Gdf2 Cas9-CKO Strategy

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Project Overview

Project Name	***Gdf2***
Project type	**Cas9-CKO**
Strain background	**C57BL/6JGpt**

Conditional Knockout strategy

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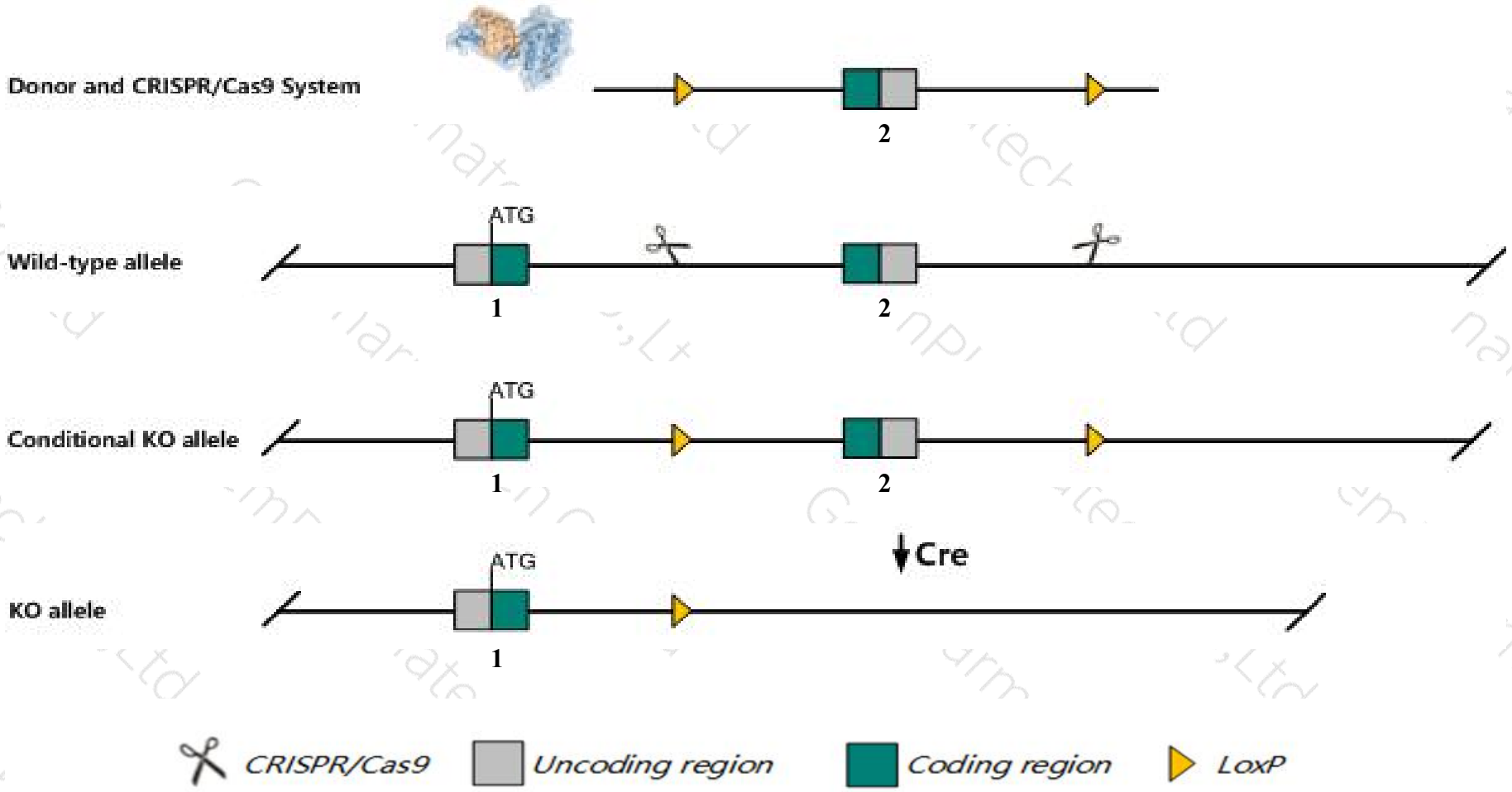
This model will use CRISPR/Cas9 technology to edit the *Gdf2* gene. The schematic diagram is as follows:



Technical routes

The *Gdf2* gene has 1 transcript. According to the structure of *Gdf2* gene, exon2 of *Gdf2-201* (ENSMUST00000100720.1) transcript is recommended as the knockout region.The region contains 944bp coding sequence. Knock out the region will result in disruption of protein function.

In this project we use CRISPR/Cas9 technology to modify *Gdf2* gene. The brief process is as follows:CRISPR/Cas9 system and Donor 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.

The flox mice will be knocked out after mating with mice expressing Cre recombinase, resulting in the loss of function of the target gene in specific tissues and cell types.

Notice

According to the existing MGI data,Homozygotes for a null allele show arteriovenous malformations, skeletal anomalies, and abnormal retinal vasculature after anti-BMP10-antibody treatment. Homozygotes for a different null allele show abnormal retinal and tracheal vasculature and tracheal lymphatic vessels after anti-BMP10 treatment.

The CKO region may affect the 5-terminal regulation of *Rbp3* gene, Because the knockout region is about 6.6 kb from the 5-terminal sequence of the *Rbp3* gene.

The *Gdf2* gene is located on the Chr14. 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information NCBI

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Gdf2 growth differentiation factor 2 [Mus musculus (house mouse)]

Gene ID: 12165, updated on 5-Mar-2019

Summary

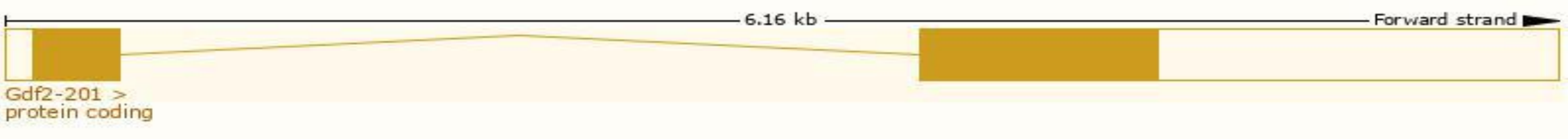
Official Symbol	Gdf2 provided by MGI
Official Full Name	growth differentiation factor 2 provided by MGI
Primary source	MGI:MGI:1321394
See related	Ensembl:ENSMUSG00000072625
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Bmp9
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 regulates cartilage and bone development, angiogenesis and differentiation of cholinergic central nervous system neurons. Homozygous null mice exhibit malformations of the vasculature and skeleton. [provided by RefSeq, Jul 2016]
Expression	Biased expression in liver E18 (RPKM 3.6), liver E14.5 (RPKM 2.8) and 2 other tissues See more
Orthologs	human all

Transcript information Ensembl

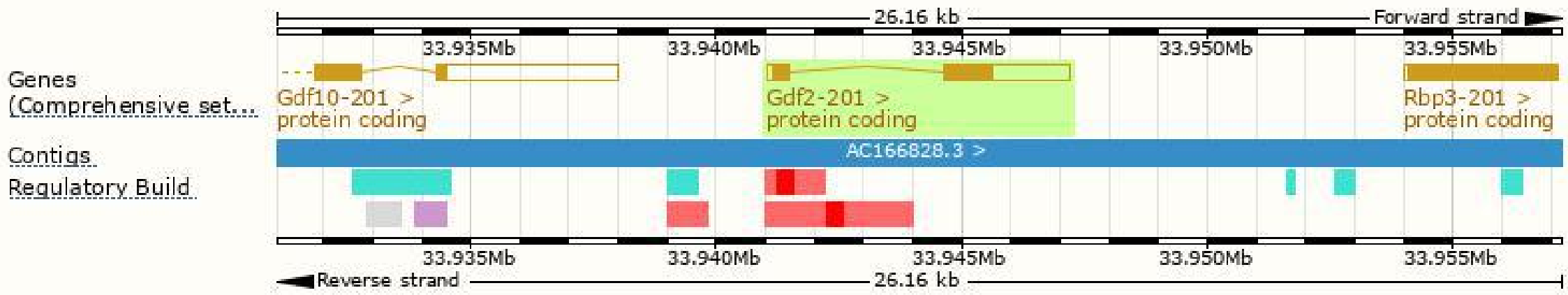
The gene has 1 transcript,and the transcript is shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Gdf2-201	ENSMUST00000100720.1	2988	428aa	Protein coding	CCDS26928	Q9WV56	TSL:1 GENCODE basic APPRIS P1

