

Atad1 Cas9-CKO Strategy

Designer:

Daohua Xu

Reviewer:

Huimin Su

Design Date:

2019-9-26

Project Overview

Project Name

Atad1

Project type

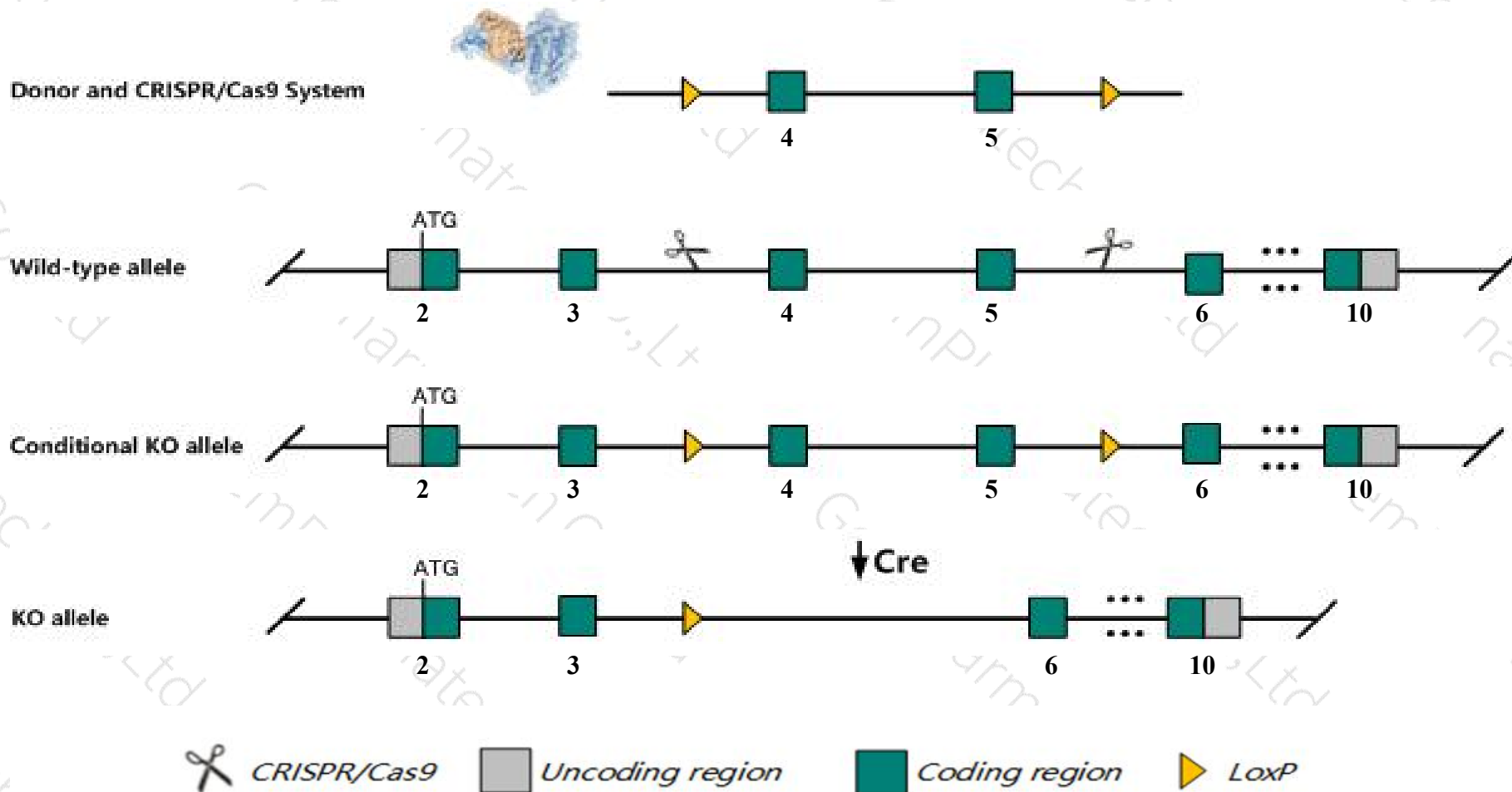
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Atad1* gene. The schematic diagram is as follows:



Technical routes

- The *Atad1* gene has 10 transcripts. According to the structure of *Atad1* gene, exon4-exon5 of *Atad1*-201 (ENSMUST00000070210.5) transcript is recommended as the knockout region. The region contains 322bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Atad1* 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 decreased body size, seizure, absent LTD, enhanced LTP, enhanced AMPA-mediated currents, and premature death.
- The *Atad1* 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information (NCBI)

Atad1 ATPase family, AAA domain containing 1 [Mus musculus (house mouse)]

Gene ID: 67979, updated on 19-Mar-2019

Summary



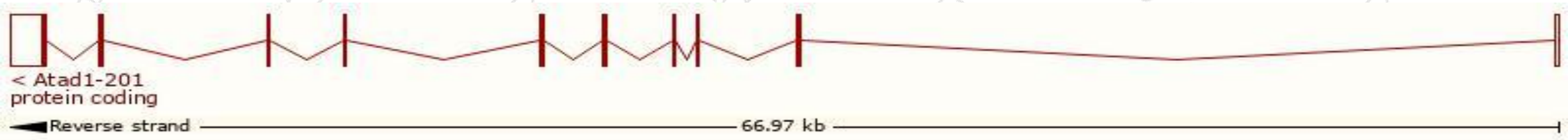
Official Symbol	Atad1 provided by MGI
Official Full Name	ATPase family, AAA domain containing 1 provided by MGI
Primary source	MGI:MGI:1915229
See related	Ensembl:ENSMUSG00000013662
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	4921525H23Rik, AW107648, Thorase
Expression	Broad expression in CNS E18 (RPKM 23.5), CNS E14 (RPKM 20.1) and 24 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

