

Arhgef15 Cas9-KO Strategy

Designer:Lixin LYU
Design Date:2019-8-12

Project Overview

Project Name

Arhgef15

Project type

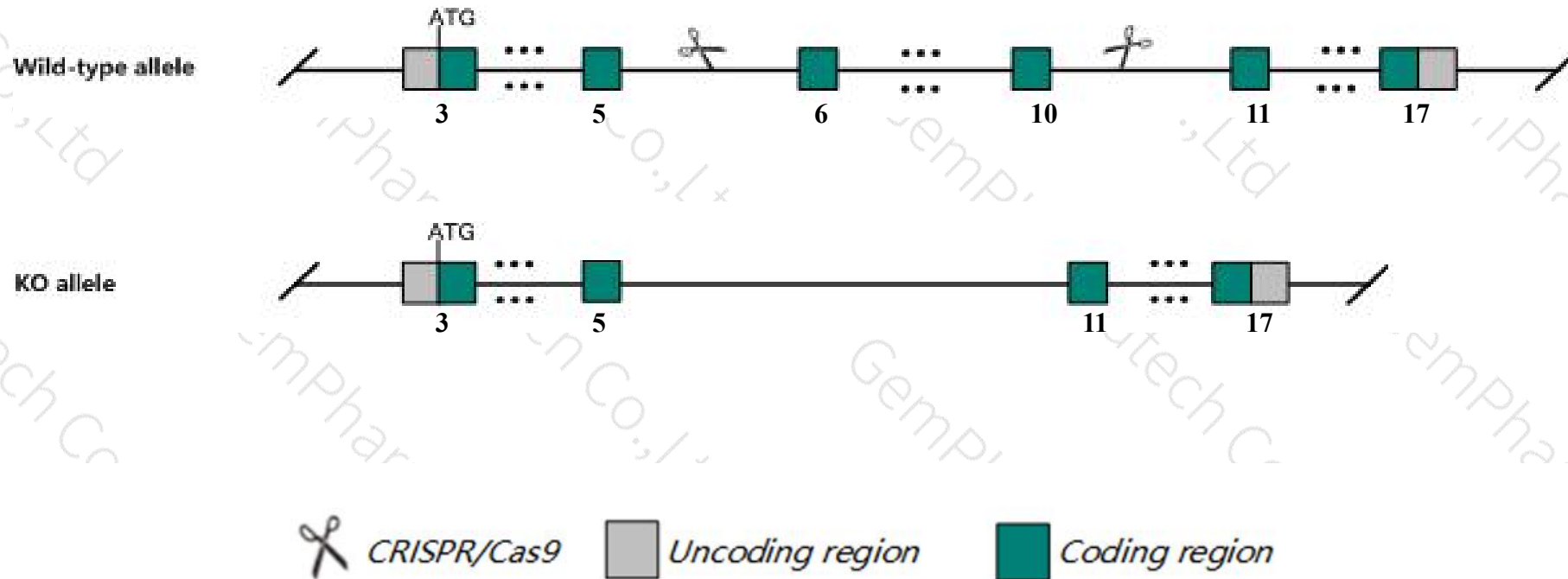
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Arhgef15* gene. The schematic diagram is as follows:



- The *Arhgef15* gene has 6 transcripts. According to the structure of *Arhgef15* gene, exon4-exon8 of *Arhgef15-201* (ENSMUST00000065040.12) transcript is recommended as the knockout region. The region contains 715bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Arhgef15* 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.

- According to the existing MGI data, Mice homozygous for a knock out allele exhibit increased excitatory synapse formation. Mice homozygous for a knock-out allele exhibit delayed radial growth, sparse vasculature and empty basement membrane sleeves in the retina.
- Transcript *Arhgef15*-204&205&206 may not be affected.
- The *Arhgef15* gene is located on the Chr11. 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)

Arhgef15 Rho guanine nucleotide exchange factor (GEF) 15 [Mus musculus (house mouse)]

Gene ID: 442801, updated on 31-Jan-2019

Summary



Official Symbol	Arhgef15 provided by MGI
Official Full Name	Rho guanine nucleotide exchange factor (GEF) 15 provided by MGI
Primary source	MGI:MGI:3045246
See related	Ensembl:ENSMUSG00000052921
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	D130071N09, D530030K12Rik, E5
Expression	Broad expression in lung adult (RPKM 39.8), adrenal adult (RPKM 12.1) and 15 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

