Grem1 Cas9-KO Strategy

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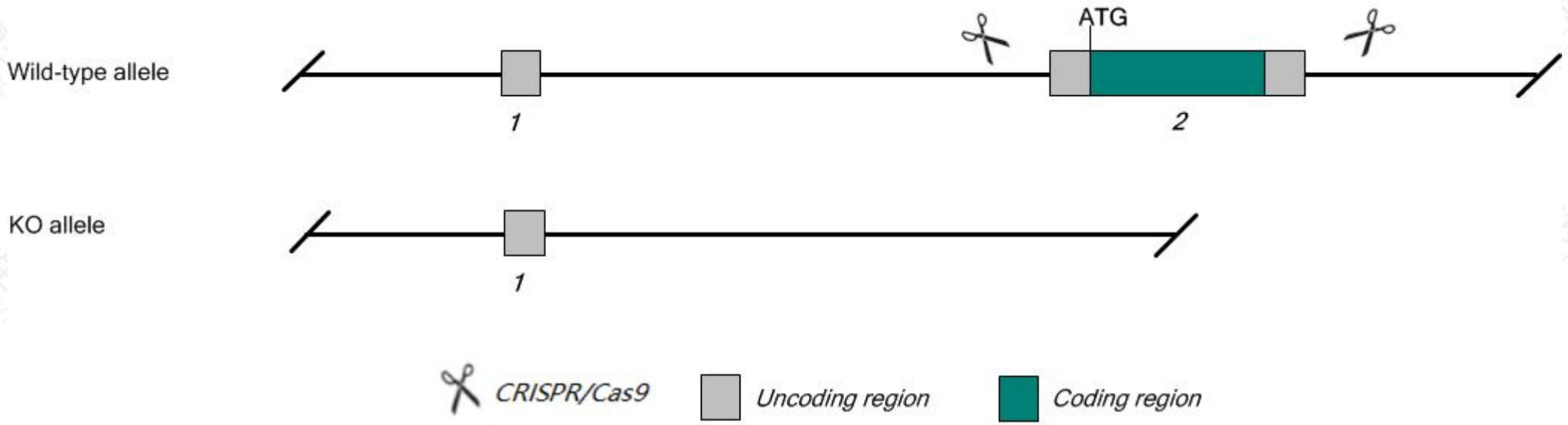
Project Overview

Project Name	***Grem1***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Grem1* gene. The schematic diagram is as follows:



Technical routes

➢ The *Grem1* gene has 1 transcript. According to the structure of *Grem1* gene, exon2 of *Grem1-201*(ENSMUST00000099575.4) transcript is recommended as the knockout region.The region contains all of the coding sequence.Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Grem1* gene. The brief process is as follows: CRISPR/Cas9 system 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,homozygous null mice display neonatal lethality with bilateral agenesis of the kidneys and ureters, oligodactyly, limb skeletal malformations, cyanosis, dyspnea, and abnormal lung morphology.

➢ The *Grem1* gene is located on the Chr2. 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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Grem1 gremlin 1, DAN family BMP antagonist [Mus musculus (house mouse)]

Gene ID: 23892, updated on 13-Mar-2020

Summary

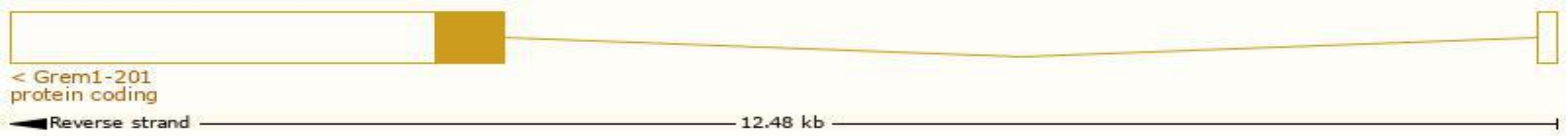
Official Symbol	Grem1 provided by MGI
Official Full Name	gremlin 1, DAN family BMP antagonist provided by MGI
Primary source	MGI:MGI:1344337
See related	Ensembl:ENSMUSG00000074934
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Cktsf1b1, Drm, Grem, Id
Expression	Biased expression in colon adult (RPKM 25.4), large intestine adult (RPKM 20.1) and 8 other tissues See more
Orthologs	human all

