

Serpina10 Cas9-CKO Strategy

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Project Overview

Project Name

Serpina10

Project type

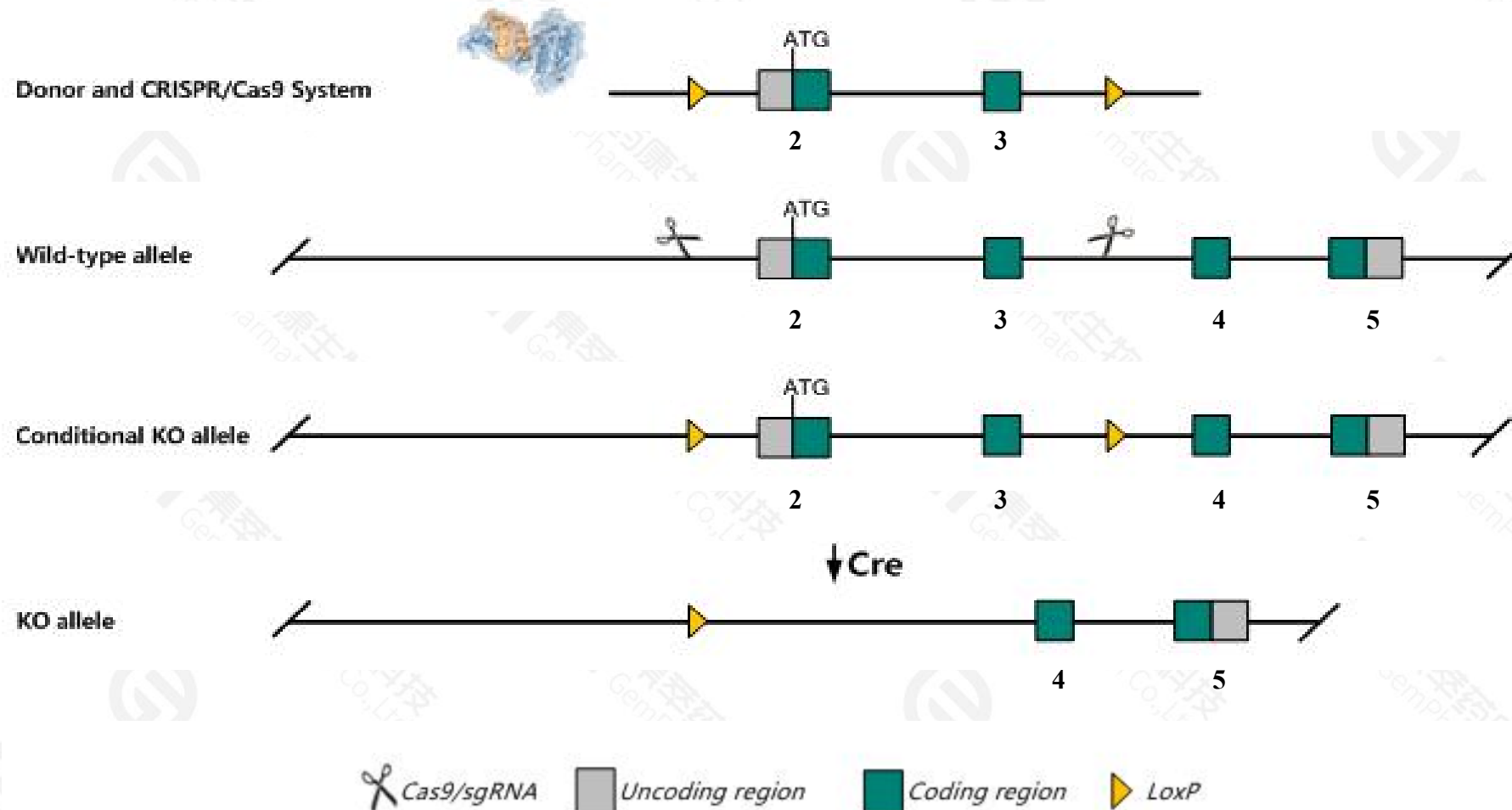
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Serpina10* gene. The schematic diagram is as follows:



Technical routes

- The *Serpina10* gene has 2 transcripts. According to the structure of *Serpina10* gene, exon2-exon3 of *Serpina10*-201(ENSMUST00000044231.12) transcript is recommended as the knockout region. The region contains start codon ATG. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Serpina10* gene. The brief process is as follows: sgRNA was transcribed in vitro, donor was constructed. Cas9, sgRNA 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 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.

