

Acta1 Cas9-KO Strategy

Designer:

Daohua Xu

Reviewer:

Huimin Su

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Project Overview

Project Name

Acta1

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Acta1* gene. The schematic diagram is as follows:



- The *Acta1* gene has 2 transcripts. According to the structure of *Acta1* gene, exon2-exon7 of *Acta1-201* (ENSMUST00000034453.5) 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 *Acta1* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Homozygous mutant animals die by postnatal day 10 and display reduced body weight/size, atrophy of brown adipose tissue, depleted glycogen stores of the liver and skeletal muscles, muscle weakness, and scoliosis.
- This strategy may affect the 5-terminal regulation of the gene of interest.
- This strategy may affect the 5-terminal regulation of *Gm29773*.
- When the target gene is deleted, partial intron of the *Gm20388* gene will also be deleted, and the impact is unknown.
- The *Acta1* gene is located on the Chr8. 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)

Acta1 actin, alpha 1, skeletal muscle [Mus musculus (house mouse)]

Gene ID: 11459, updated on 5-Mar-2019

Summary



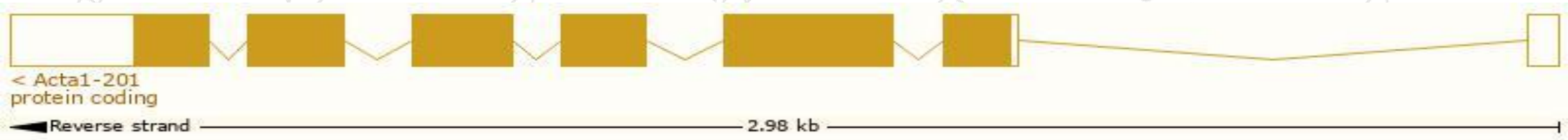
Official Symbol	Acta1 provided by MGI
Official Full Name	actin, alpha 1, skeletal muscle provided by MGI
Primary source	MGI:MGI:87902
See related	Ensembl:ENSMUSG00000031972
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	AA959943, Acta-2, Acts, Actsk-1
Expression	Biased expression in mammary gland adult (RPKM 2915.2), bladder adult (RPKM 558.4) and 4 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

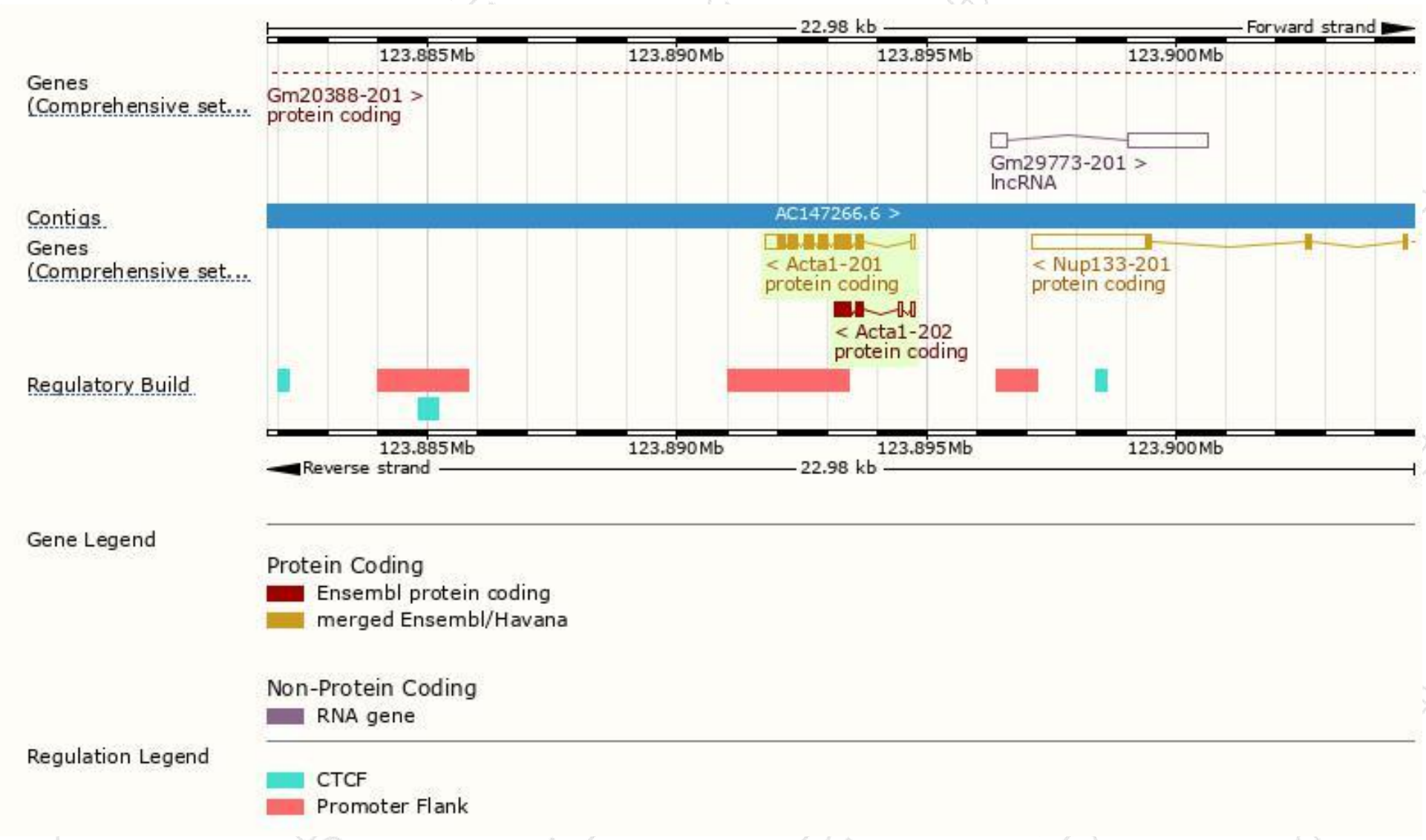
The gene has 2 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Acta1-201	ENSMUST00000034453.5	1446	377aa	Protein coding	CCDS22764	P68134	TSL:1 GENCODE basic APPRIS P1
Acta1-202	ENSMUST00000212584.1	616	151aa	Protein coding	-	A0A1D5RM20	CDS 3' incomplete TSL:2

