

Arrb2 Cas9-CKO Strategy

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Project Overview

Project Name

Arrb2

Project type

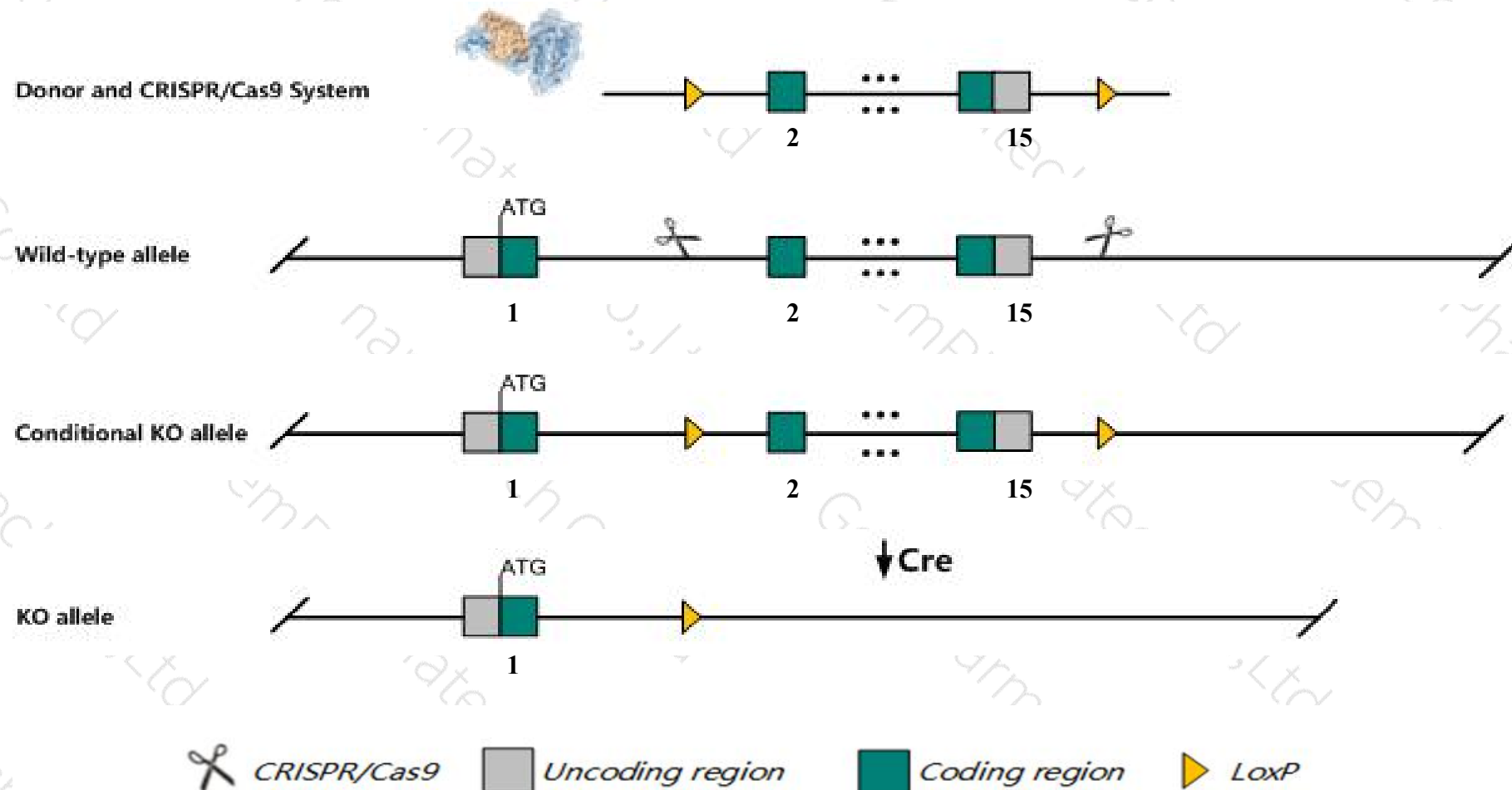
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Arrb2* gene. The schematic diagram is as follows:



- The *Arrb2* gene has 13 transcripts. According to the structure of *Arrb2* gene, exon2-exon15 of *Arrb2*-205(ENSMUST00000108568.9) transcript is recommended as the knockout region. The region contains 1243bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Arrb2* gene. The brief process is as follows: CRISPR/Cas9 system 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, mice homozygous for a knock-out allele exhibit enhanced morphine analgesia, an enhanced inflammatory response and reduced threshold to lethal endotoxin challenge, and impaired T and B lymphocyte chemotaxis.
- The KO region contains functional region of the *Mir7115* gene. Knockout the region may affect the function of *Mir7115* gene.
- The *Arrb2* 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information (NCBI)

