

Adra1a Cas9-CKO Strategy

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Project Overview

Project Name

Adrala

Project type

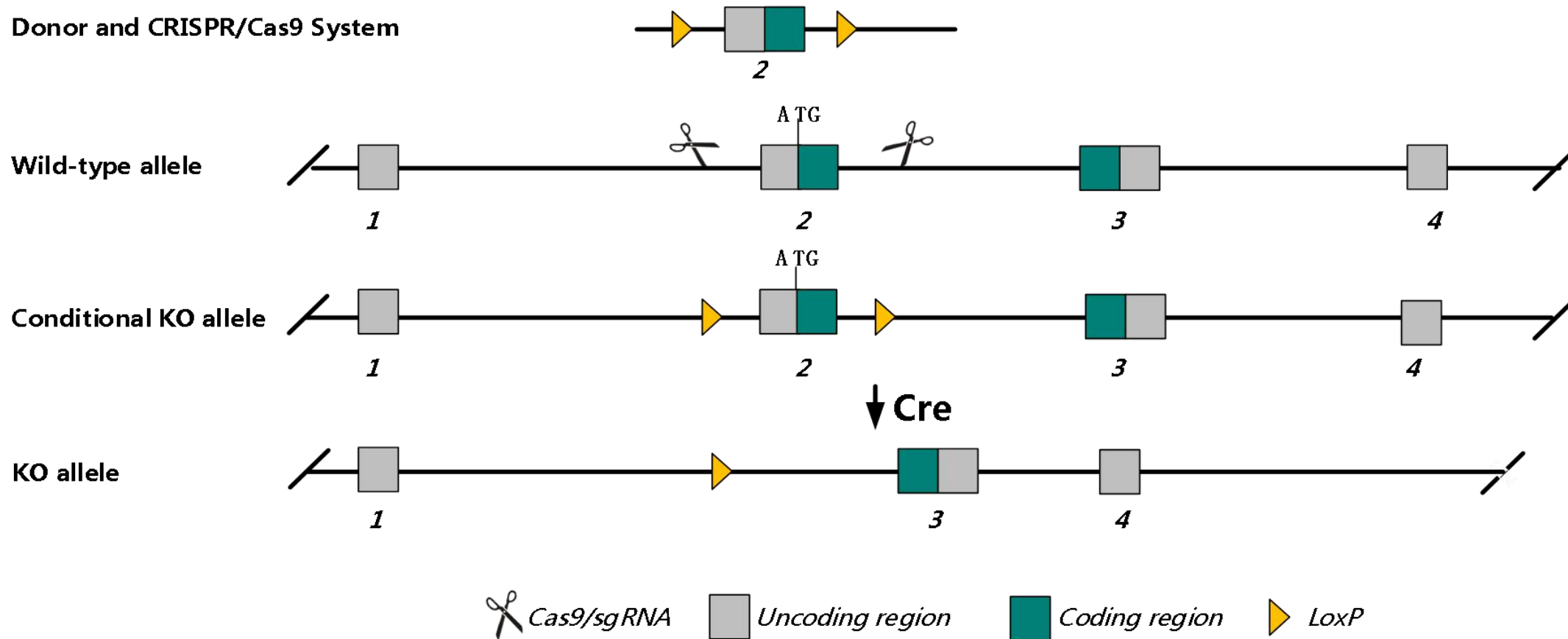
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Adra1a* gene. The schematic diagram is as follows:



- The *Adrala* gene has 6 transcripts. According to the structure of *Adrala* gene, exon2 of *Adrala-201* ([ENSMUST00000054661.7](#)) transcript is recommended as the knockout region. The region contains start codon ATG. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Adrala* 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, Mutations in this gene result in hypotension.
- The *Adra1a* 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)

Adra1a adrenergic receptor, alpha 1a [Mus musculus (house mouse)]