Transcript information（Ensembl）

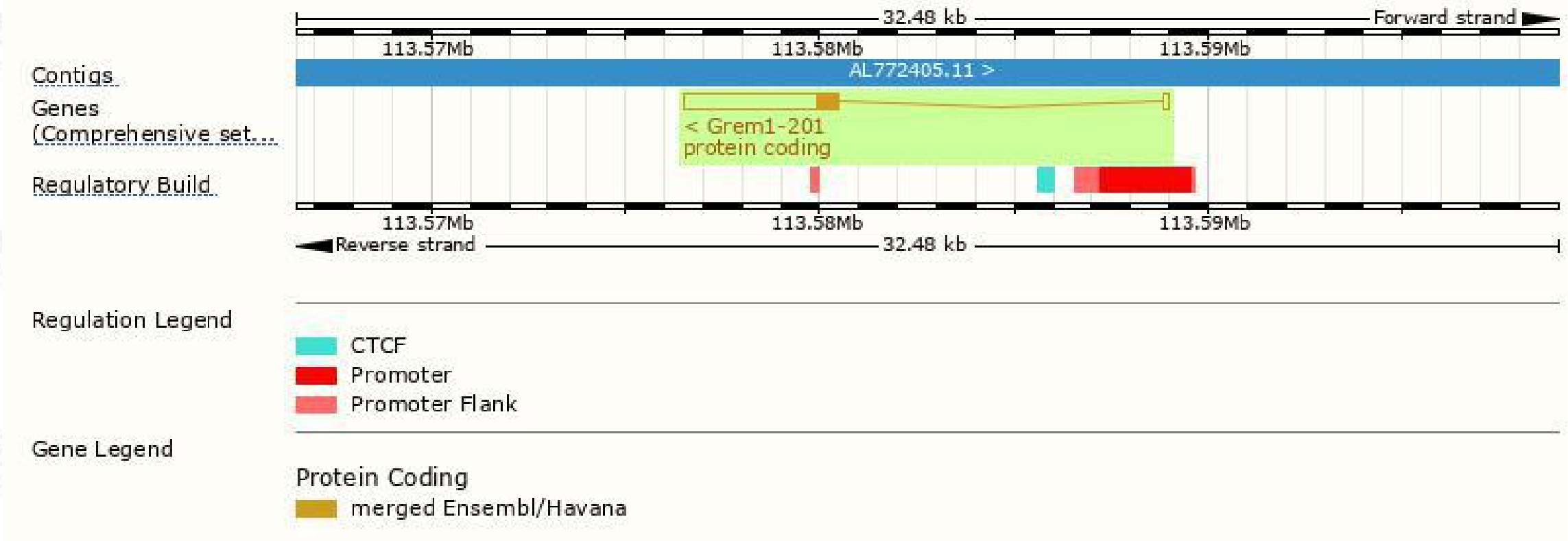
The gene has 1 transcript,and the transcript is shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Grem1-201	ENSMUST00000099575.3	4148	184aa	Protein coding	CCDS16560	O70326 Q3TNY7	TSL:1 GENCODE basic APPRIS is a system to annotate alternatively spliced transcripts based on a range of computational methods to identify the most functionally important transcript(s) of a gene. APPRIS P1

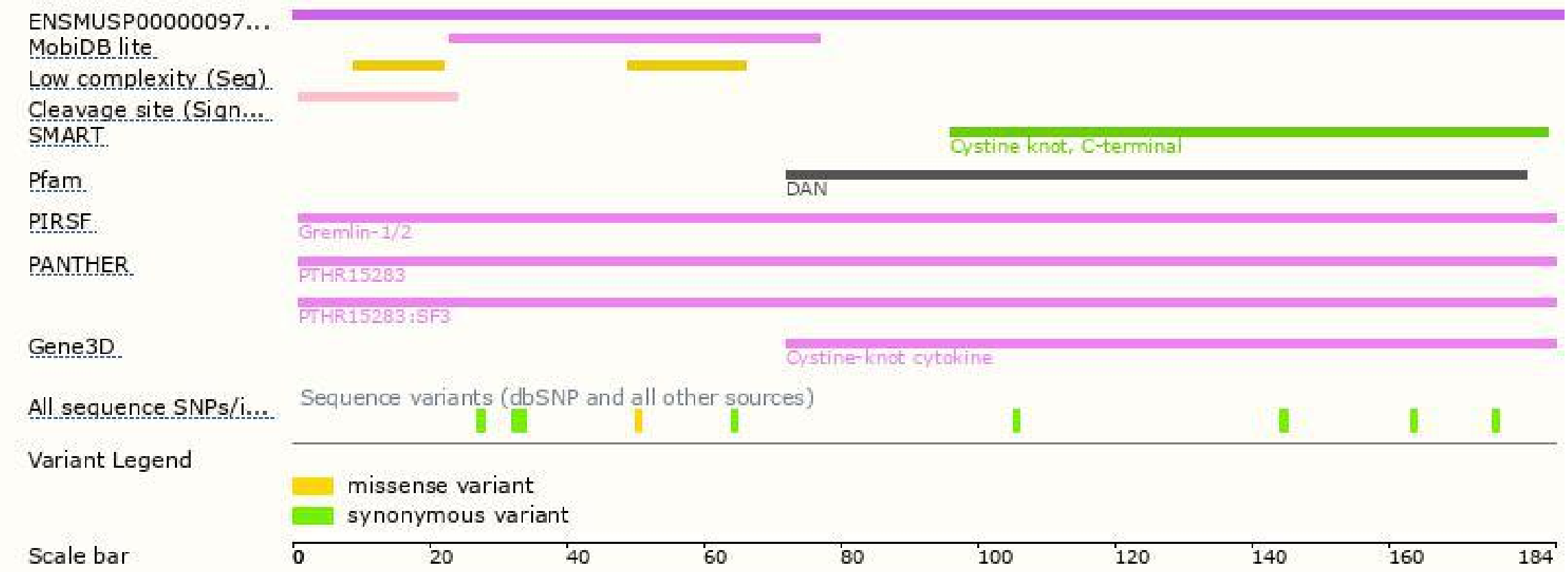
The strategy is based on the design of *Grem1-201* transcript,the transcription is shown below:



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/).

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