

# *Gdf6* Cas9-KO Strategy

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**Reviewer:**

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**Design Date:**

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# Project Overview

**Project Name**

*Gdf6*

**Project type**

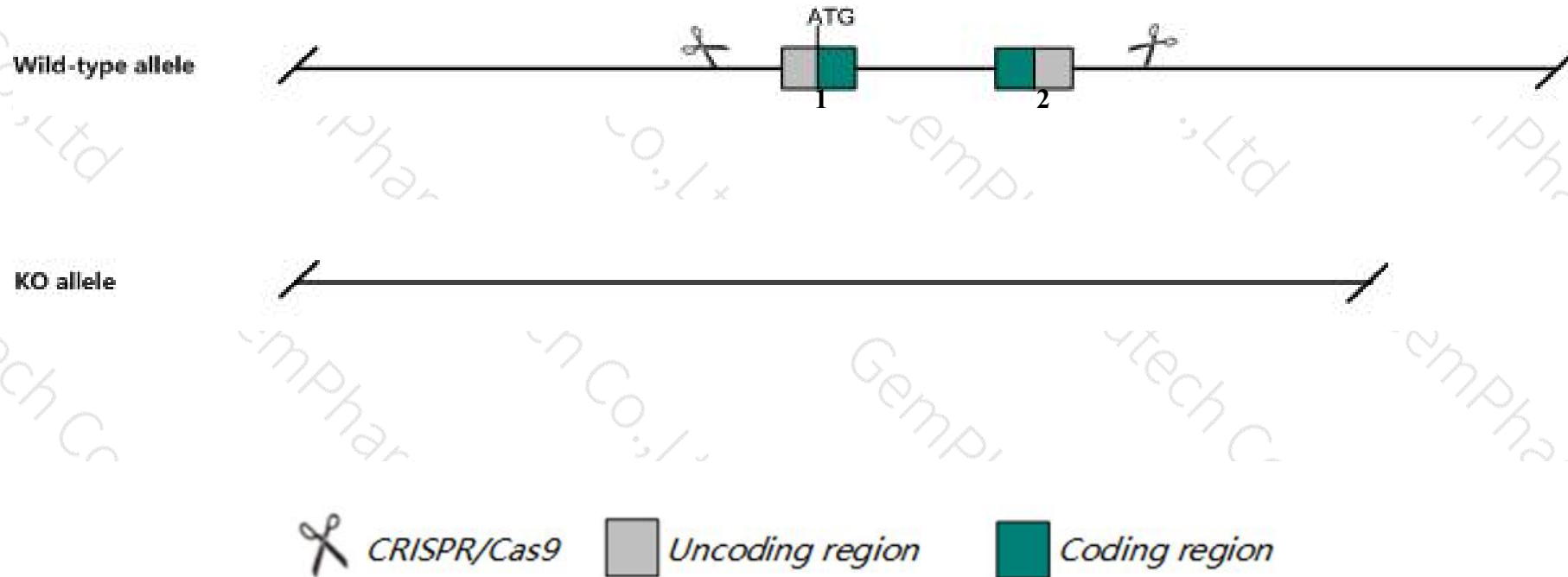
**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Gdf6* gene. The schematic diagram is as follows:



- The *Gdf6* gene has 1 transcript. According to the structure of *Gdf6* gene, exon1-exon2 of *Gdf6-201* (ENSMUST00000057613.2) 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 *Gdf6* gene. The brief process is as follows: CRISPR/Cas9 system v

- According to the existing MGI data, Homozygous null mice show multiple joint and skeletal patterning defects affecting the extremities, inner ear, and skull.
- The *Gdf6* gene is located on the Chr4. 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)