- According to the existing MGI data, mice homozygous for a knock-out allele display a reduced survival rate, enhanced thrombosis after ferric chloride-induced carotid artery injury, and increased mortality from pulmonary thromboembolism following collagen/epinephrine infusion.
- The *Serpina10* gene is located on the Chr12. 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)

Serpina10 serine (or cysteine) peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 10 [Mus musculus (house mouse)]

Gene ID: 217847, updated on 25-Sep-2020

Summary



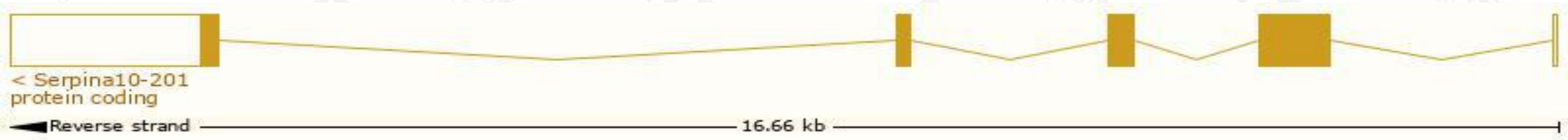
Official Symbol	Serpina10 provided by MGI
Official Full Name	serine (or cysteine) peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 10 provided by MGI
Primary source	MGI:MGI:2667725
See related	Ensembl:ENSMUSG00000061947
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	P, PZI, ZPI
Summary	The protein encoded by this gene is a member of the large serpin family of proteins, and is also known as serpin PZ-dependent protease inhibitor (ZPI or PZI). This protein is thought to play an important role in the regulation of coagulation. It directly inhibits factor XIa, and also inhibits factor Xa in the presence of calcium, phospholipids, and protein Z (PZ). Deficiencies in this gene lead to an increase in thrombosis. Alternative splicing results in multiple transcript variants that encode multiple protein isoforms. [provided by RefSeq, Aug 2014]
Expression	Biased expression in liver E18 (RPKM 38.8), liver adult (RPKM 34.0) and 3 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

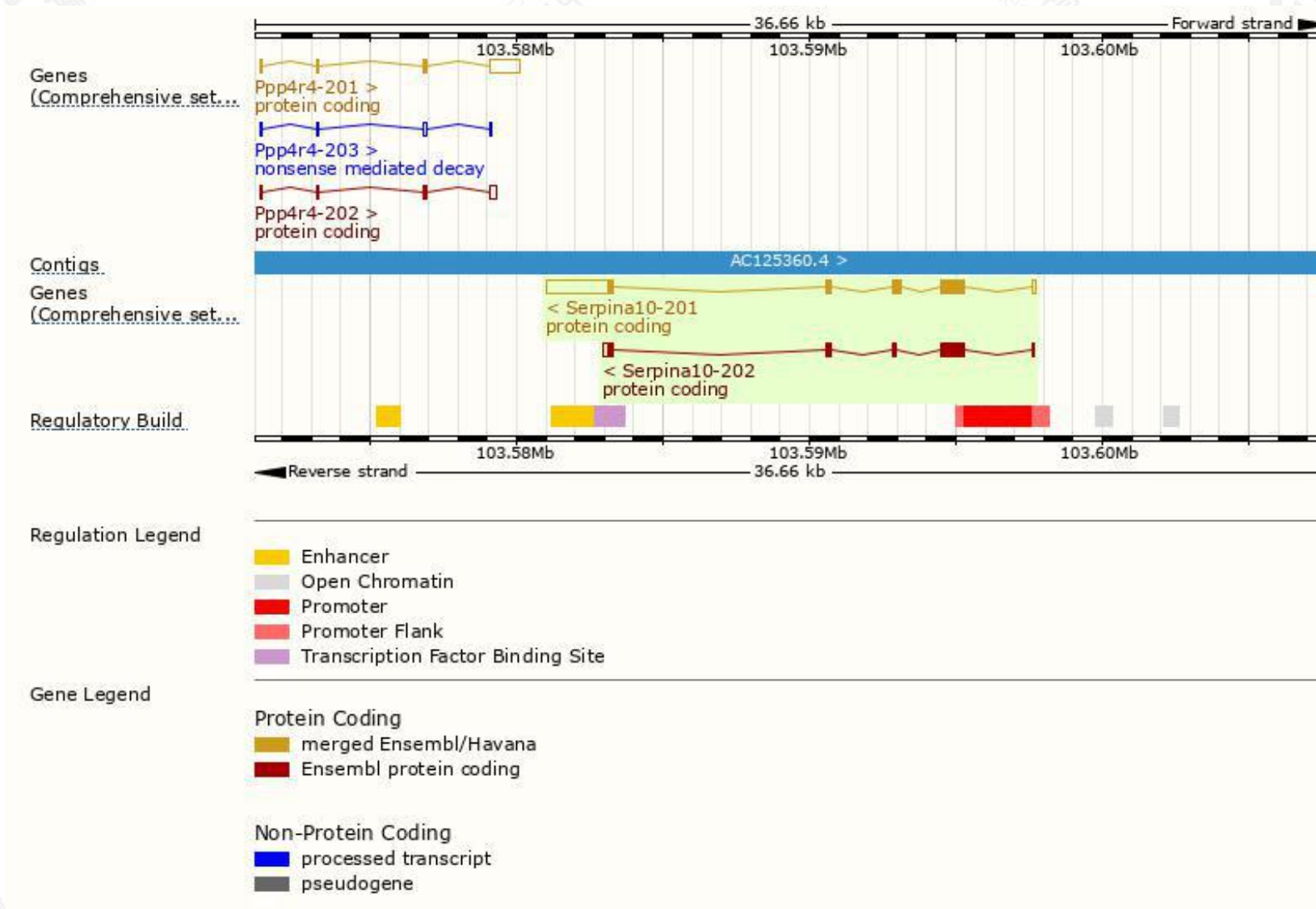
The gene has 2 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Serpina10-201	ENSMUST00000044231.12	3498	448aa	Protein coding	CCDS26134		TSL:1 , GENCODE basic , APPRIS P1 ,
Serpina10-202	ENSMUST00000121625.2	1424	394aa	Protein coding	CCDS79150		TSL:1 , GENCODE basic ,

