# *Serpina10* Cas9-KO Strategy

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# Project Overview

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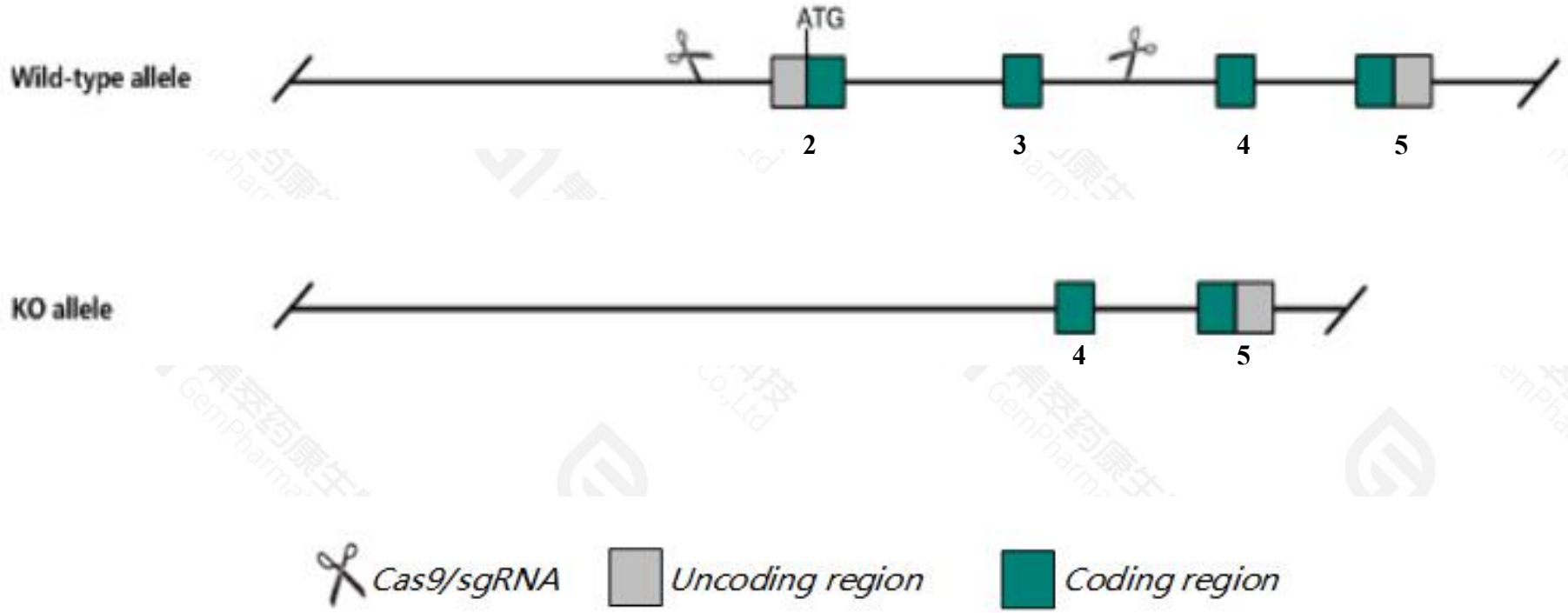
| **Project Name** | ***Serpina10*** |
| **Project type** | **Cas9-KO** |
| **Strain background** | **C57BL/6JGpt** |

# 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.Cas9 and sgRNA 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.

# Notice

➢ 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 the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

# Gene information （NCBI）

集萃药康 GemPharmatech

## 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

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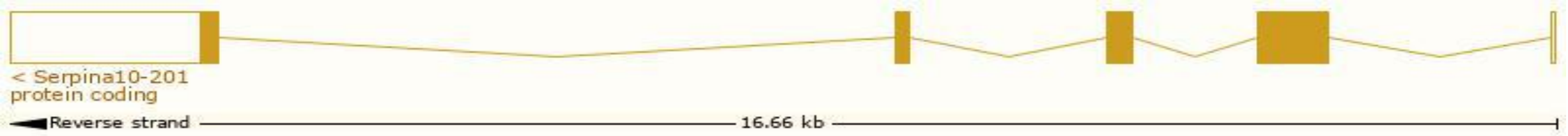
|---|---|
| **Official Symbol** | Serpina10 provided by MGI |
| **Official Full Name** | serine (or cysteine) peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 10 provided by MGI |
| **Primary source** | MGI:MGI:2667725 |
| **See related** | Ensembl:ENSMUSG00000061947 |
| **Gene 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 tissuesSee more |
| **Orthologs** | human all |

