Bmp3 Cas9-KO Strategy

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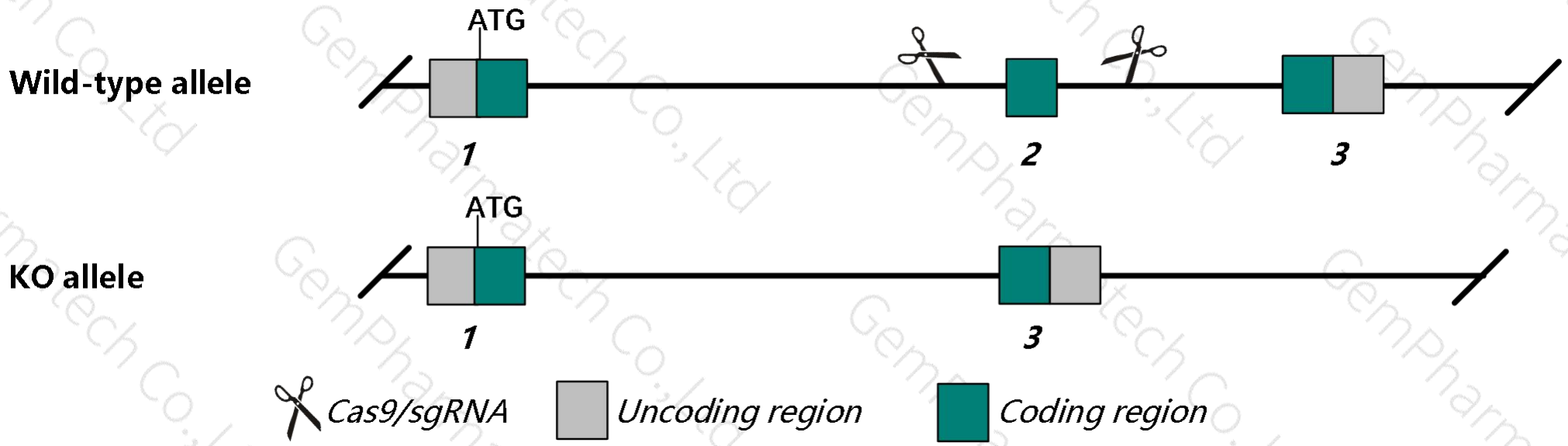
Project Overview

Project Name	***Bmp3***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Bmp3* gene. The schematic diagram is as follows:



Technical routes

➢ The *Bmp3* gene has 3 transcripts. According to the structure of *Bmp3* gene, exon2 of *Bmp3-201* (ENSMUST00000031278.5) transcript is recommended as the knockout region.The region contains 905bp coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Bmp3* gene. The brief process is as follows: CRISPR/Cas9 system

Notice

➢ According to the existing MGI data,Homozygous mutation of this gene results in increased bone density.

➢ The *Bmp3* gene is located on the Chr5. 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）

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Bmp3 bone morphogenetic protein 3 [*Mus musculus* (house mouse)]

Gene ID: 110075, updated on 14-Jan-2020

Summary

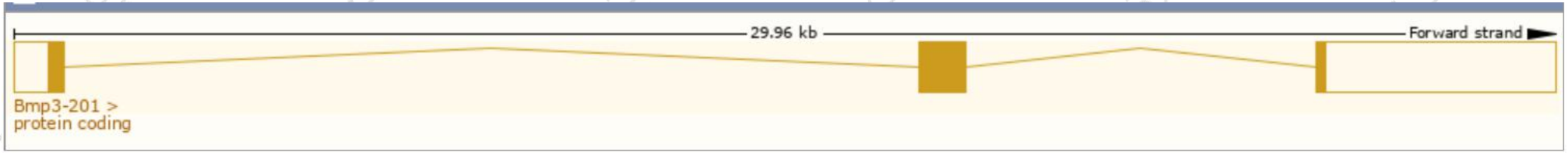
Official Symbol	Bmp3 provided by MGI
Official Full Name	bone morphogenetic protein 3 provided by MGI
Primary source	MGI:MGI:88179
See related	Ensembl:ENSMUSG00000029335
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	9530029I04Rik
Summary	This gene encodes a secreted ligand of the TGF-beta (transforming growth factor-beta) superfamily of proteins. Ligands of this family bind various TGF-beta receptors leading to recruitment and activation of SMAD family transcription factors that regulate gene expression. The encoded preproprotein is proteolytically processed to generate each subunit of the disulfide-linked homodimer. This protein suppresses osteoblast differentiation, and negatively regulates bone density, by modulating TGF-beta receptor availability to other ligands. Homozygous knockout mice for this gene exhibit increased bone density and volume, while overexpression of this gene in a transgenic mouse causes bone defects resulting in spontaneous rib fractures. This gene encodes distinct protein isoforms that may be similarly proteolytically processed. [provided by RefSeq, Jul 2016]
Expression	Biased expression in bladder adult (RPKM 21.8), lung adult (RPKM 8.1) and 11 other tissues See more
Orthologs	human all

