shown below:

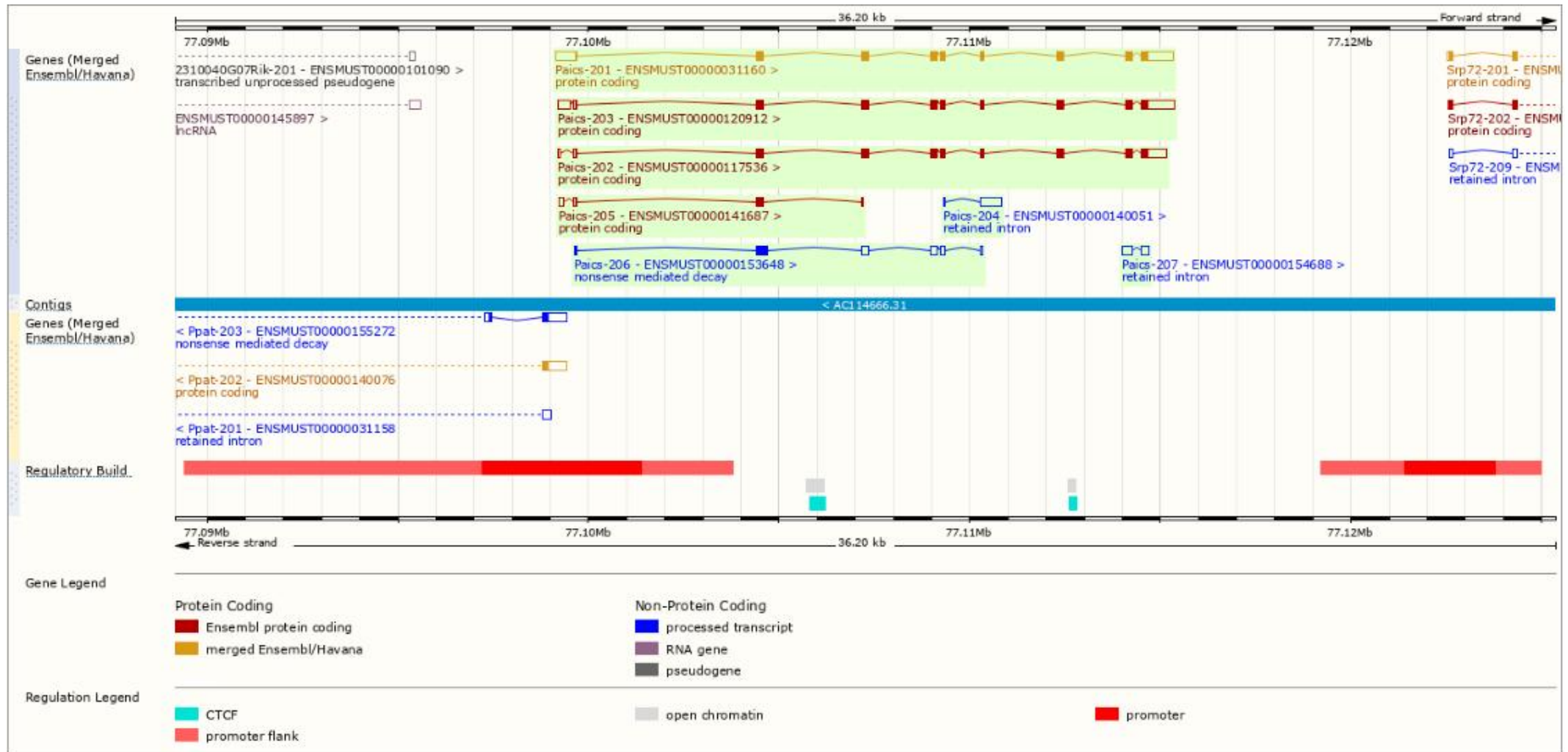
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000031160.16	Paics-201	2482	425aa	Protein coding	CCDS19367	Q9DCL9	Ensembl Canonical Gencode basic APPRIS P1 TSL:1
ENSMUST00000120912.8	Paics-203	2345	425aa	Protein coding	CCDS19367	Q9DCL9	Gencode basic APPRIS P1 TSL:1
ENSMUST00000117536.8	Paics-202	1862	425aa	Protein coding	CCDS19367	Q9DCL9	Gencode basic APPRIS P1 TSL:5
ENSMUST00000141687.2	Paics-205	422	83aa	Protein coding		D3Z6P1	TSL:5 CDS 3' incomplete
ENSMUST00000153648.2	Paics-206	886	103aa	Nonsense mediated decay		D6RCU8	TSL:5
ENSMUST00000140051.2	Paics-204	575	No protein	Retained intron		-	TSL:5
ENSMUST00000154688.2	Paics-207	443	No protein	Retained intron		-	TSL:2