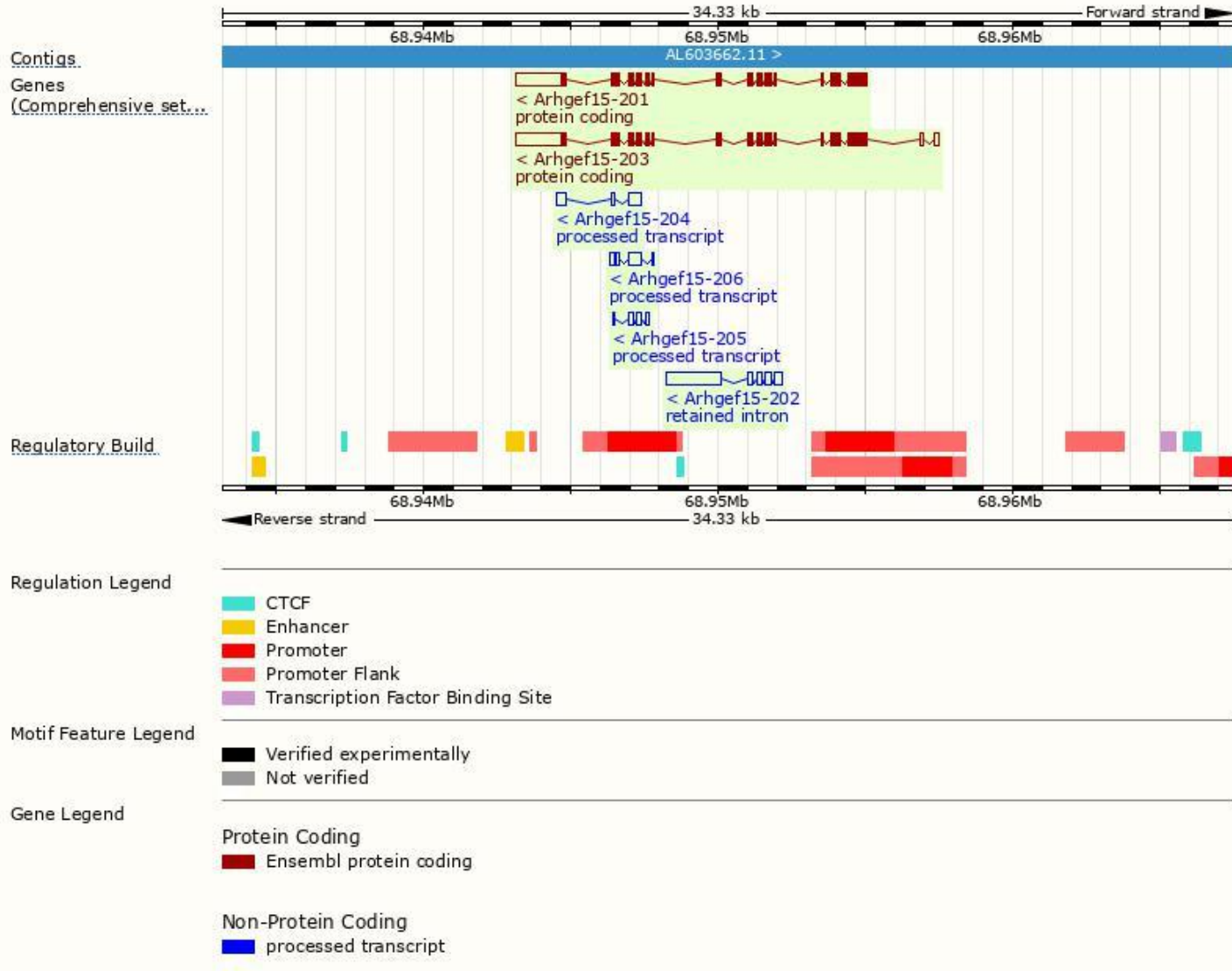
The gene has 6 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Arhgef15-203	ENSMUST00000108671.1	4372	849aa	Protein coding	CCDS24873	Q5FWH6	TSL:5 GENCODE basic APPRIS P1
Arhgef15-201	ENSMUST00000065040.12	4123	849aa	Protein coding	CCDS24873	Q5FWH6	TSL:5 GENCODE basic APPRIS P1
Arhgef15-204	ENSMUST00000131686.1	805	No protein	Processed transcript	-	-	TSL:2
Arhgef15-206	ENSMUST00000151520.1	726	No protein	Processed transcript	-	-	TSL:3
Arhgef15-205	ENSMUST00000141747.1	428	No protein	Processed transcript	-	-	TSL:5
Arhgef15-202	ENSMUST00000108670.1	2659	No protein	Retained intron	-	-	TSL:1

