

# ***Adams5 Cas9-CKO Strategy***

**Designer:**

**Yang Zeng**

**Reviewer:**

**Huimin Su**

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# Project Overview

**Project Name**

*Adamts5*

**Project type**

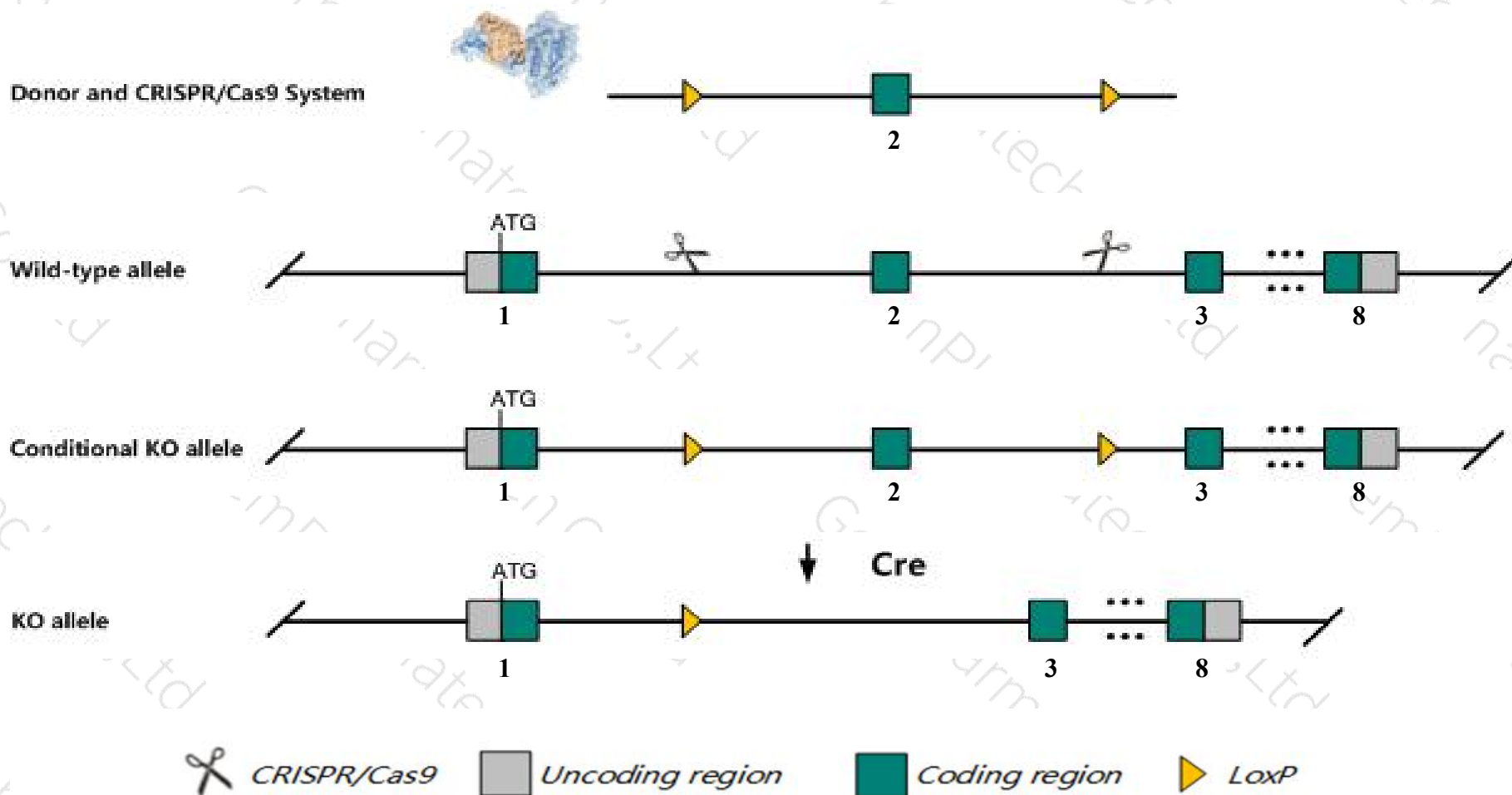
**Cas9-CKO**

**Strain background**

**C57BL/6JGpt**

# Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Adamts5* gene. The schematic diagram is as follows:



- The *Adamts5* gene has 1 transcript. According to the structure of *Adamts5* gene, exon2 of *Adamts5-201* (ENSMUST00000023611.6) transcript is recommended as the knockout region. The region contains 133bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Adamts5* 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 sequencing. A stable F1 generation mouse model was obtained by mating positive F0 generation mice with C57BL/6JGpt mice.
- 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.

- According to the existing MGI data, Mice homozygous for one null allele exhibit a significant reduction in cartilage degradation after induction of osteoarthritis whereas those homozygous for another show no affect.
- The *Adamts5* gene is located on the Chr16. 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)

**Adamts5** a disintegrin-like and metalloproteinase (reprolysin type) with thrombospondin type 1 motif, 5 (aggrecanase-2) [ *Mus musculus* (house mouse) ]

Gene ID: 23794, updated on 26-Nov-2019

## Summary

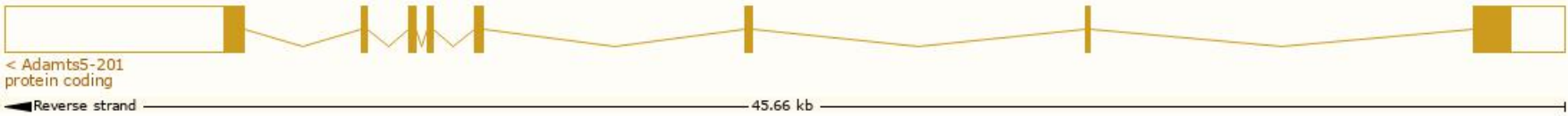
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Official Symbol    | Adamts5 provided by MGI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Official Full Name | a disintegrin-like and metalloproteinase (reprolysin type) with thrombospondin type 1 motif, 5 (aggrecanase-2) provided by MGI                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Primary source     | MGI:MGI:1346321                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| See related        | Ensembl:ENSMUSG00000022894                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Gene type          | protein coding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| RefSeq status      | REVIEWED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Organism           | <a href="#">Mus musculus</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Lineage            | Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus                                                                                                                                                                                                                                                                                                                                                                                                |
| Also known as      | ADMP-2; ASMP-2; ADAMTS1; ADAM-TS5; ADAMTS11; AI481094; 9530092O11Rik                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Summary            | This gene encodes a member of "a disintegrin and metalloproteinase with thrombospondin motifs" (ADAMTS) family of multi-domain matrix-associated metalloendopeptidases that have diverse roles in tissue morphogenesis and pathophysiological remodeling, in inflammation and in vascular biology. The encoded preproprotein undergoes proteolytic processing to generate an active, zinc-dependent aggrecanase enzyme. Mice lacking the encoded protein are protected from surgery-induced osteoarthritis and antigen-induced arthritis. [provided by RefSeq, May 2016] |
| Expression         | Biased expression in subcutaneous fat pad adult (RPKM 15.5), genital fat pad adult (RPKM 13.8) and 10 other tissues <a href="#">See more</a>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Orthologs          | <a href="#">human</a> <a href="#">all</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