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

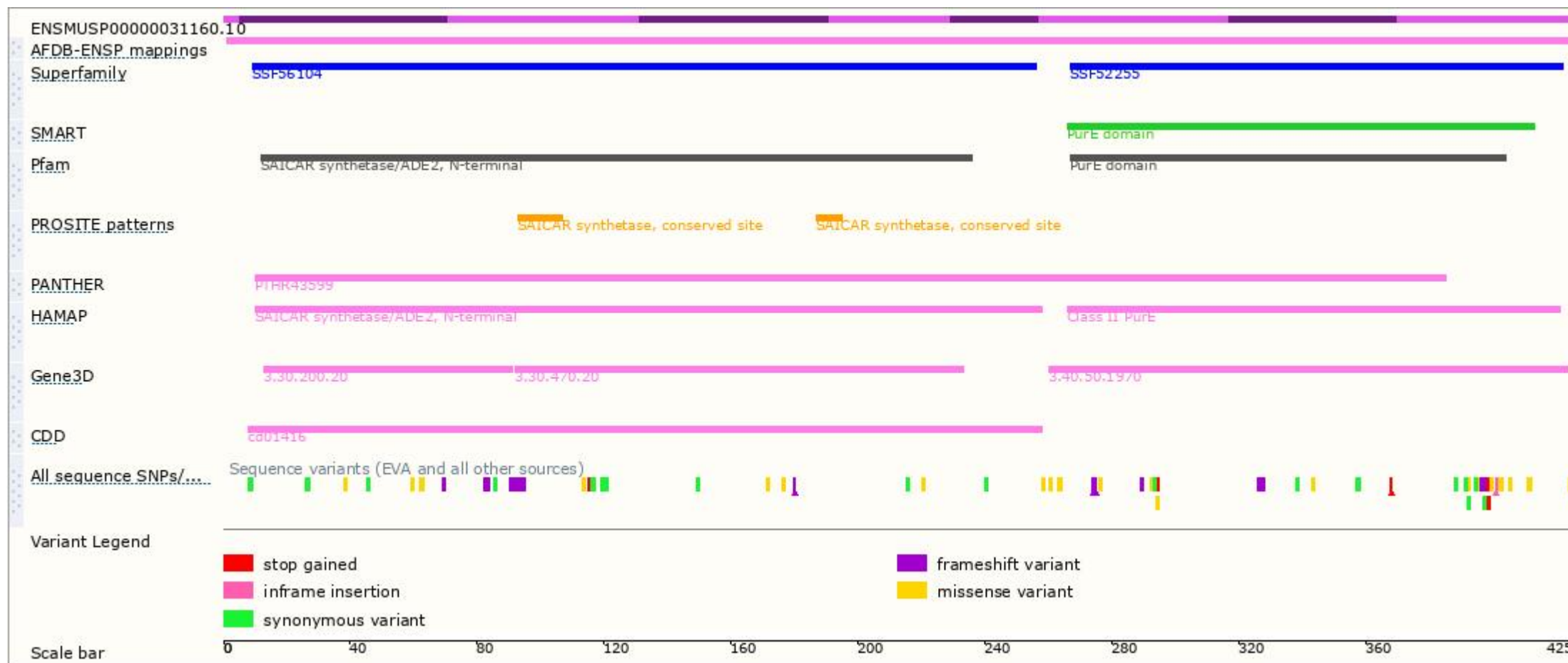


Source: <https://www.ensembl.org>

Genomic Information



Protein Information



Important Information

- The impact on the *Paics*-205 transcript is unknown.
- The knockout region is about 6.7 kb away from the 5' of *Ppat*, which may affect the regulation of this gene.
- *Paics* is located on Chr5. 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.