## Gdf6 growth differentiation factor 6 [Mus musculus (house mouse)]

Gene ID: 242316, updated on 31-Jan-2019

### Summary



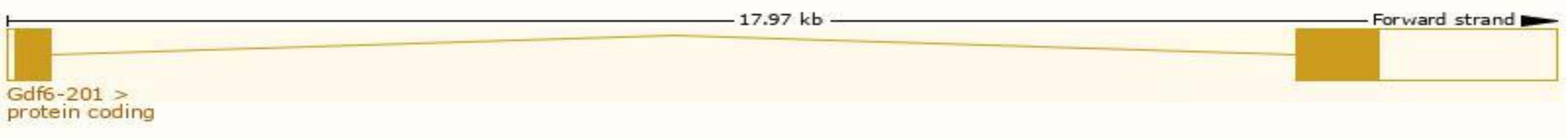
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Official Symbol</b>    | Gdf6 provided by <a href="#">MGI</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Official Full Name</b> | growth differentiation factor 6 provided by <a href="#">MGI</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Primary source</b>     | <a href="#">MGI:MGI:95689</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>See related</b>        | <a href="#">Ensembl:ENSMUSG000000051279</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Gene type</b>          | protein coding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>RefSeq status</b>      | REVIEWED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <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>      | BMP-13, BMP13, GDF16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Summary</b>            | 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 preprotein is proteolytically processed to generate each subunit of the disulfide-linked homodimer. This protein is required for normal formation of some bones and joints in the limbs, skull, and axial skeleton. Mice lacking a functional copy of this gene exhibit joint and skeletal defects. [provided by RefSeq, Sep 2016] |
| <b>Expression</b>         | Biased expression in spleen adult (RPKM 5.5), limb E14.5 (RPKM 1.7) and 5 other tissues <a href="#">See more</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Orthologs</b>          | <a href="#">human</a> <a href="#">all</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

# Transcript information (Ensembl)

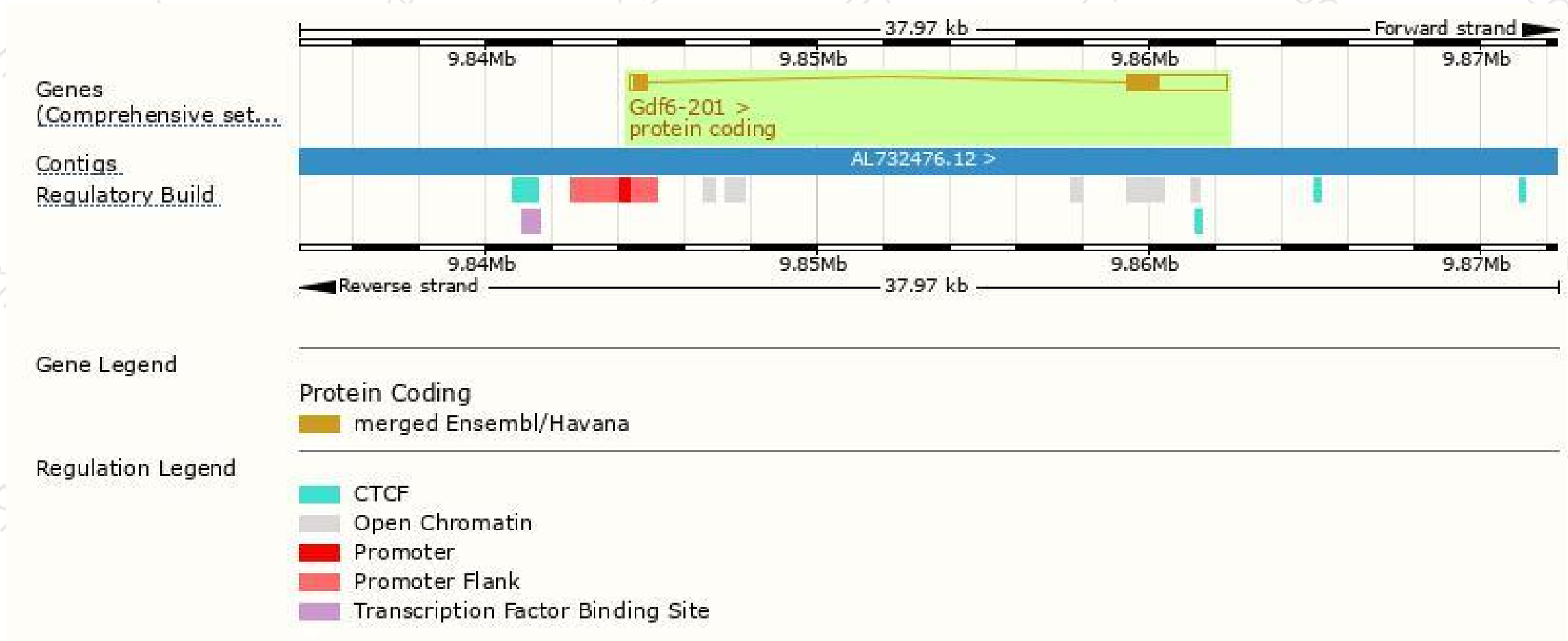
The gene has 1 transcript, and the transcript is shown below:

| Name     | Transcript ID                        | bp   | Protein               | Biotype        | CCDS                      | UniProt                       | Flags                         |
|----------|--------------------------------------|------|-----------------------|----------------|---------------------------|-------------------------------|-------------------------------|
| Gdf6-201 | <a href="#">ENSMUST00000057613.2</a> | 3532 | <a href="#">454aa</a> | Protein coding | <a href="#">CCDS17960</a> | <a href="#">A2AII0 P43028</a> | TSL:1 GENCODE basic APPRIS P1 |

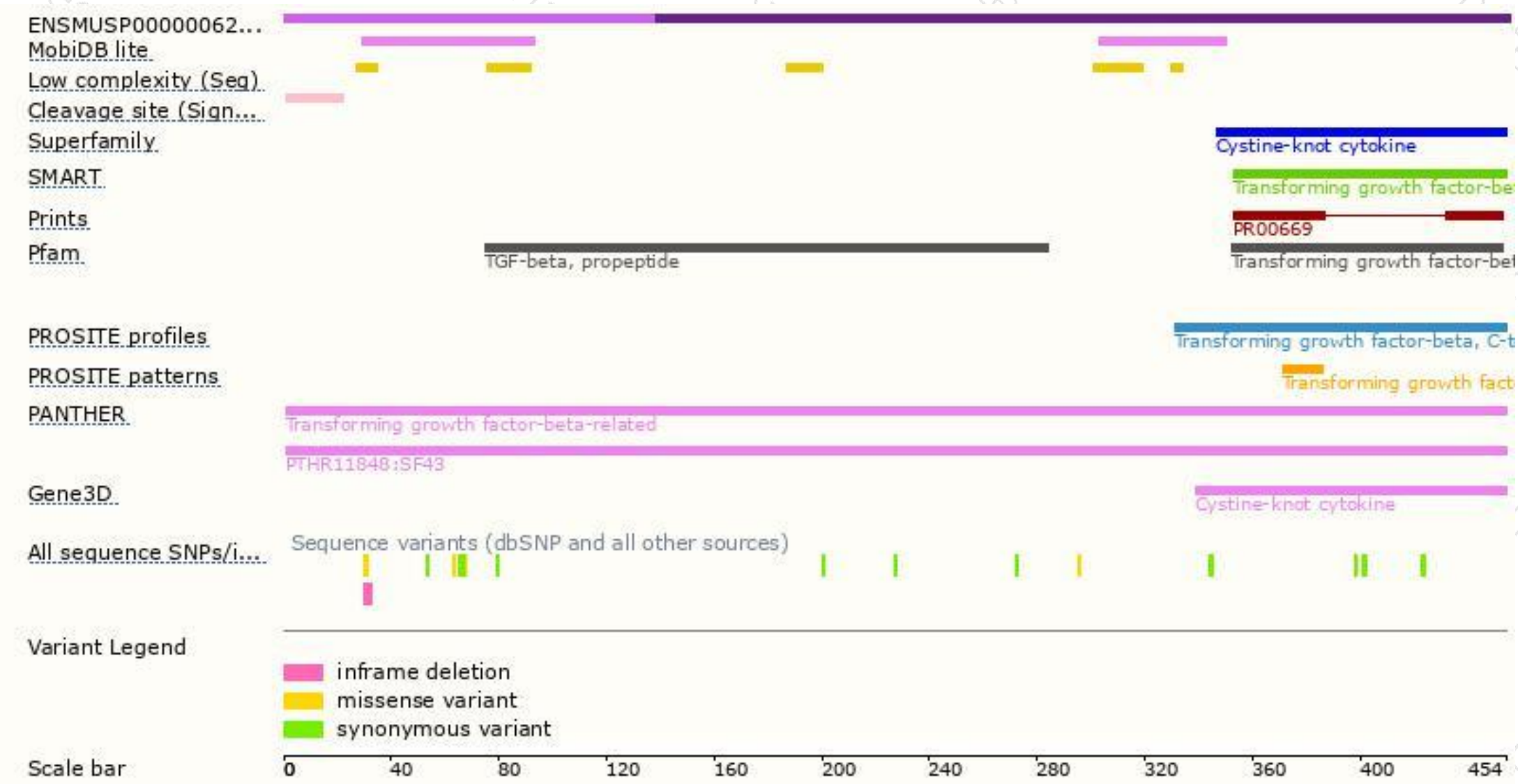
The strategy is based on the design of *Gdf6-201* transcript, The transcription is shown below



