Adrb1 Cas9-KO Strategy

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Project Overview

Project Name	***Adrb1***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Adrb1* gene. The schematic diagram is as follows:

Technical routes

➢ The *Adrb1* gene has 2 transcripts. According to the structure of *Adrb1* gene, exon1 of *Adrb1-201* (ENSMUST00000038949.5) 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 *Adrb1* gene. The brief process is as follows: gRNA was transcribed in vitro.Cas9 and gRNA 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.

Notice

➢ According to the existing MGI data, Most mice homozygous for targeted mutations that inactivate the gene die prenatally, with the penetrance of lethality showing strain dependence. Surviving knockouts appear normal, but lack the chronotropic and inotropic responses seen in wild-type mice when beta-AR agonists such as isoproterenol are administered.

➢ The *Adrb1* gene is located on the Chr19. 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）

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Adrb1 adrenergic receptor, beta 1 [*Mus musculus* (house mouse)]

Gene ID: 11554, updated on 2-Jul-2019

Summary

Official Symbol	Adrb1 provided by MGI
Official Full Name	adrenergic receptor, beta 1 provided by MGI
Primary source	MGI:MGI:87937
See related	Ensembl:ENSMUSG00000035283
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Adrb-1; beta-AR
Orthologs	human all

Genomic context

Location: 19 D2; 19 51.96 cM

See Adrb1 in Genome Data Viewer

Exon count: 1

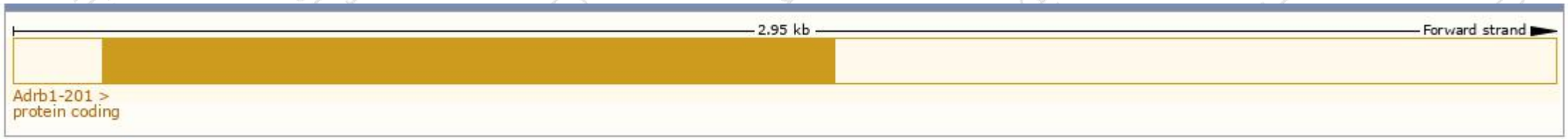
Annotation release	Status	Assembly	Chr	Location
106	current	GRCm38.p4 (GCF_000001635.24)	19	NC_000085.6 (56722372..56724862)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	19	NC_000085.5 (56796862..56799352)

Transcript information（Ensembl）

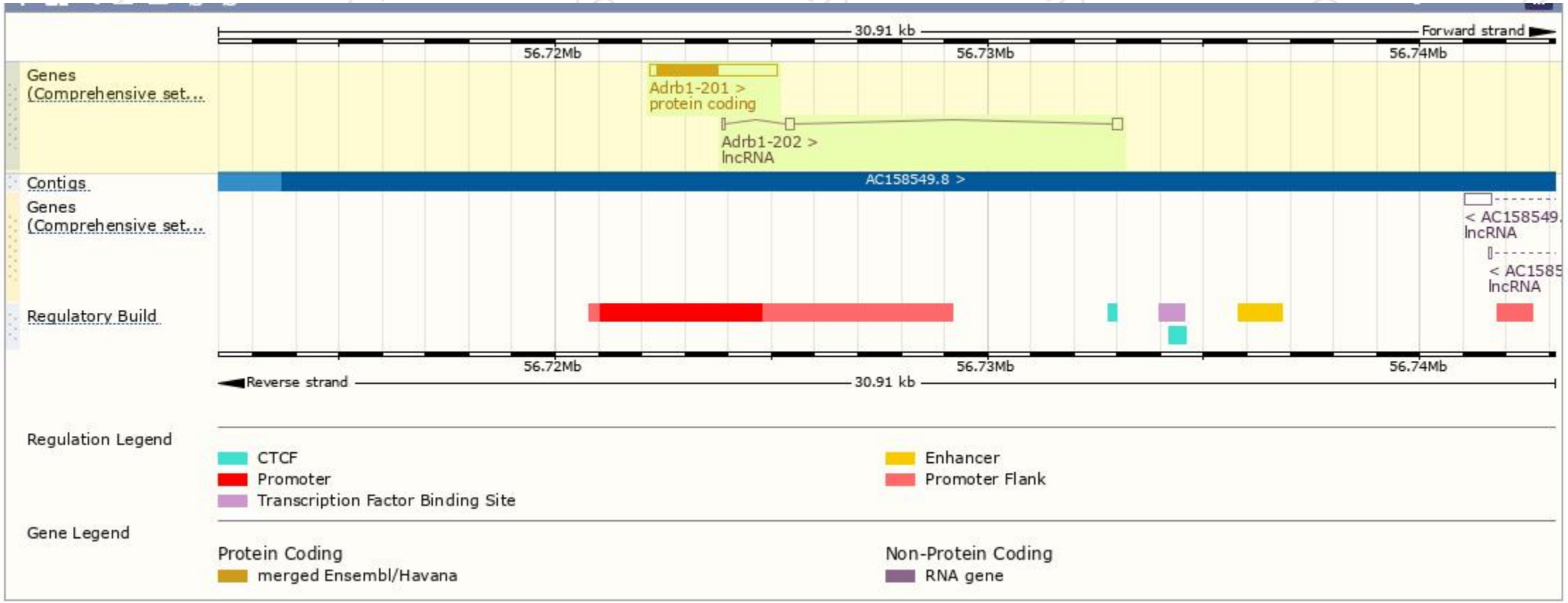
The gene has 2 transcripts,all transcripts are shown below:

Name	Transcript ID ▲	bp	Protein	Biotype	CCDS	UniProt	Flags
Adrb1-201	ENSMUST00000038949.5	2952	466aa	Protein coding	CCDS29919	P34971	TSL:NA GENCODE basic APPRIS P1
Adrb1-202	ENSMUST00000236875.1	494	No protein	lncRNA	-	-	-

The strategy is based on the design of *Adrb1-201* transcript,The transcription is shown below

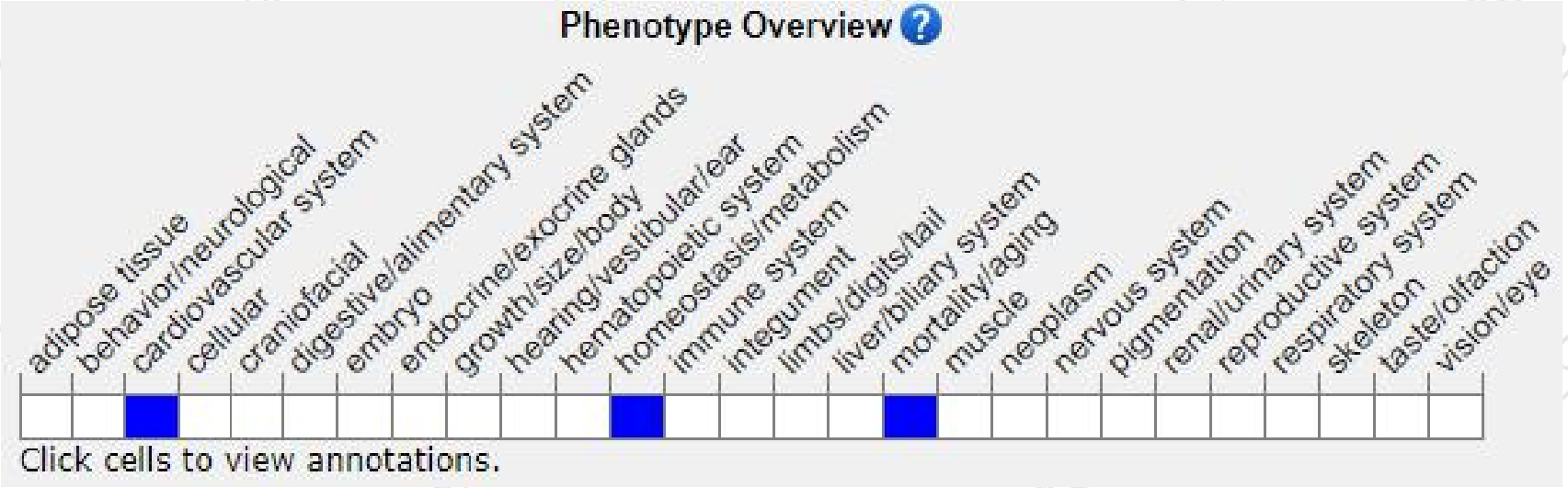


Genomic location distribution



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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