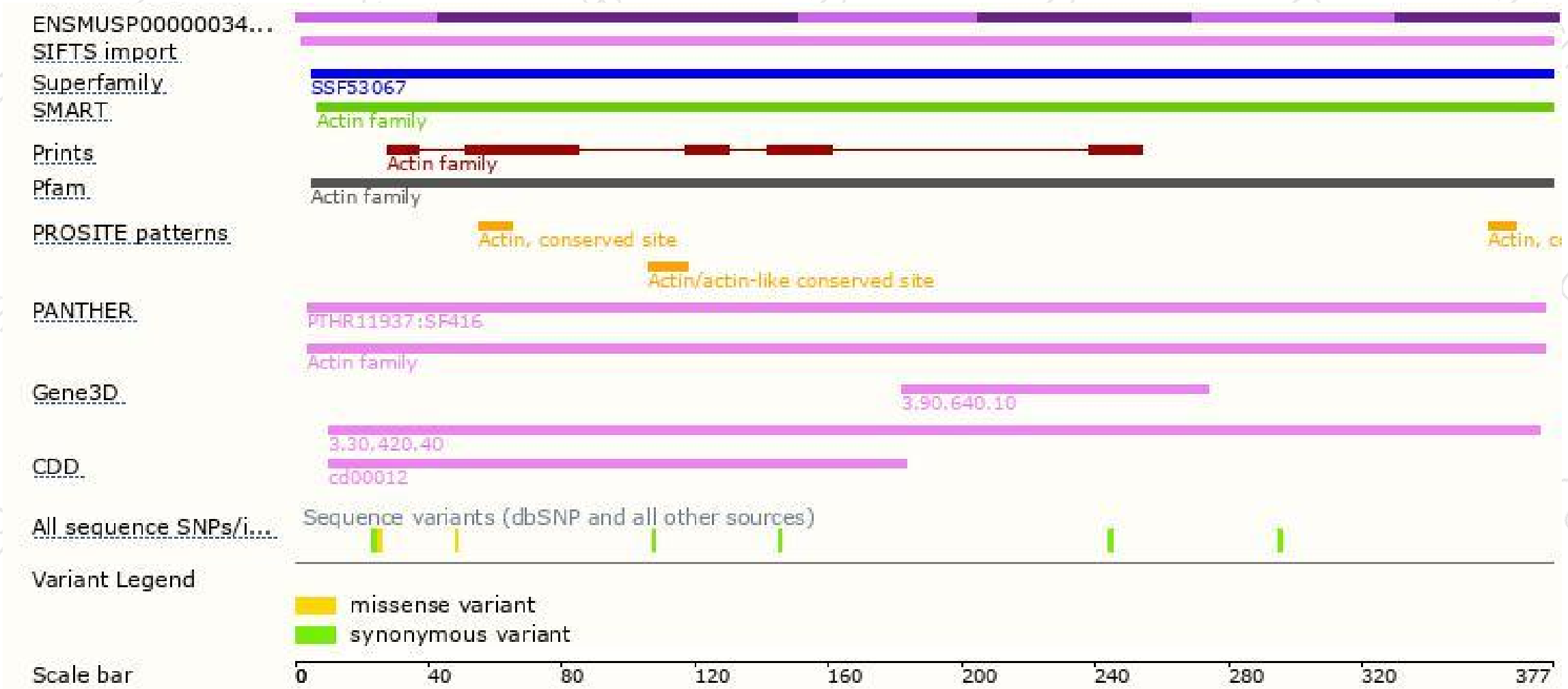
The strategy is based on the design of *Acta1-201* transcript,The transcription is shown below