Arrb2 arrestin, beta 2 [Mus musculus (house mouse)]

Gene ID: 216869, updated on 13-Mar-2020

Summary



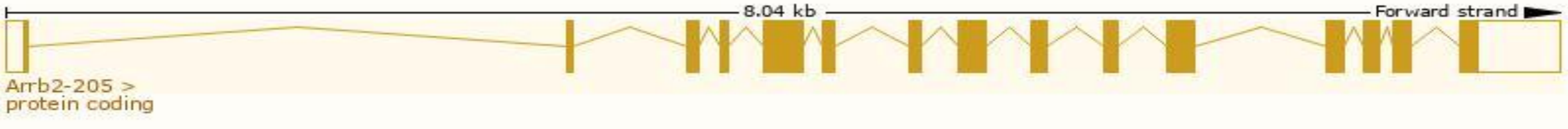
Official Symbol	Arrb2 provided by MGI
Official Full Name	arrestin, beta 2 provided by MGI
Primary source	MGI:MGI:99474
See related	Ensembl:ENSMUSG00000060216
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	AI326910, AW122872, Arr3
Expression	Ubiquitous expression in spleen adult (RPKM 25.2), thymus adult (RPKM 24.8) and 28 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

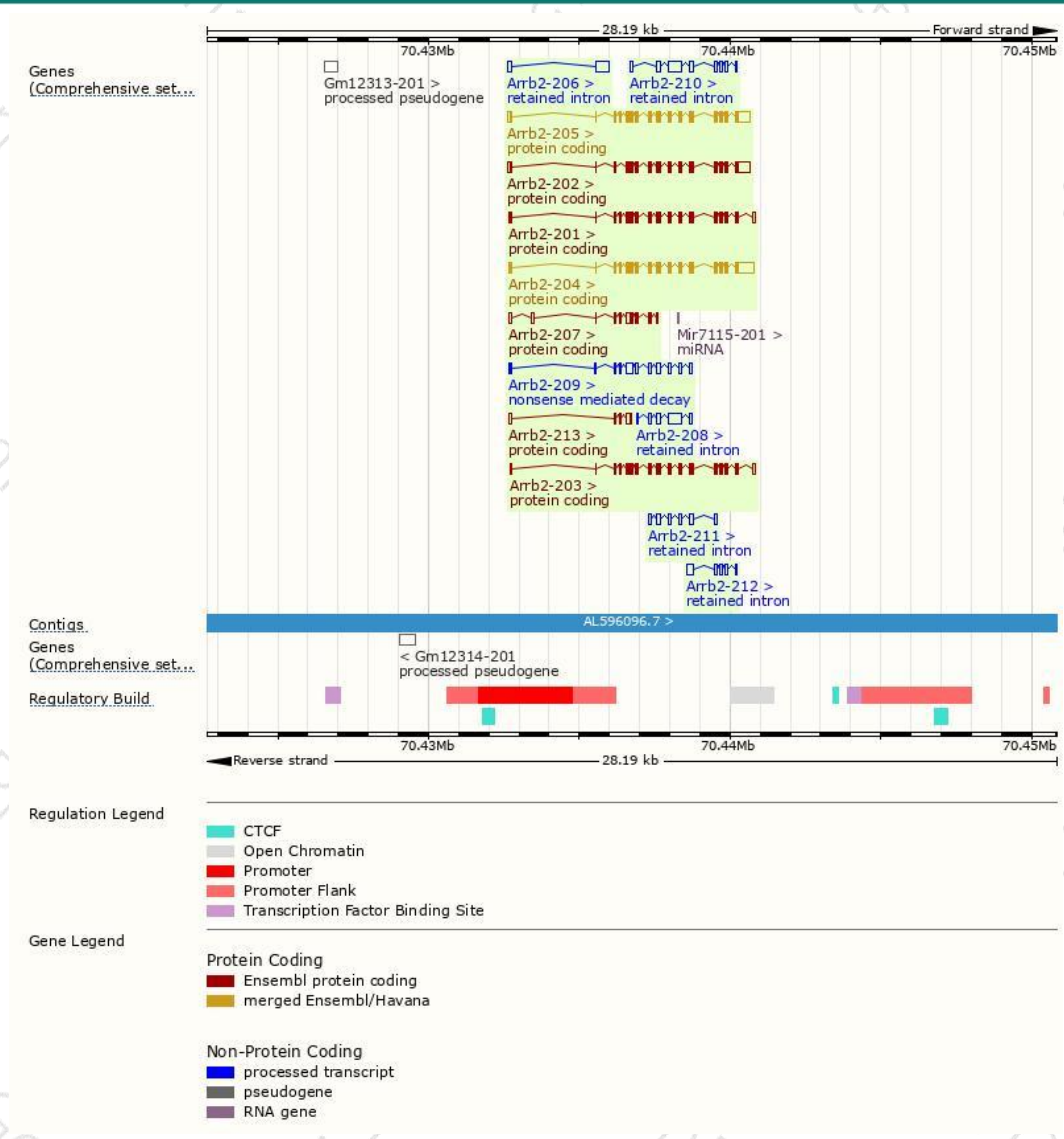
The gene has 13 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Arrb2-204	ENSMUST00000102564.10	1848	410aa	Protein coding	CCDS24946	A0A158SIT9 Q91YI4	TSL:1 GENCODE basic APPRIS P1
Arrb2-205	ENSMUST00000108568.9	1777	421aa	Protein coding	CCDS70226	J3JS97 Q91YI4	TSL:1 GENCODE basic
