

***Bmp1* Cas9-CKO Strategy**

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Reviewer: JiaYu

Project Overview

Project Name

Bmp1

Project type

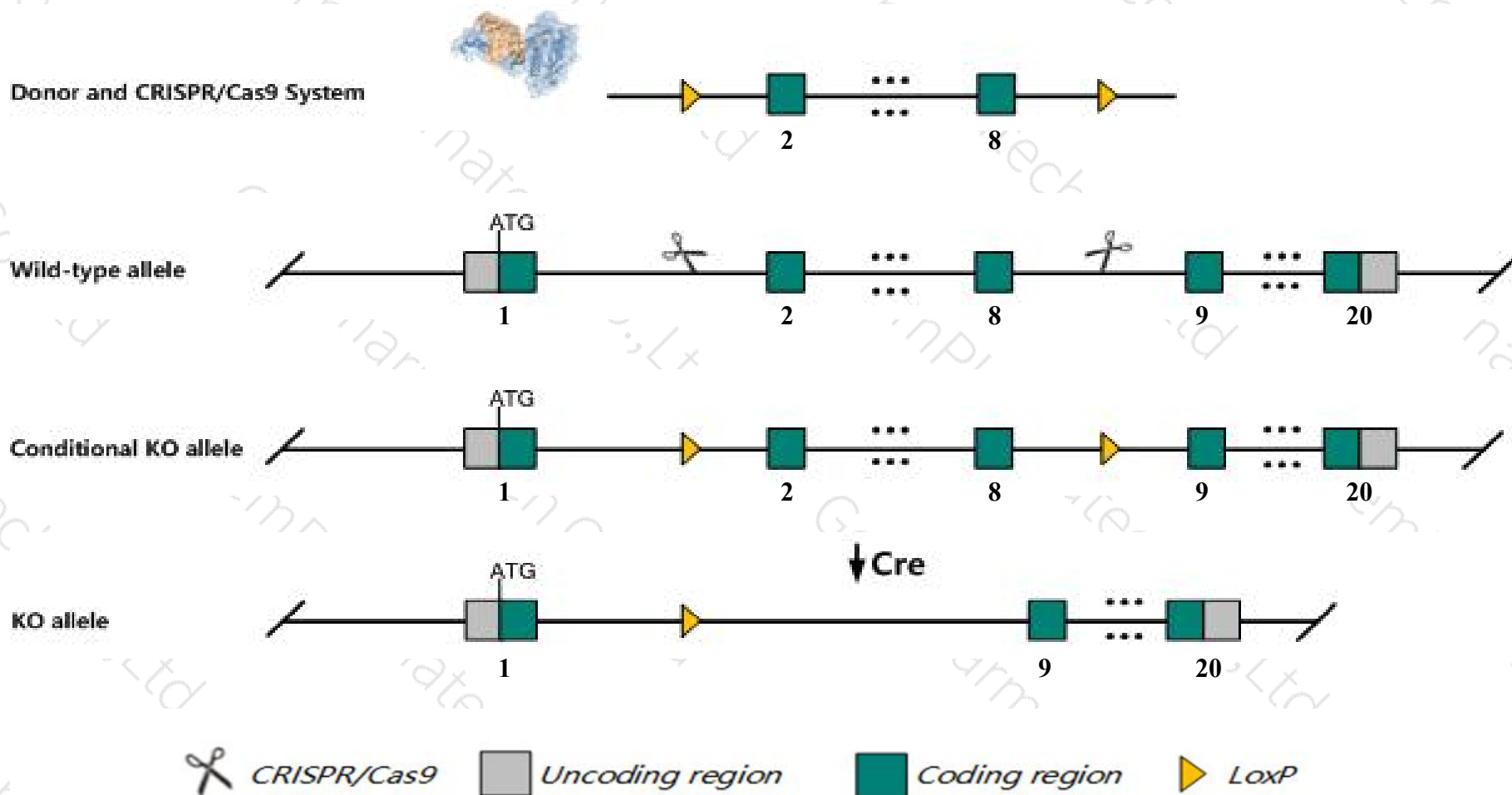
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Bmp1* gene. The schematic diagram is as follows:



- The *Bmp1* gene has 7 transcripts. According to the structure of *Bmp1* gene, exon2-exon8 of *Bmp1-201* (ENSMUST00000022693.8) transcript is recommended as the knockout region. The region contains 923bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Bmp1* gene. The brief process is as follows: gRNA was transcribed in vitro, donor was constructed. Cas9, gRNA 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.