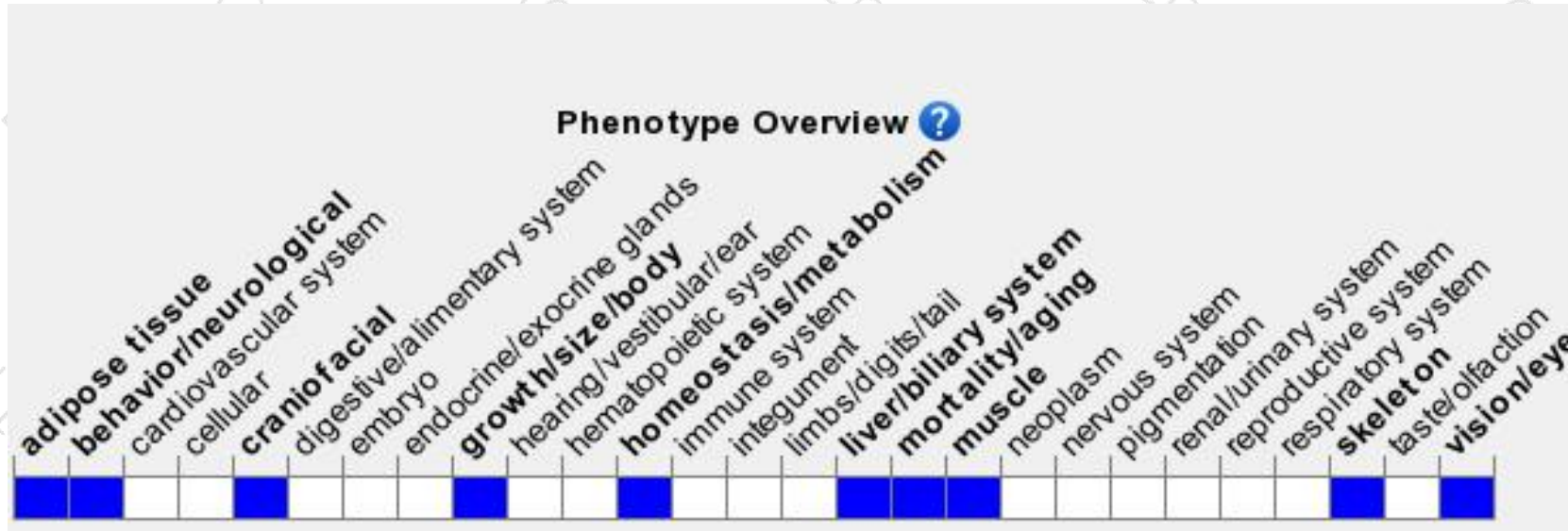
Genomic location distribution



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 mutant animals die by postnatal day 10 and display reduced body weight/size, atrophy of brown adipose tissue, depleted glycogen stores of the liver and skeletal muscles, muscle weakness, and scoliosis.

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

Tel: 400-9660890

