

# *Grem2* Cas9-KO Strategy

**Designer:**                      **Yupeng Yang**  
**Design Date:**                **2019-9-30**

# Project Overview

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**Project Name**

***Grem2***

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**Project type**

**Cas9-KO**

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**Strain background**

**C57BL/6JGpt**

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# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Grem2* gene. The schematic diagram is as follows:



The *Grem2* gene has 1 transcript. According to the structure of *Grem2* gene, exon2 of *Grem2-201* (ENSMUST00000055294.3) 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 *Grem2* gene. The brief process is as follows: CRISPR/Cas9 system

According to the existing MGI data, Mice homozygous for a null allele show small and malformed mandibular and maxillary incisors and slightly increased bone mineral density but appear otherwise normal.

The *Grem2* gene is located on the Chr1. 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.

**Grem2 gremlin 2, DAN family BMP antagonist [Mus musculus (house mouse)]**

Gene ID: 23893, updated on 31-Jan-2019

**Summary**

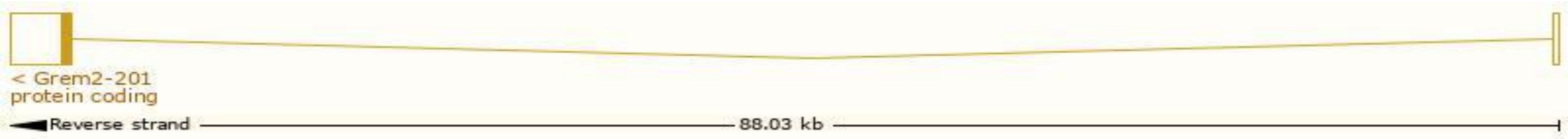
|                           |                                                                                                                                                                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Official Symbol</b>    | Grem2 provided by <a href="#">MGI</a>                                                                                                                                     |
| <b>Official Full Name</b> | gremlin 2, DAN family BMP antagonist provided by <a href="#">MGI</a>                                                                                                      |
| <b>Primary source</b>     | <a href="#">MGI:MGI:1344367</a>                                                                                                                                           |
| <b>See related</b>        | <a href="#">Ensembl:ENSMUSG00000050069</a>                                                                                                                                |
| <b>Gene type</b>          | protein coding                                                                                                                                                            |
| <b>RefSeq status</b>      | VALIDATED                                                                                                                                                                 |
| <b>Organism</b>           | <a href="#">Mus musculus</a>                                                                                                                                              |
| <b>Lineage</b>            | Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus |
| <b>Also known as</b>      | Gremlin2, Prdc                                                                                                                                                            |
| <b>Expression</b>         | Broad expression in ovary adult (RPKM 15.0), lung adult (RPKM 14.2) and 20 other tissues <a href="#">See more</a>                                                         |
| <b>Orthologs</b>          | <a href="#">human</a> <a href="#">all</a>                                                                                                                                 |