Gene ID: 11549, updated on 25-Mar-2019

Summary



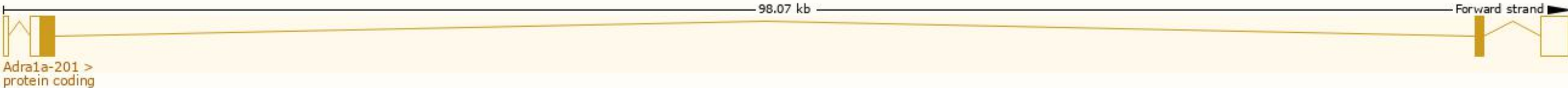
Official Symbol	Adra1a provided by MGI
Official Full Name	adrenergic receptor, alpha 1a provided by MGI
Primary source	MGI:MGI:104773
See related	Ensembl:ENSMUSG00000045875
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Adra1c
Summary	This gene encodes one of several multipass transmembrane proteins that function as G protein-coupled receptors. The encoded protein binds to epinephrine and norepinephrine to mediate signaling in cells of the cardiac, nervous, and other organ systems. Alternatively spliced transcript variants encoding multiple isoforms have been observed for this gene. [provided by RefSeq, Nov 2012]
Expression	Biased expression in frontal lobe adult (RPKM 2.7), lung adult (RPKM 1.9) and 14 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

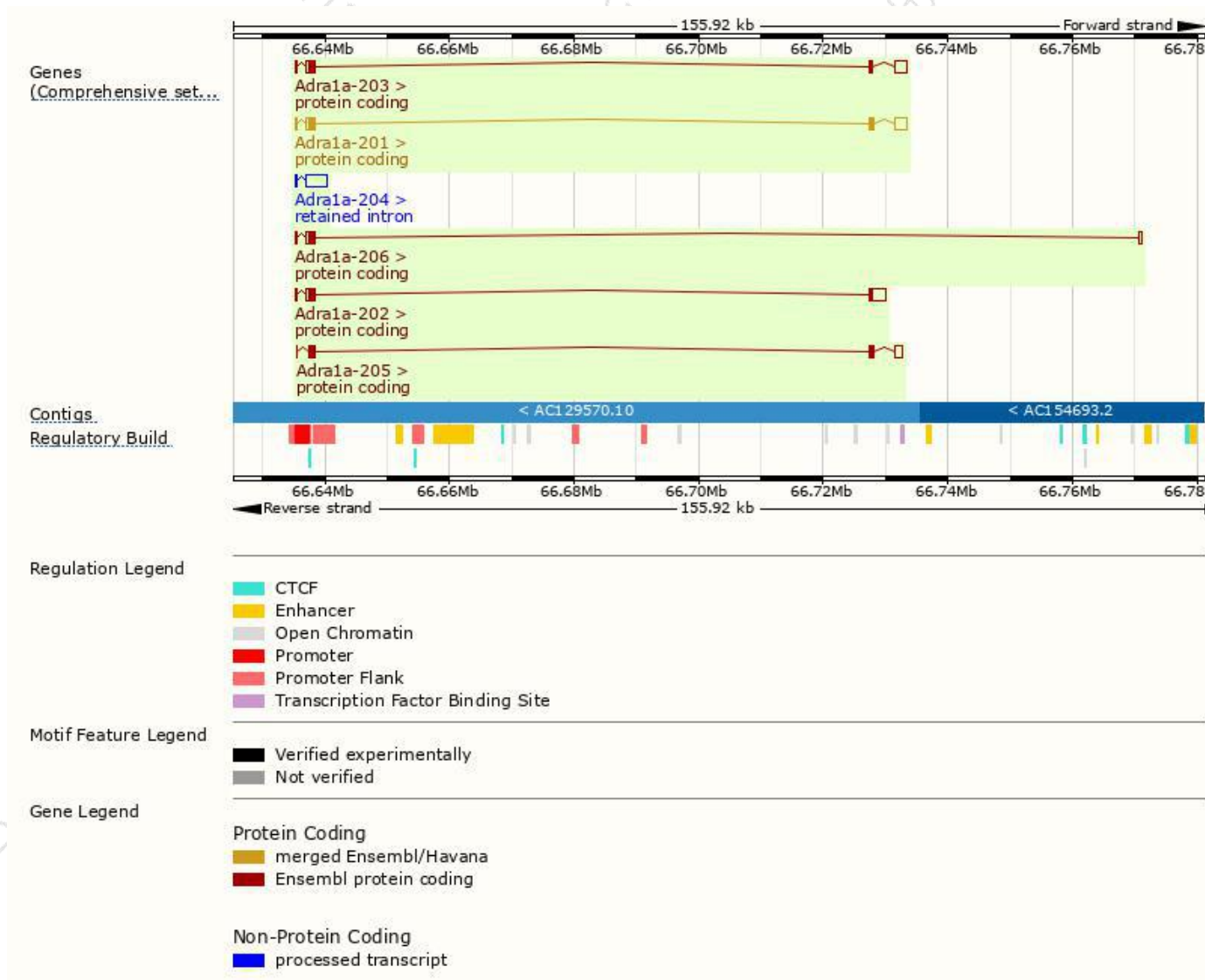
The gene has 6 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Adra1a-202	ENSMUST00000159068.1	4282	466aa	Protein coding	CCDS27223	P97718	TSL:2 GENCODE basic APPRIS P3
Adra1a-201	ENSMUST00000054661.7	4137	466aa	Protein coding	CCDS27223	P97718	TSL:1 GENCODE basic APPRIS P3
Adra1a-203	ENSMUST00000159365.7	4118	427aa	Protein coding	CCDS70600	Q8BUE5	TSL:1 GENCODE basic APPRIS ALT1
Adra1a-205	ENSMUST00000161339.1	2788	466aa	Protein coding	CCDS27223	P97718	TSL:1 GENCODE basic APPRIS P3
Adra1a-206	ENSMUST00000225182.1	2337	295aa	Protein coding	-	Q8BXZ4	GENCODE basic
Adra1a-204	ENSMUST00000160647.1	3648	No protein	Retained intron	-	-	TSL:1