Transcript information（Ensembl）

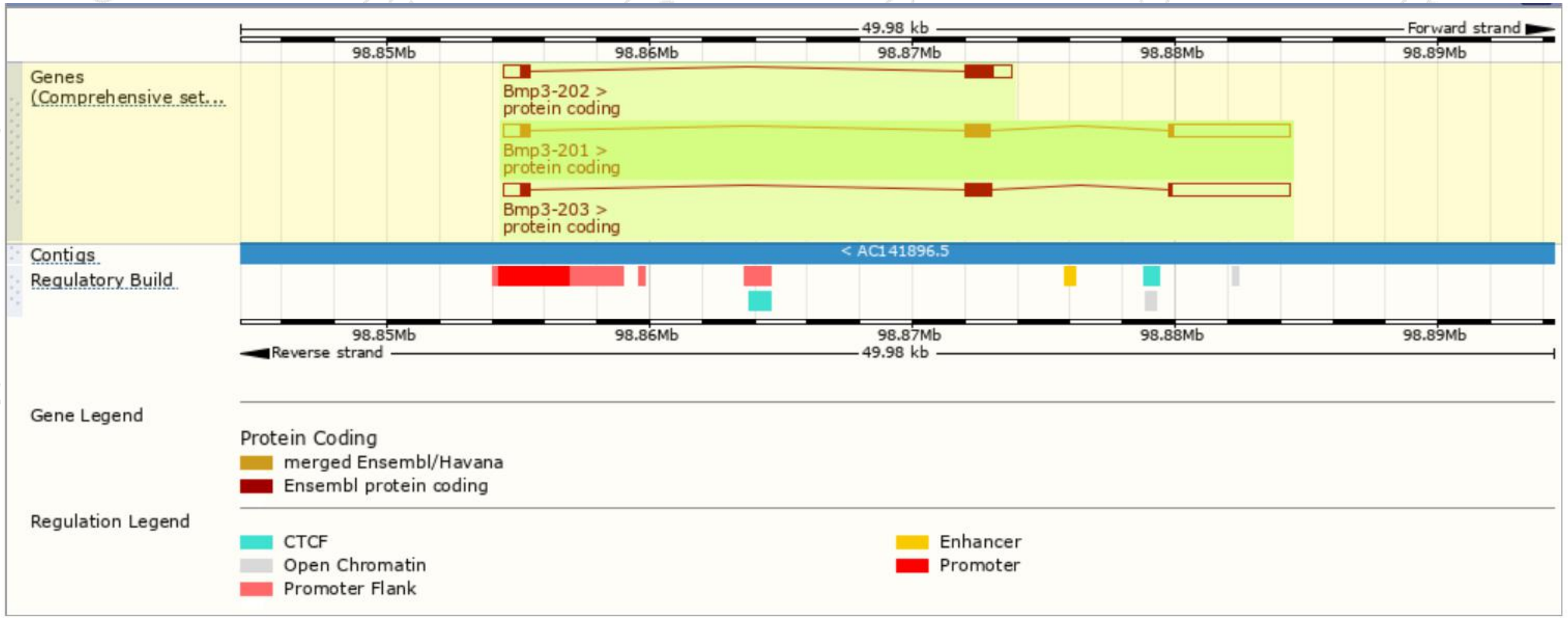
The gene has 3 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Bmp3-203	ENSMUST00000200388.1	6609	470aa	Protein coding	CCDS80345	A0A0G2JEU2	TSL:1 GENCODE basic
Bmp3-201	ENSMUST00000031278.5	6548	468aa	Protein coding	CCDS19458	Q149J9 Q8BHE5	TSL:1 GENCODE basic APPRIS P1
Bmp3-202	ENSMUST00000197143.1	2739	443aa	Protein coding	-	A0A0G2JE75	TSL:2 GENCODE basic