# Transcript information      Ensembl

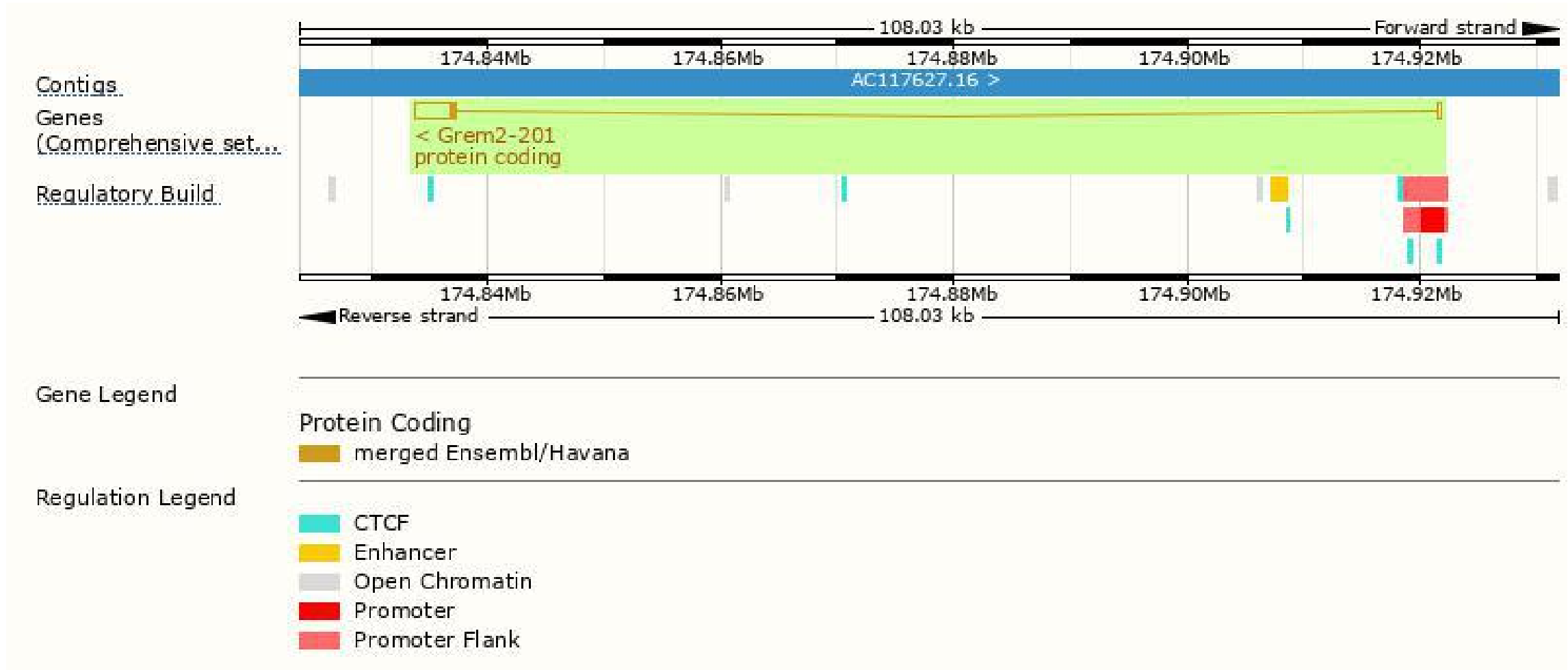
The gene has 1 transcript,and the transcript is shown below:

| Name      | Transcript ID                        | bp   | Protein               | Biotype        | CCDS                      | UniProt                       | Flags                         |
|-----------|--------------------------------------|------|-----------------------|----------------|---------------------------|-------------------------------|-------------------------------|
| Grem2-201 | <a href="#">ENSMUST00000055294.3</a> | 3745 | <a href="#">168aa</a> | Protein coding | <a href="#">CCDS15545</a> | <a href="#">O88273 Q3TST1</a> | TSL:1 GENCODE basic APPRIS P1 |

