

***Col12a1* Cas9-KO Strategy**

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Project Overview

Project Name

Col12a1

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Coll2a1* gene. The schematic diagram is as follows:



- The *Coll2a1* gene has 6 transcripts. According to the structure of *Coll2a1* gene, exon2-exon5 of *Coll2a1-201* (ENSMUST00000071750.12) 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 *Coll2a1* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Mice homozygous for a knock-out allele exhibit partial perinatal lethality, decreased body weight, shorter and slender long bones, altered vertebrae structure, kyphosis, decreased bone strength, and abnormalities in osteoblast differentiation and bone matrix formation.
- The *Coll2a1* gene is located on the Chr9. 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)

Col12a1 collagen, type XII, alpha 1 [*Mus musculus* (house mouse)]

Gene ID: 12816, updated on 5-Nov-2019

Summary

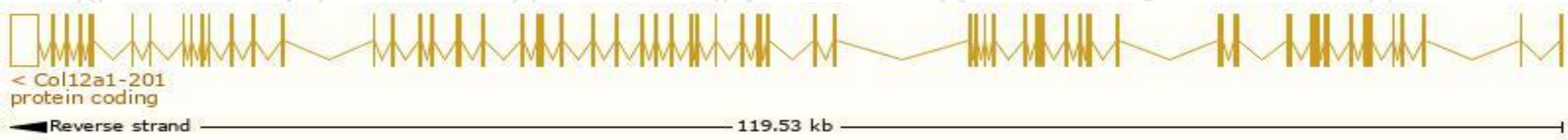