- According to the existing MGI data, Homozygous targeted mutant embryos have reduced ossification of the skull, persistent herniation of the gut, abnormal collagen fibrils in the amnion, and die at birth.
- The *Bmp1* 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)

Bmp1 bone morphogenetic protein 1 [Mus musculus (house mouse)]

Gene ID: 12153, updated on 12-Mar-2019

Summary



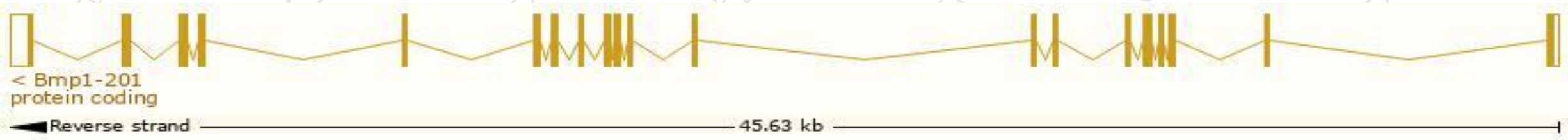
Official Symbol	Bmp1 provided by MGI
Official Full Name	bone morphogenetic protein 1 provided by MGI
Primary source	MGI:MGI:88176
See related	Ensembl:ENSMUSG00000022098
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Pcp, Tld
Summary	This gene encodes a metalloproteinase that plays an essential role in the formation of the extracellular matrix and is also able to induce ectopic bone formation. Unlike other bone morphogenetic proteins, the protein encoded by this gene is not closely related to transforming growth factor-beta. This protein plays in role several developmental processes. In humans, mutations in this gene are associated with osteogenesis imperfecta and with increased bone mineral density and multiple recurrent fractures. Alternative splicing results in multiple transcript variants. [provided by RefSeq, Dec 2013]
Expression	Ubiquitous expression in limb E14.5 (RPKM 81.0), ovary adult (RPKM 50.8) and 25 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

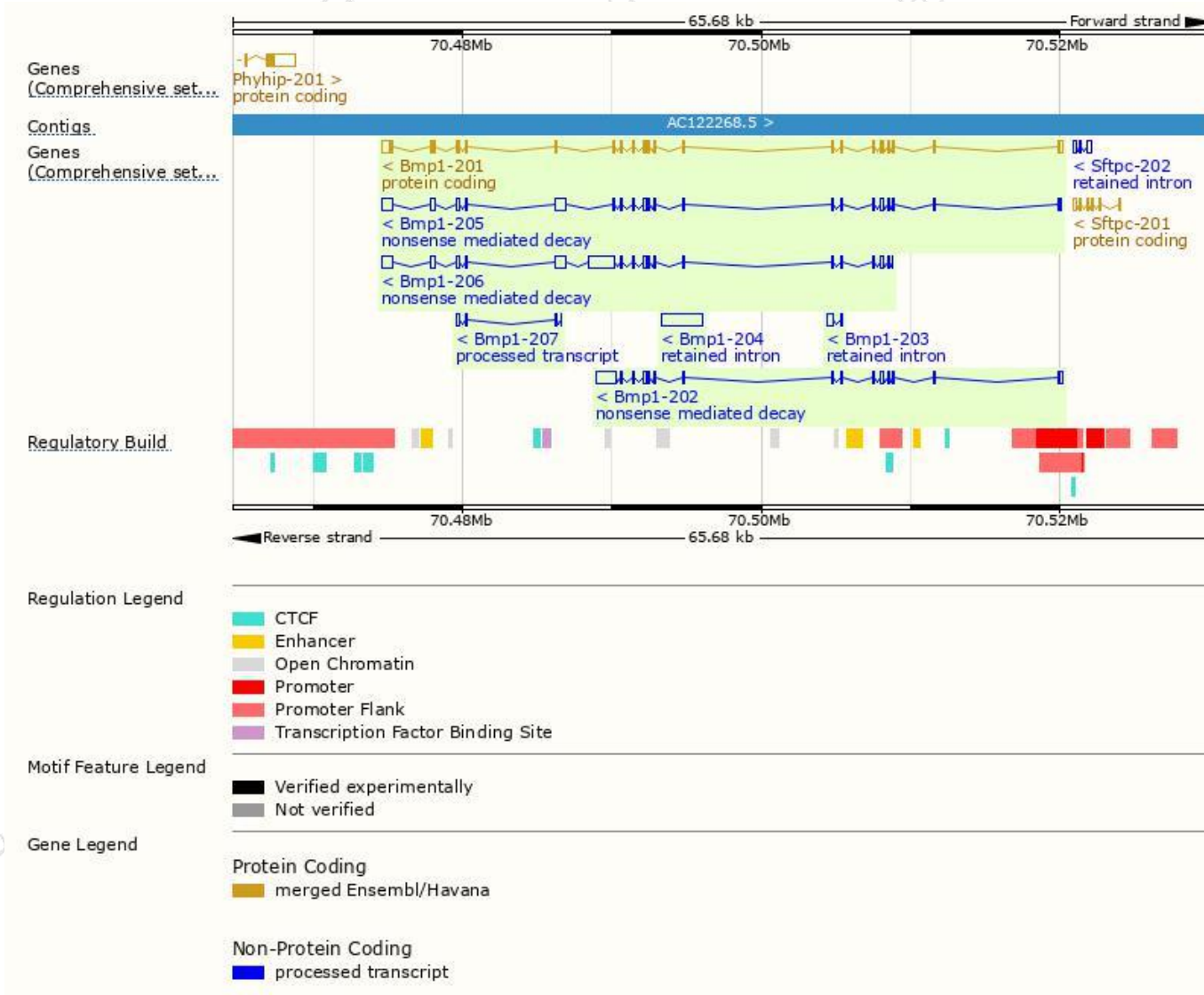
The gene has 7 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Bmp1-201	ENSMUST00000022693.8	3684	991aa	Protein coding	CCDS36972	P98063	TSL:1 GENCODE basic APPRIS P1
Bmp1-206	ENSMUST000000227944.1	5365	57aa	Nonsense mediated decay	-	A0A2I3BQB3	CDS 5' incomplete
Bmp1-205	ENSMUST000000226906.1	4340	194aa	Nonsense mediated decay	-	A0A2I3BRJ8	
Bmp1-202	ENSMUST000000226246.1	3472	194aa	Nonsense mediated decay	-	A0A2I3BRJ8	
Bmp1-207	ENSMUST000000228501.1	507	No protein	Processed transcript	-	-	
Bmp1-204	ENSMUST000000226601.1	2736	No protein	Retained intron	-	-	
Bmp1-203	ENSMUST000000226539.1	452	No protein	Retained intron	-	-	