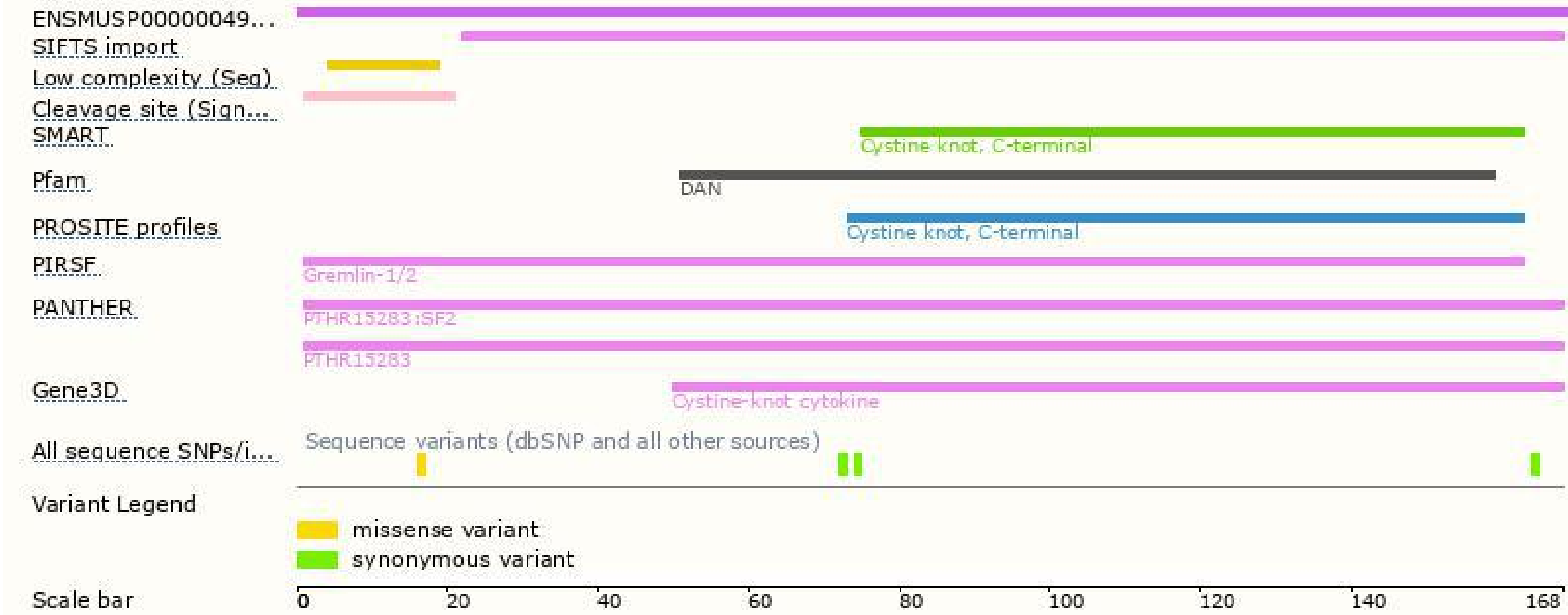
The strategy is based on the design of *Grem2-201* transcript,The transcription is shown below



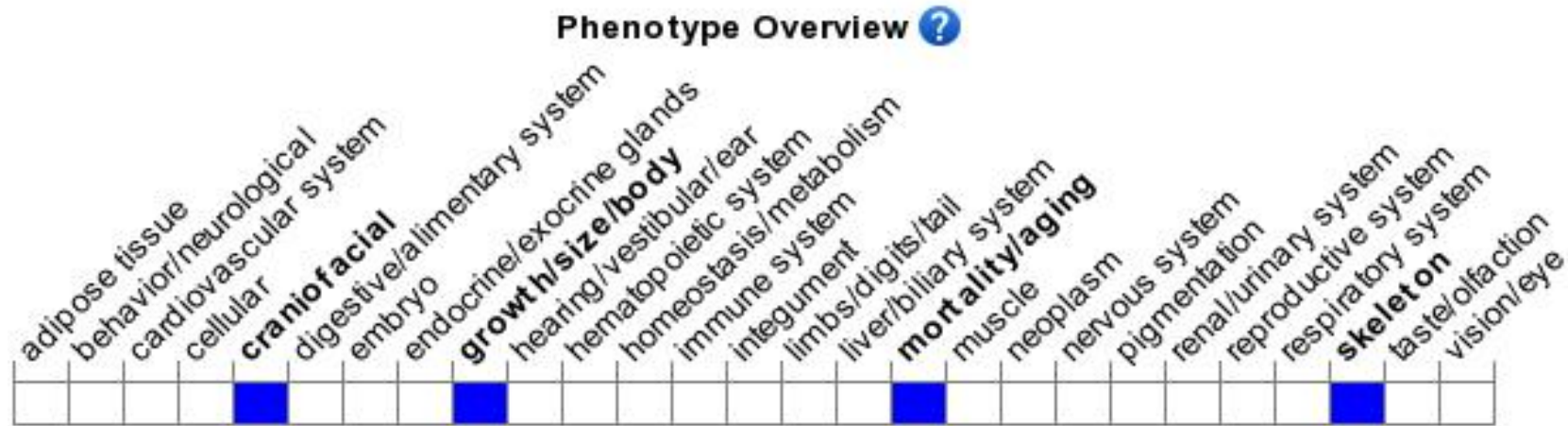
# Genomic location distribution



# 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 null allele show small and malformed mandibular and maxillary incisors and slightly increased bone mineral density but appear otherwise normal.

If you have any questions, you are welcome to inquire.  
Tel: 400-9660890