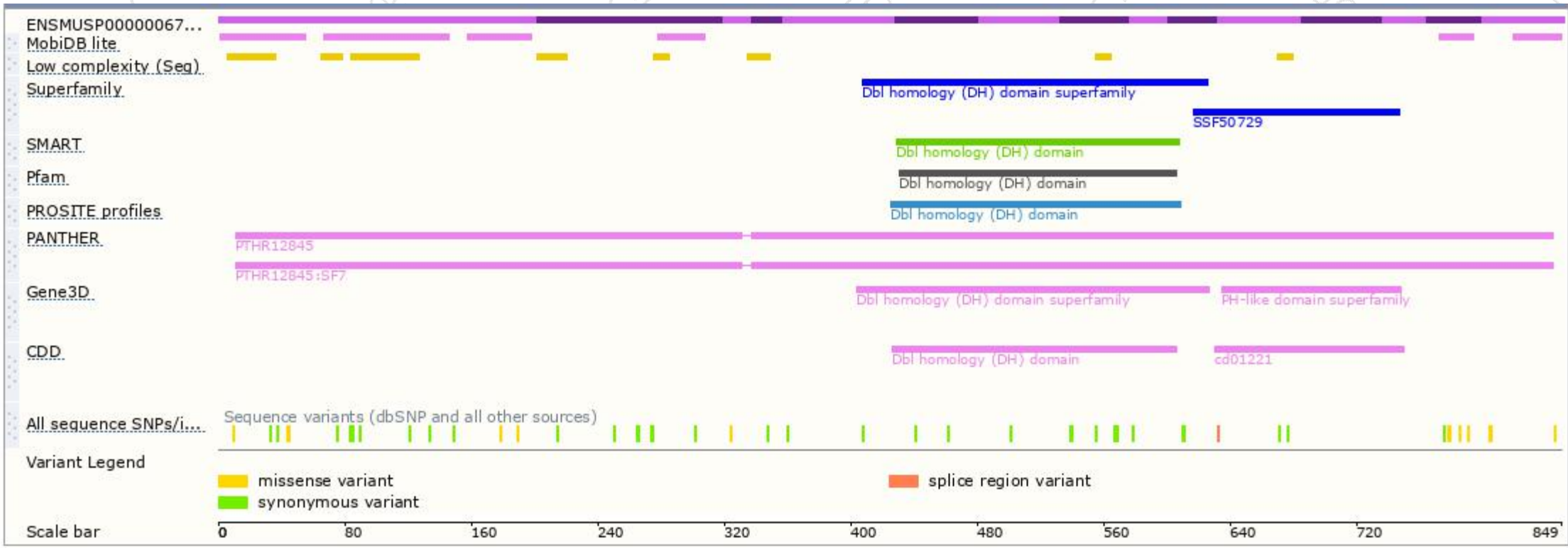
The strategy is based on the design of *Arhgef15-201* transcript,The transcription is shown below



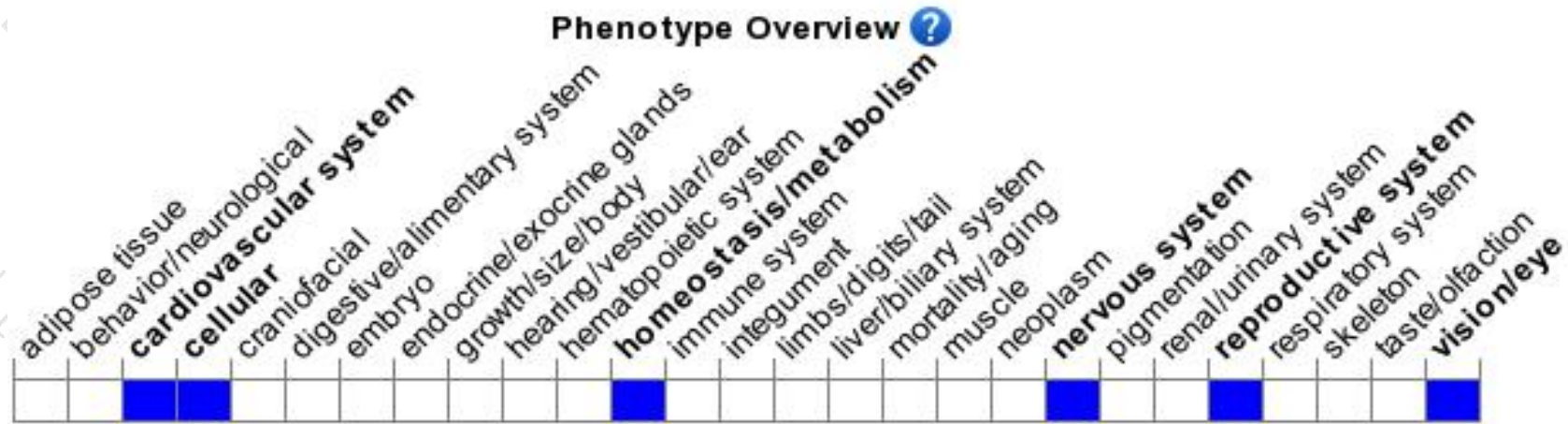
Genomic location distribution



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, Mice homozygous for a knock out allele exhibit increased excitatory synapse formation. Mice homozygous for a knock-out allele exhibit delayed radial growth, sparse vasculature and empty basement membrane sleeves in the retina.

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

Tel: 400-9660890