# Transcript information（Ensembl）

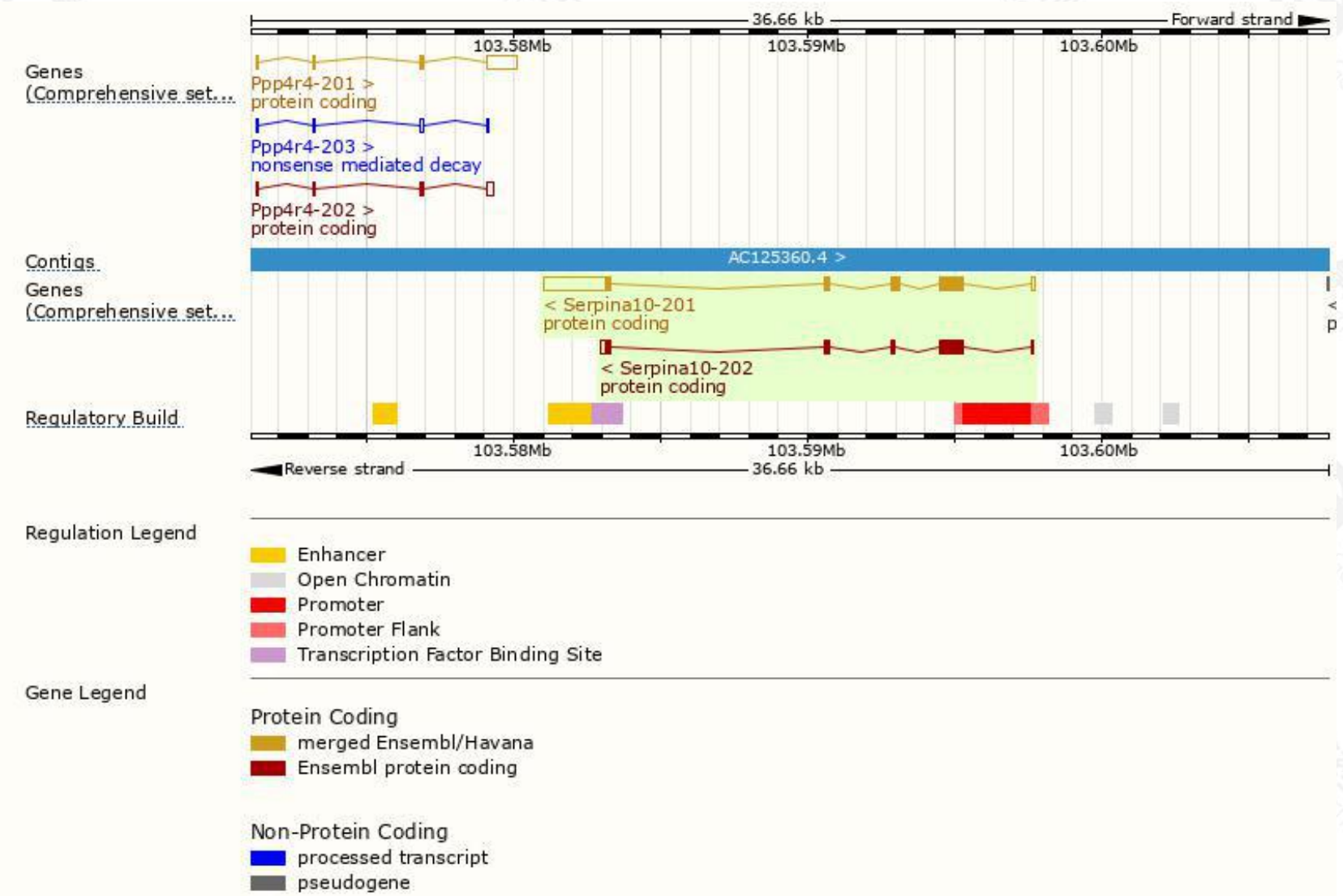
The gene has 2 transcripts,all transcripts are shown below:

| 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:

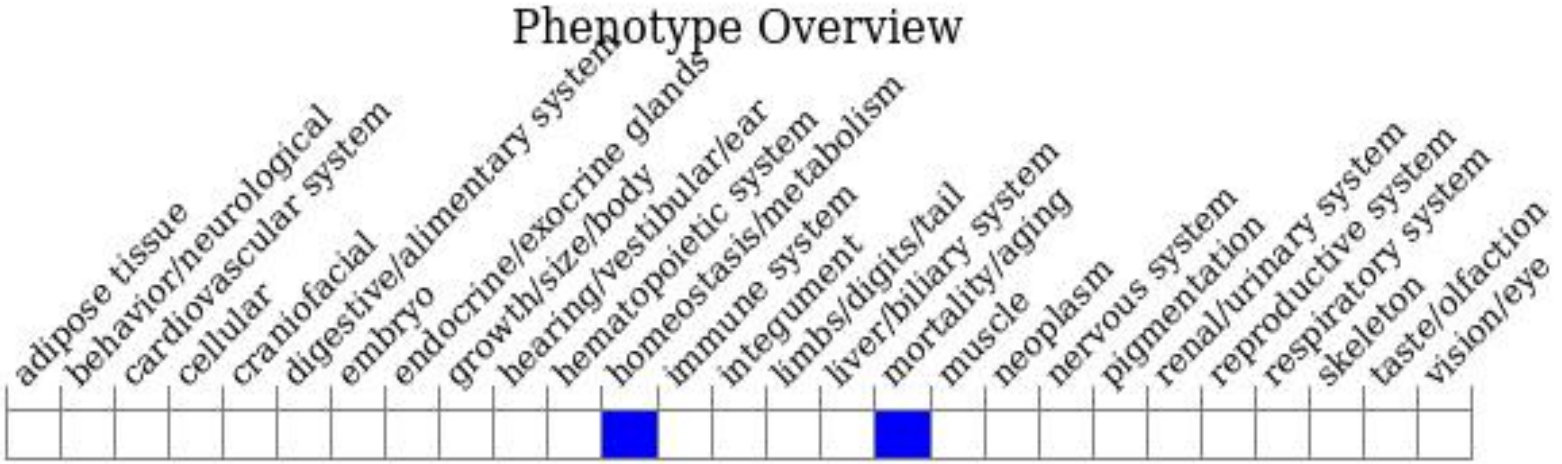


# Genomic location distribution



# 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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