The strategy is based on the design of *Serpina10-201* transcript,the transcription is shown below:



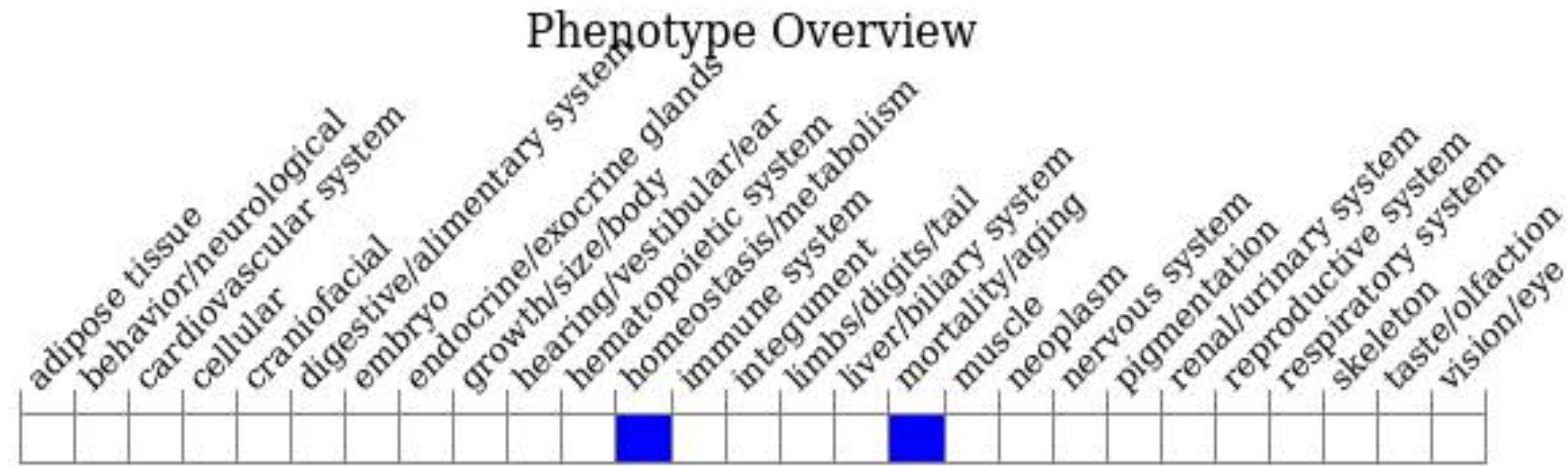
Genomic location distribution



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 knock-out allele display a reduced survival rate, enhanced thrombosis after ferric chloride-induced carotid artery injury, and increased mortality from pulmonary thromboembolism following collagen/epinephrine infusion.

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

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