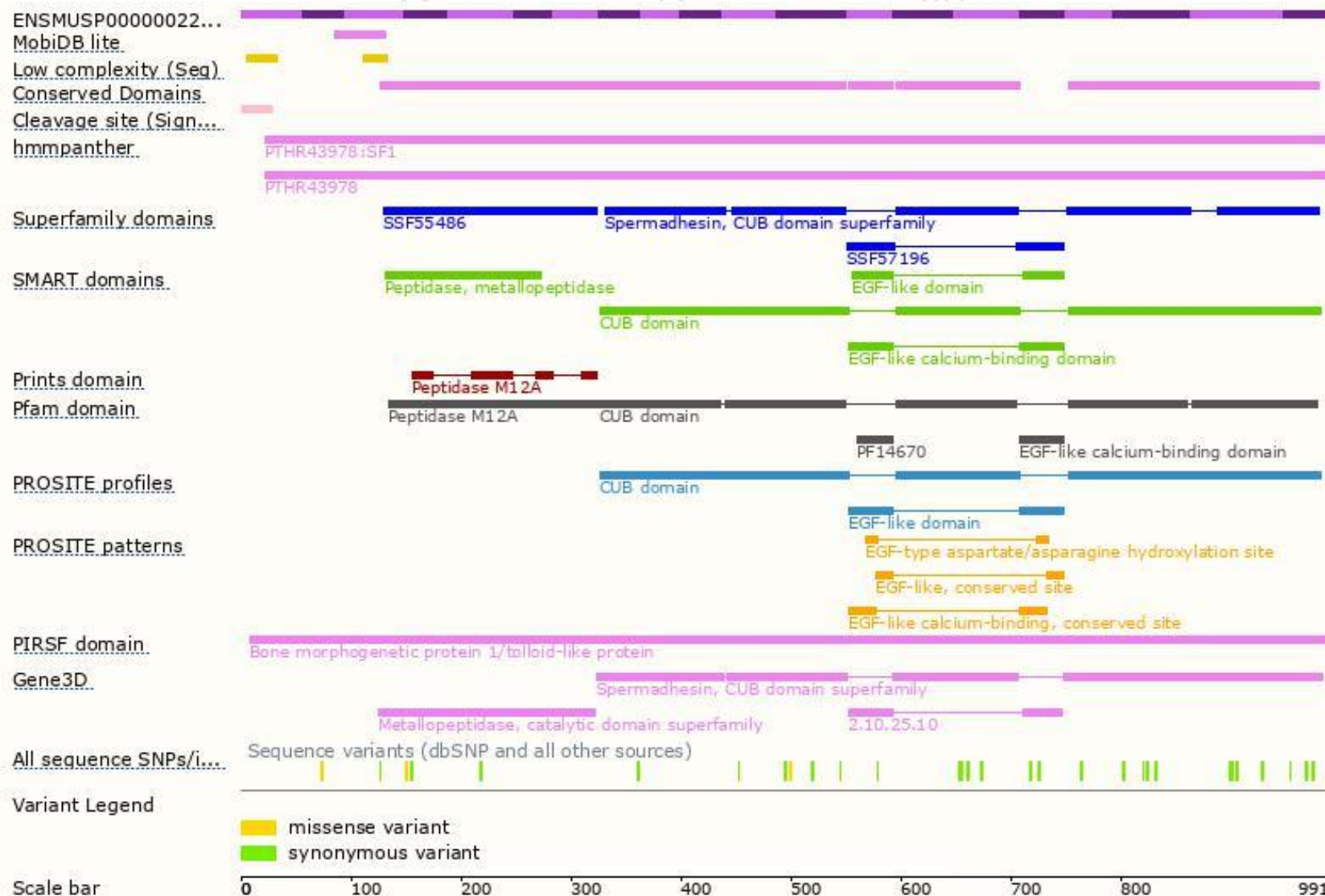
The strategy is based on the design of *Bmp1-201* transcript,The transcription is shown below