Official Symbol	Col12a1 provided by MGI
Official Full Name	collagen, type XII, alpha 1 provided by MGI
Primary source	MGI:MGI:88448
See related	Ensembl:ENSMUSG00000032332
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Expression	Biased expression in limb E14.5 (RPKM 27.9), bladder adult (RPKM 22.2) and 9 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

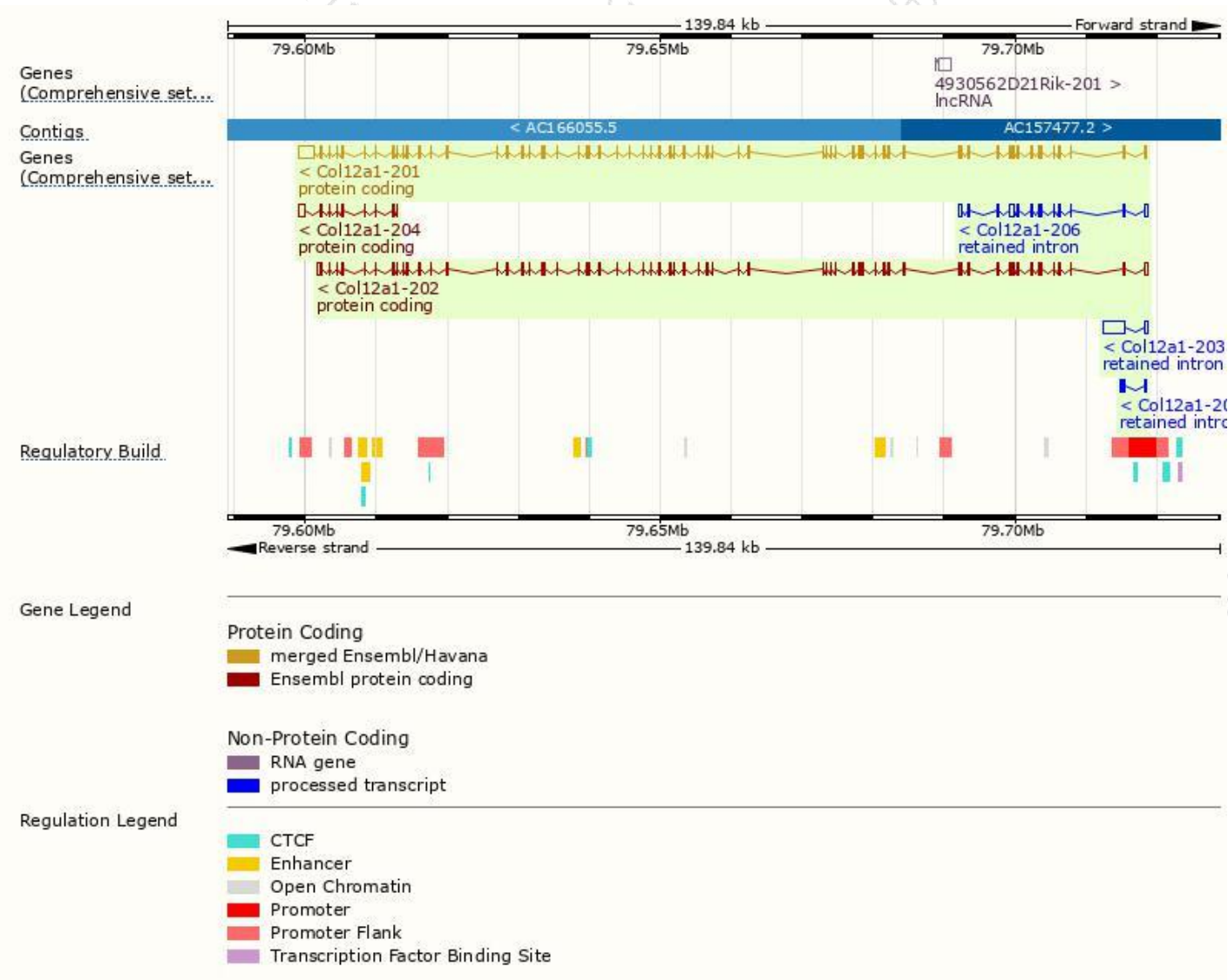
The gene has 6 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Col12a1-201	ENSMUST00000071750.12	11511	3065aa	Protein coding	CCDS72284	Q60847	TSL:5 GENCODE basic APPRIS P1
Col12a1-202	ENSMUST00000121227.7	9953	3064aa	Protein coding	-	E9PX70	TSL:5 GENCODE basic
Col12a1-204	ENSMUST00000135009.7	1784	314aa	Protein coding	-	F6WIM8	CDS 5' incomplete TSL:5
Col12a1-203	ENSMUST00000122827.1	3351	No protein	Retained intron	-	-	TSL:1
Col12a1-206	ENSMUST00000150289.7	3179	No protein	Retained intron	-	-	TSL:1
Col12a1-205	ENSMUST00000141667.1	432	No protein	Retained intron	-	-	TSL:2