# Transcript information (Ensembl)

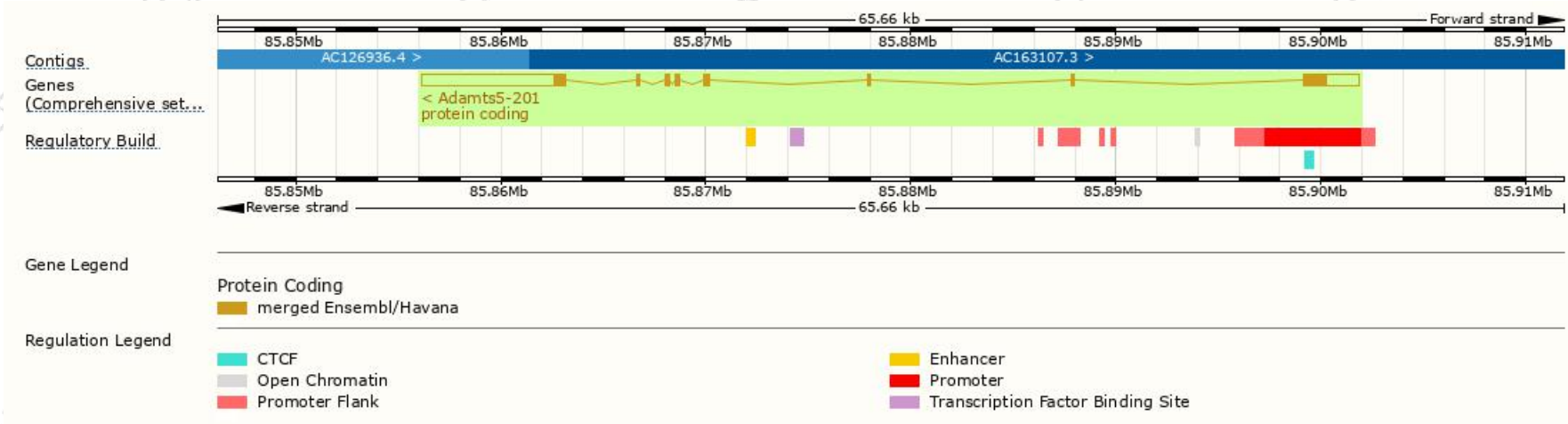
The gene has 1 transcript, and the transcript is shown below:

| Name        | Transcript ID                        | bp    | Protein               | Biotype        | CCDS                      | UniProt                | Flags                         |
|-------------|--------------------------------------|-------|-----------------------|----------------|---------------------------|------------------------|-------------------------------|
| Adamts5-201 | <a href="#">ENSMUST00000023611.6</a> | 10791 | <a href="#">930aa</a> | Protein coding | <a href="#">CCDS28288</a> | <a href="#">Q9R001</a> | TSL:1 Gencode basic APPRIS P1 |

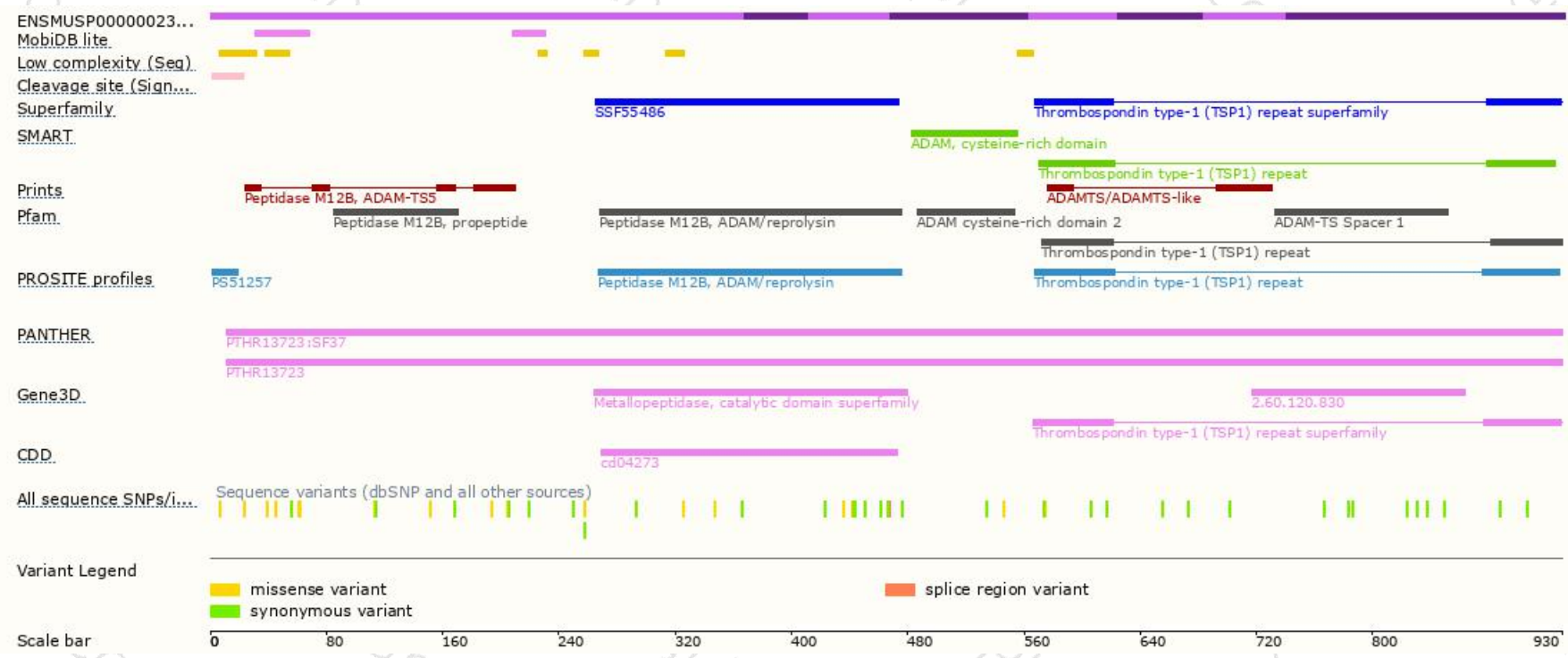
The strategy is based on the design of *Adamts5-201* transcript, The transcription is shown below