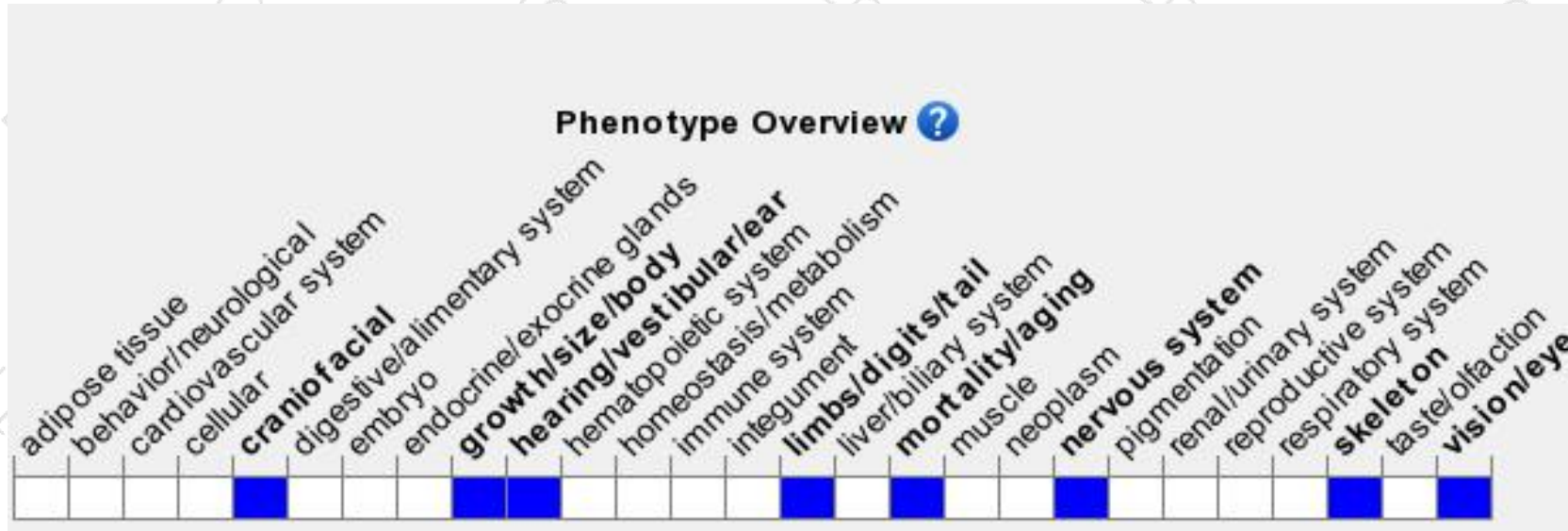
# Genomic location distribution



# 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 null mice show multiple joint and skeletal patterning defects affecting the extremities, inner ear, and skull.

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

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