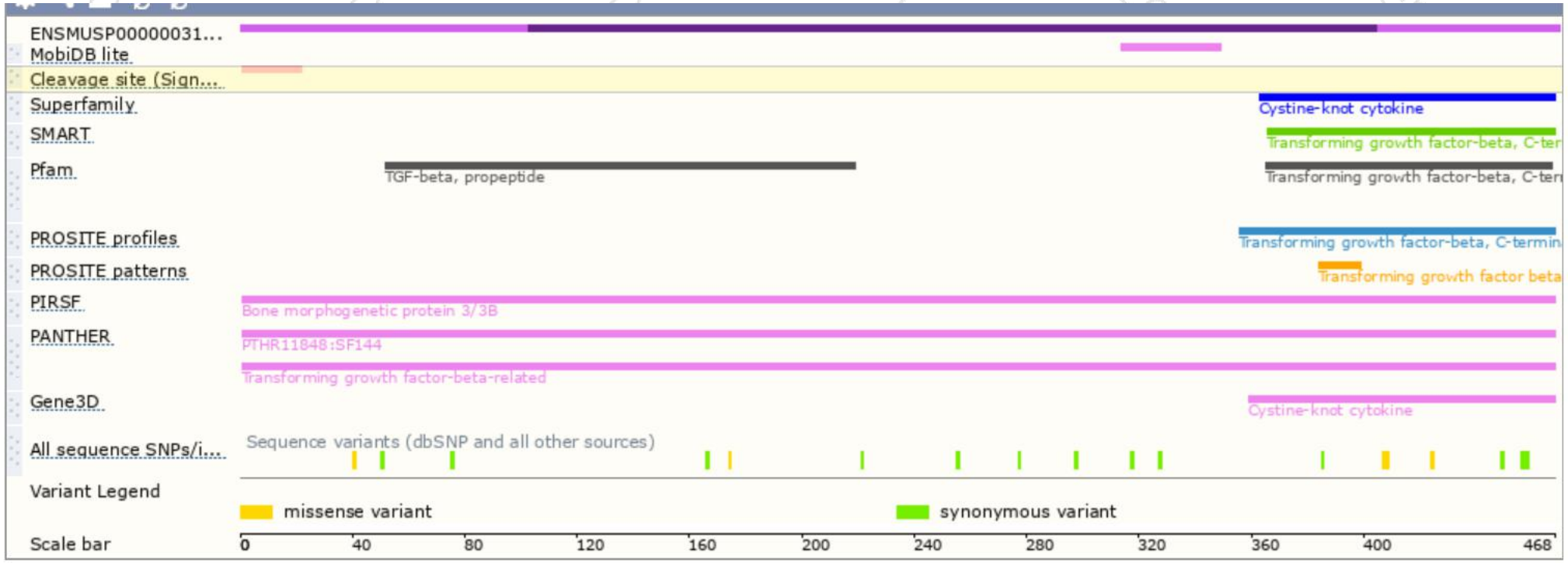
The strategy is based on the design of *Bmp3-201* transcript,The transcription is shown below



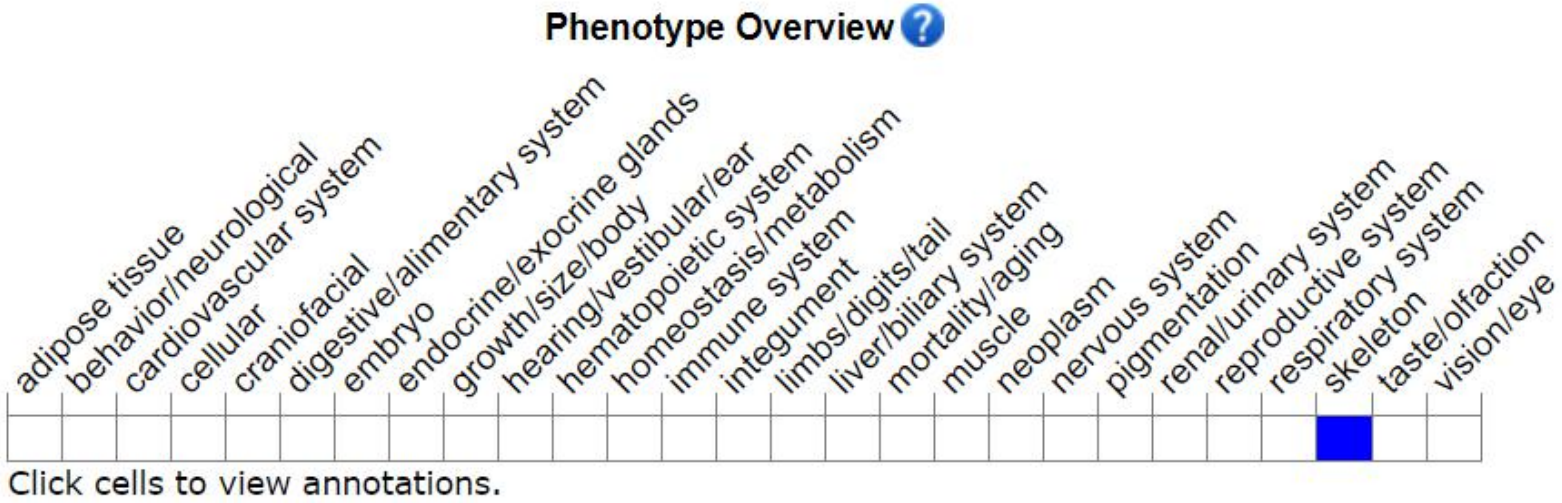
Genomic location distribution



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,Homozygous mutation of this gene results in increased bone density.

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

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