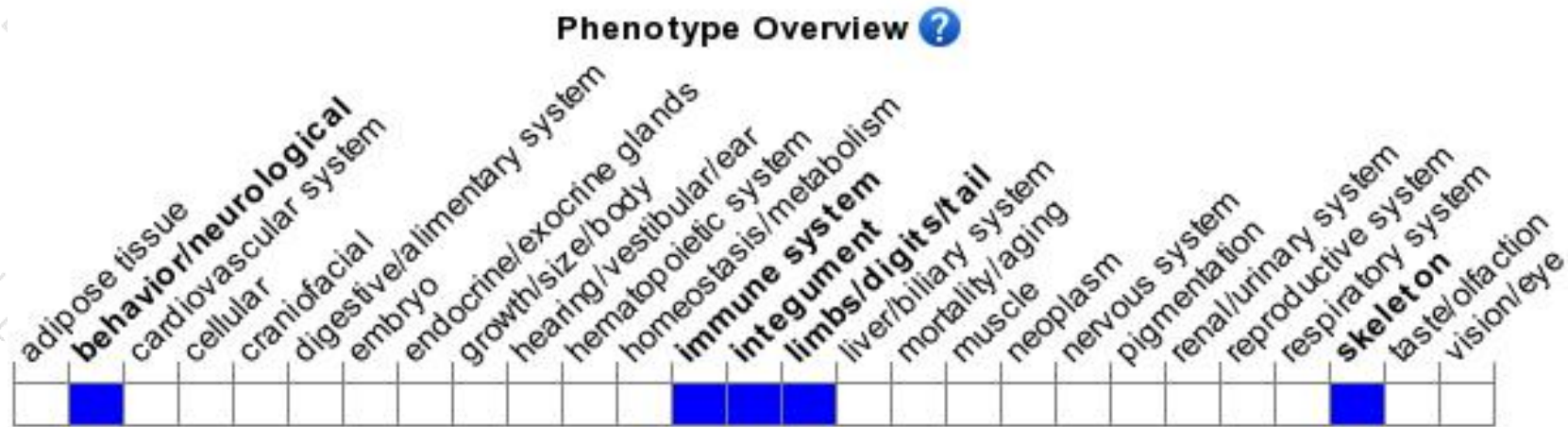
# Genomic location distribution



# 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 one null allele exhibit a significant reduction in cartilage degradation after induction of osteoarthritis whereas those homozygous for another show no affect.

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

Tel: 400-9660890