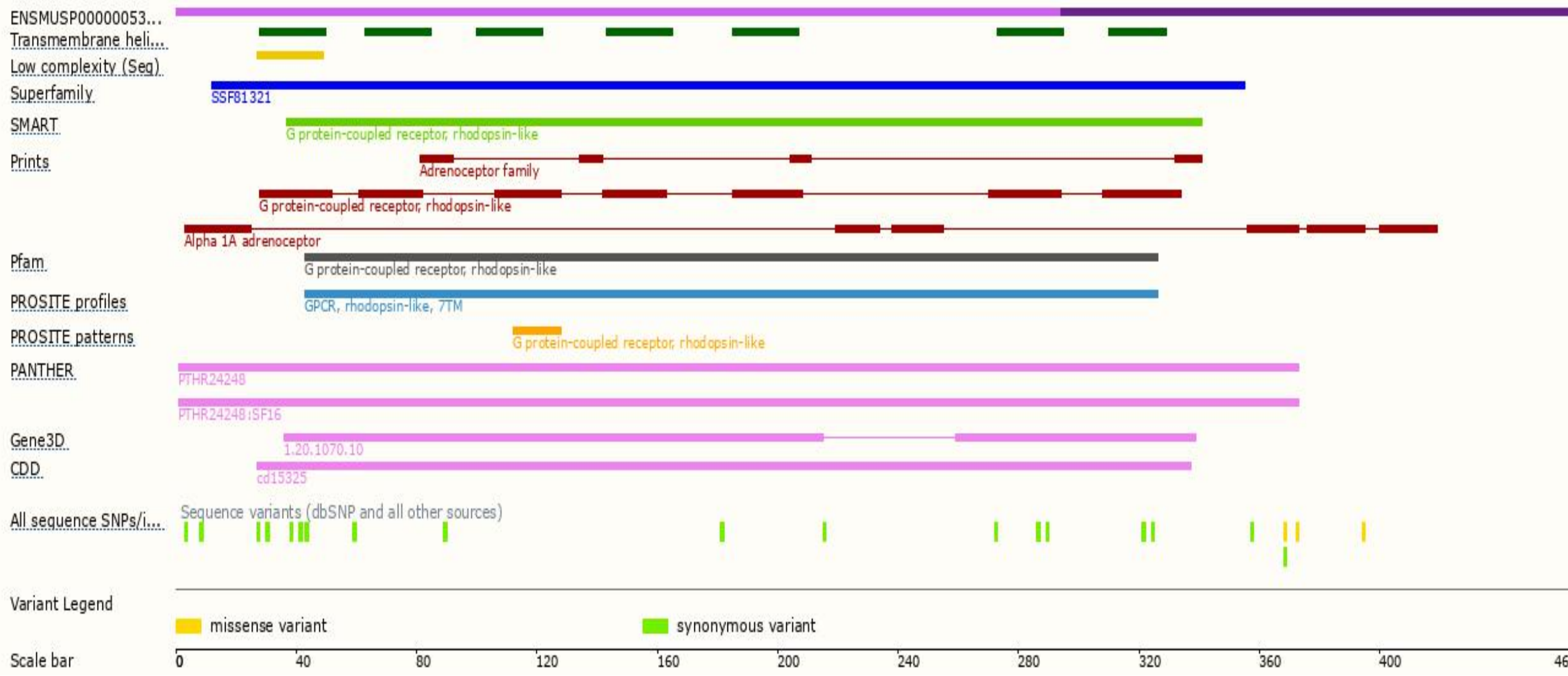
The strategy is based on the design of *Adra1a-201* transcript,The transcription is shown below