Arrb2-201	ENSMUST00000079056.8	1443	421aa	Protein coding	CCDS70226	J3JS97 Q91YI4	TSL:1 GENCODE basic
Arrb2-203	ENSMUST00000102563.1	1352	410aa	Protein coding	CCDS24946	A0A158SIT9 Q91YI4	TSL:1 GENCODE basic APPRIS P1
Arrb2-202	ENSMUST00000084954.12	1732	406aa	Protein coding	-	Q5F2D9	TSL:5 GENCODE basic
Arrb2-207	ENSMUST00000124943.7	662	83aa	Protein coding	-	J3QNV6	CDS 3' incomplete TSL:3
Arrb2-213	ENSMUST00000150076.7	370	27aa	Protein coding	-	J3QN53	CDS 3' incomplete TSL:3
Arrb2-209	ENSMUST00000128748.7	957	37aa	Nonsense mediated decay	-	G3UZ54	TSL:5
Arrb2-210	ENSMUST00000138006.7	1073	No protein	Retained intron	-	-	TSL:5
Arrb2-208	ENSMUST00000125441.7	756	No protein	Retained intron	-	-	TSL:3
Arrb2-211	ENSMUST00000143232.1	603	No protein	Retained intron	-	-	TSL:5
Arrb2-206	ENSMUST00000124112.1	574	No protein	Retained intron	-	-	TSL:5
Arrb2-212	ENSMUST00000144454.1	488	No protein	Retained intron	-	-	TSL:2