The strategy is based on the design of *Gdf2-201* transcript,The transcription is shown below



Genomic location distribution



Gene Legend

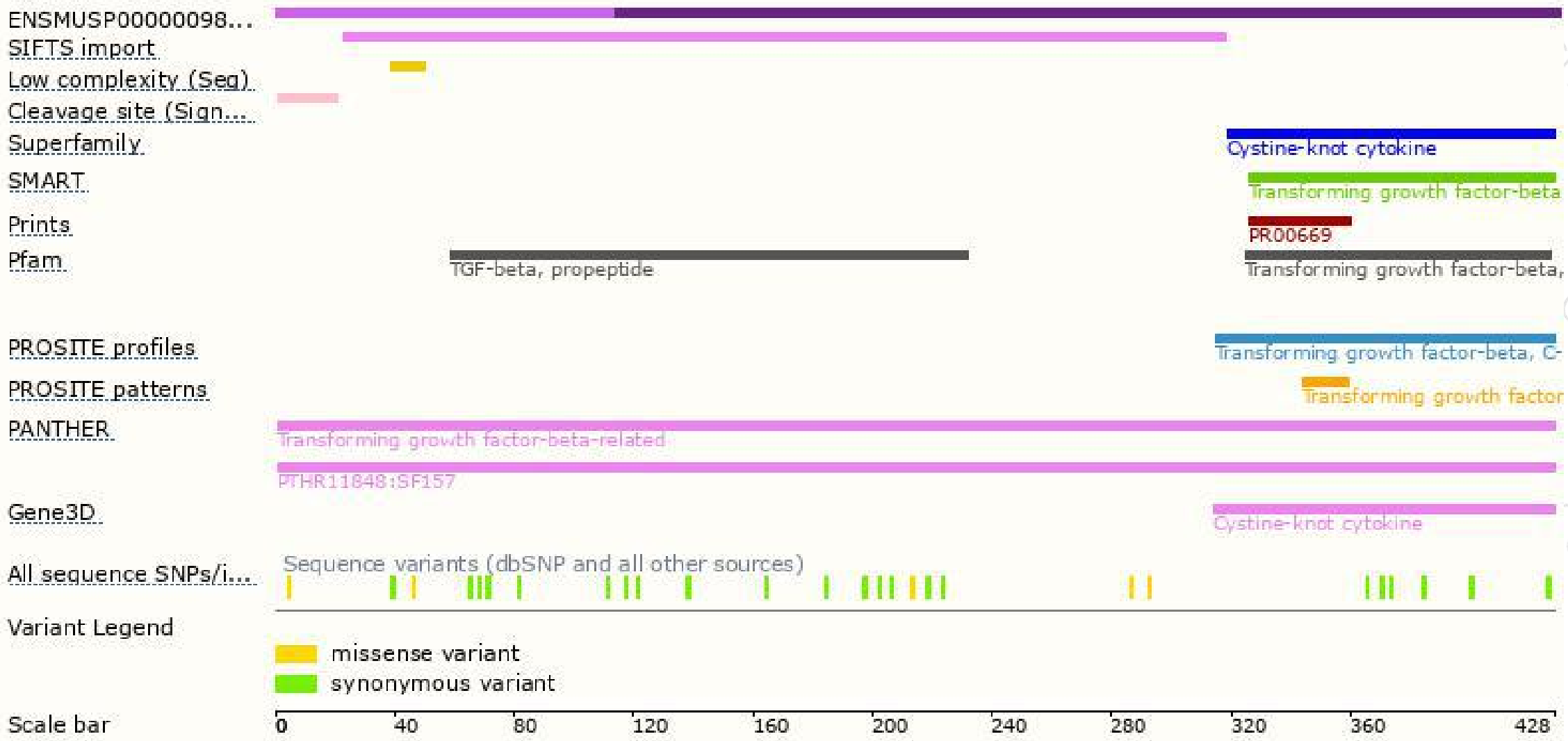
Protein Coding

merged Ensembl/Havana

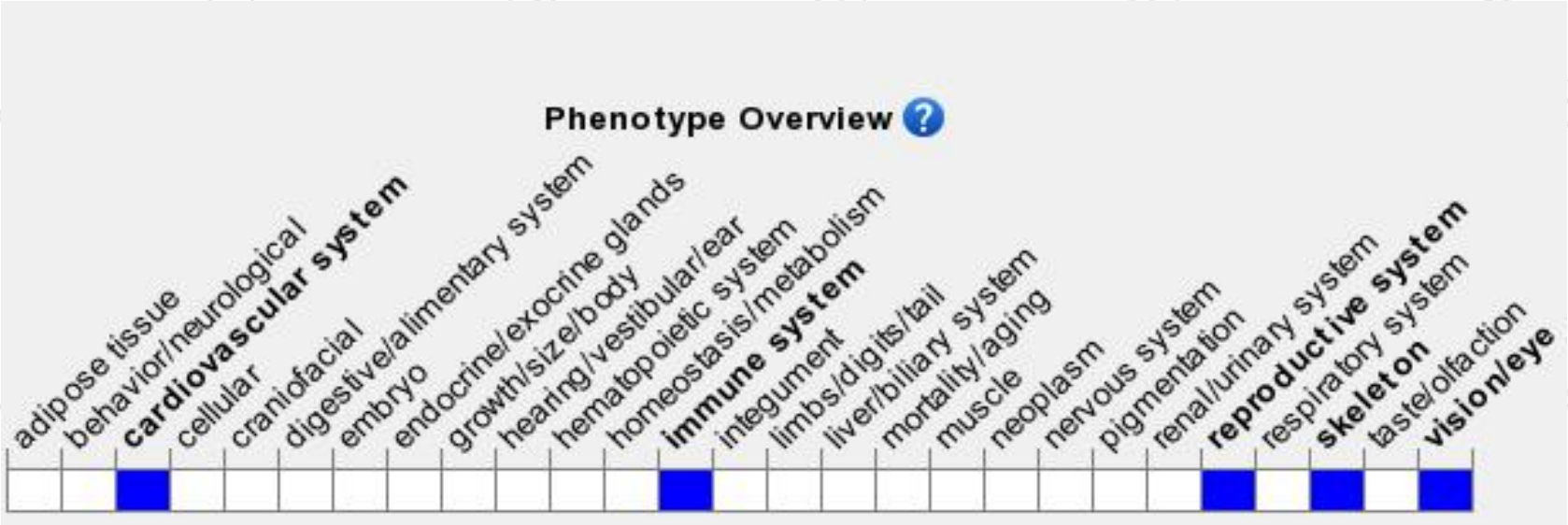
Regulation Legend

- CTCF
- Open Chromatin
- Promoter
- Promoter Flank
- Transcription Factor Binding Site

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,Homozygotes for a null allele show arteriovenous malformations, skeletal anomalies, and abnormal retinal vasculature after anti-BMP10-antibody treatment. Homozygotes for a different null allele show abnormal retinal and tracheal vasculature and tracheal lymphatic vessels after anti-BMP10 treatment.

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

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