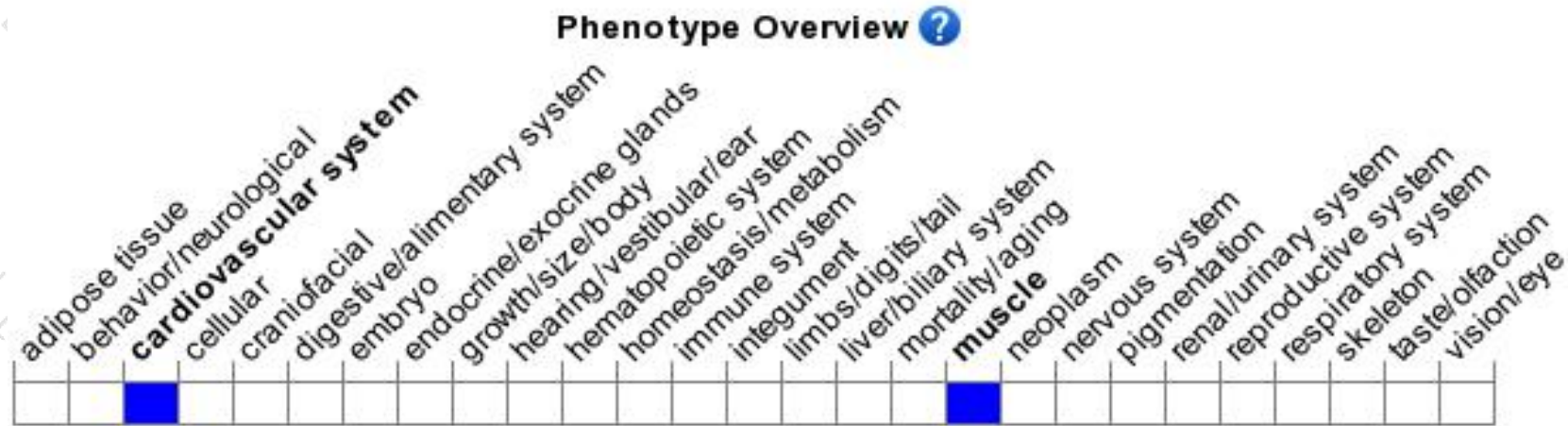
Genomic location distribution



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, Mutations in this gene result in hypotension.

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

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