The strategy is based on the design of *Col12a1-201* transcript,The transcription is shown below



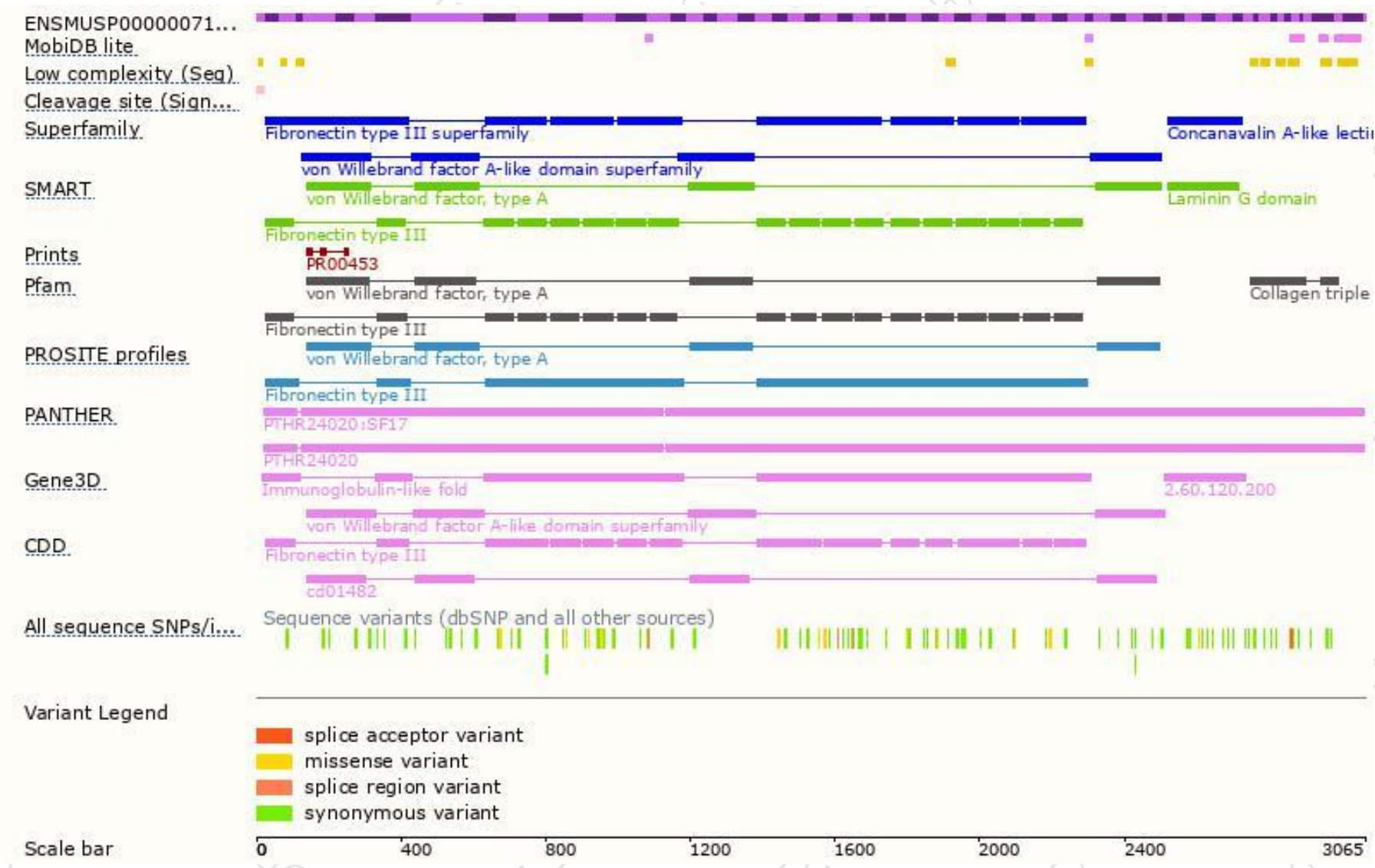
Genomic location distribution



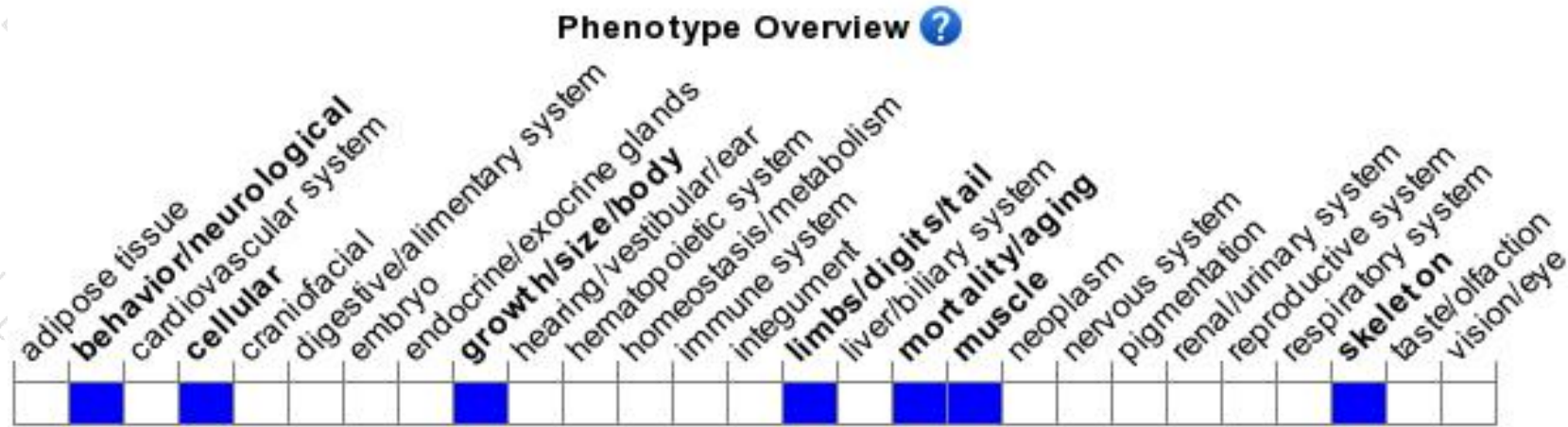
Protein domain



集萃药康
GemPharmatech



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 exhibit partial perinatal lethality, decreased body weight, shorter and slender long bones, altered vertebrae structure, kyphosis, decreased bone strength, and abnormalities in osteoblast differentiation and bone matrix formation.

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

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