The strategy is based on the design of *Arrb2-205* transcript,the transcription is shown below:



Genomic location distribution



Protein domain

ENSMUSP00000104...

Low complexity (Seq)

Superfamily

SMART

Prints

Pfam

PROSITE patterns

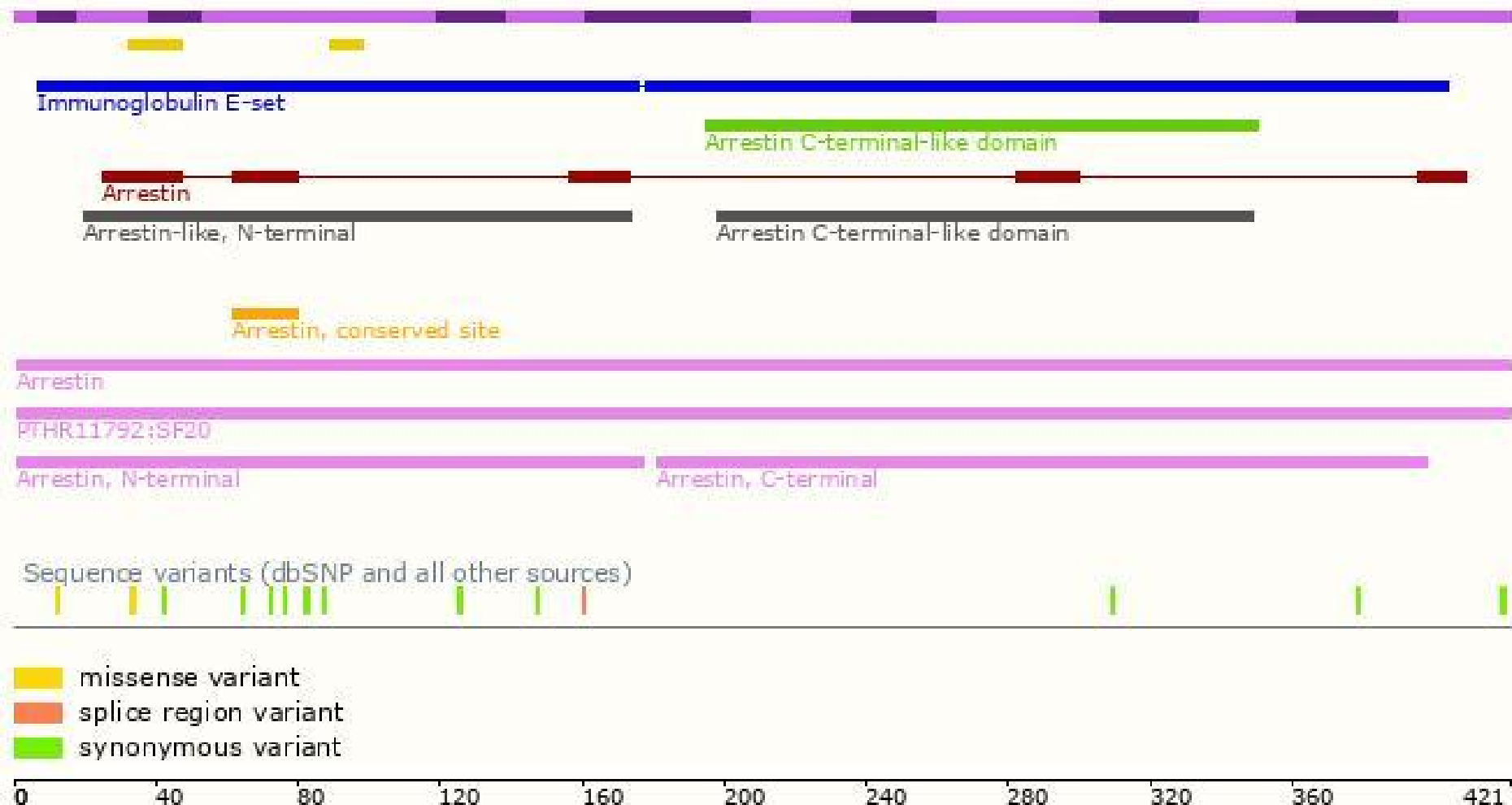
PANTHER

Gene3D

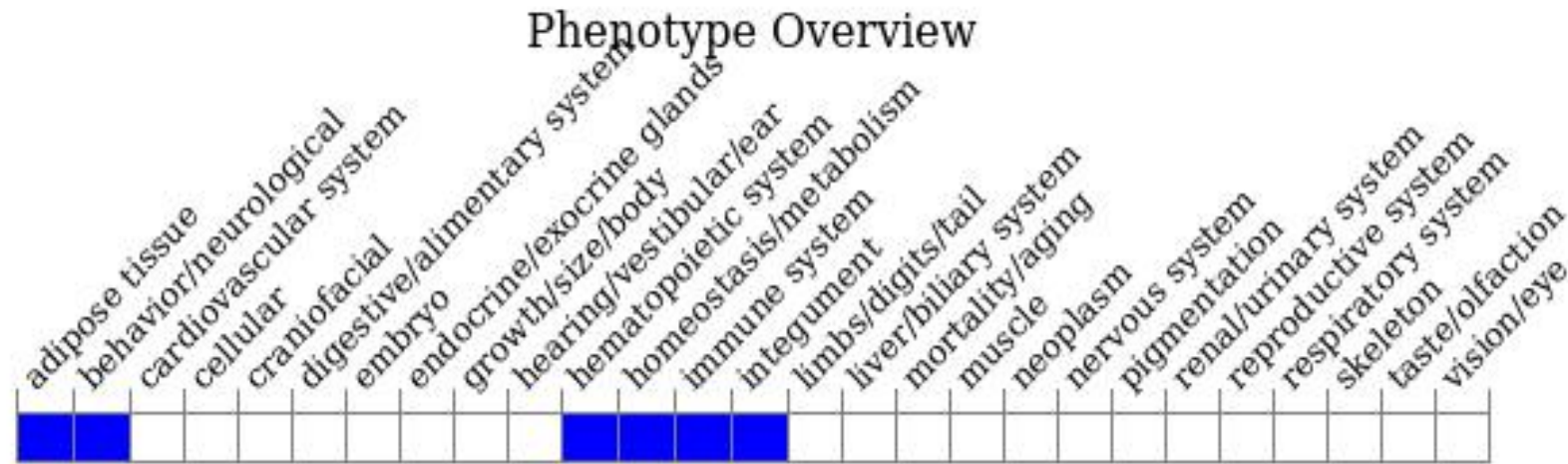
All sequence SNPs/i...

Variant Legend

Scale bar



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 enhanced morphine analgesia, an enhanced inflammatory response and reduced threshold to lethal endotoxin challenge, and impaired T and B lymphocyte chemotaxis.

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

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