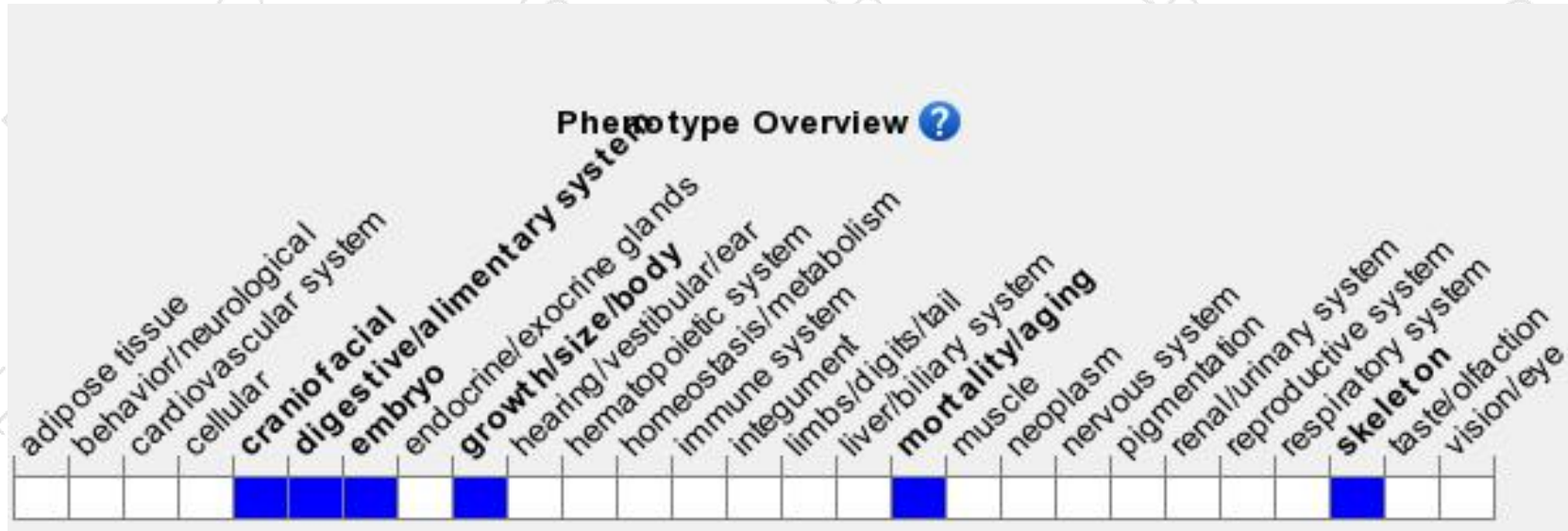
Genomic location distribution



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

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