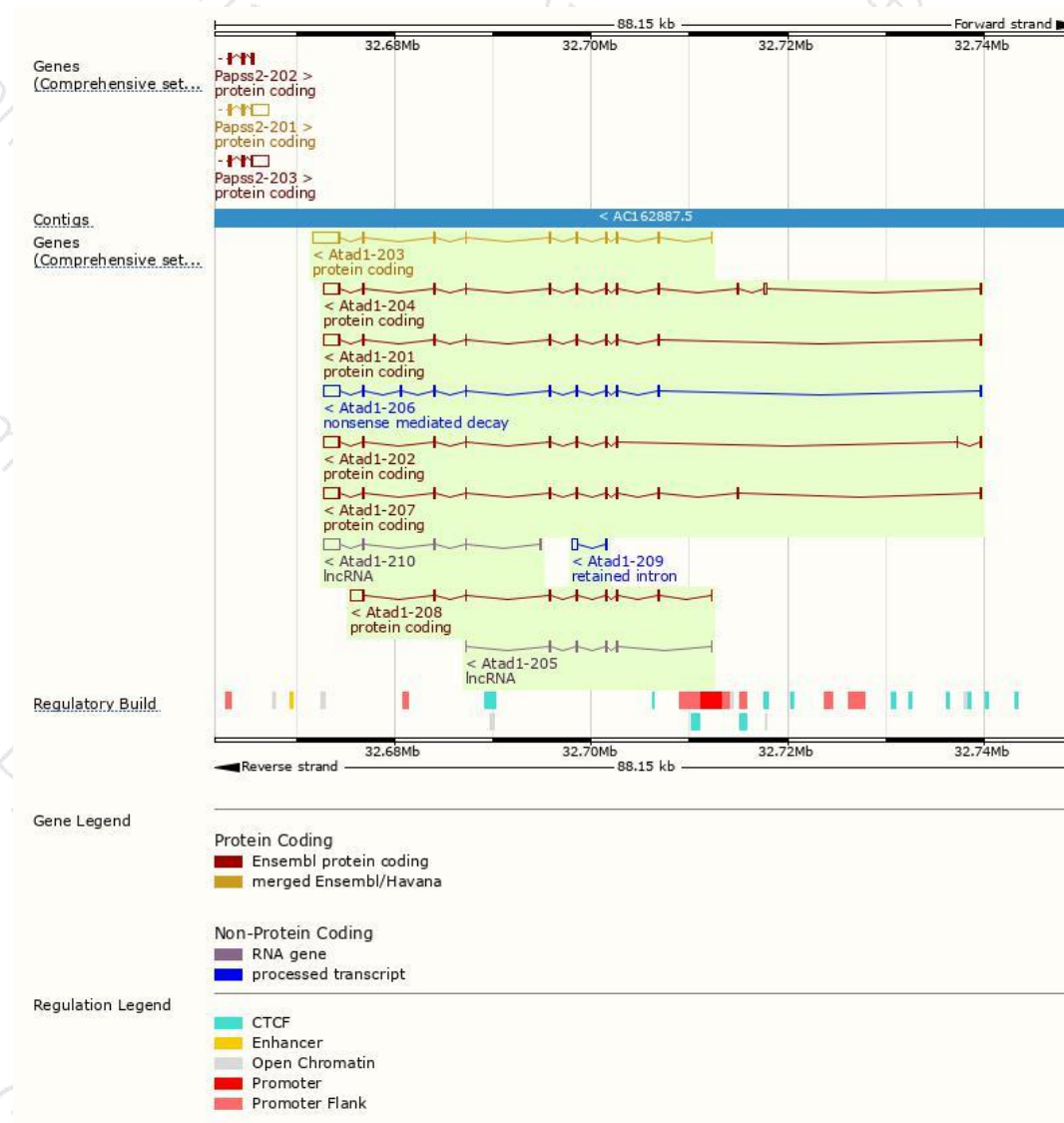
The gene has 10 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Atad1-203	ENSMUST00000235412.1	3771	361aa	Protein coding	CCDS29752	-	GENCODE basic APPRIS P1
Atad1-204	ENSMUST00000236011.1	2943	361aa	Protein coding	CCDS29752	-	GENCODE basic APPRIS P1
Atad1-207	ENSMUST00000236985.1	2722	361aa	Protein coding	CCDS29752	-	GENCODE basic APPRIS P1
Atad1-201	ENSMUST00000070210.5	2666	361aa	Protein coding	CCDS29752	Q9D5T0	TSL:1 GENCODE basic APPRIS P1
Atad1-202	ENSMUST00000235142.1	2535	276aa	Protein coding	-	-	GENCODE basic
Atad1-208	ENSMUST00000237752.1	2269	322aa	Protein coding	-	-	GENCODE basic
Atad1-206	ENSMUST00000236701.1	2736	303aa	Nonsense mediated decay	-	-	
Atad1-209	ENSMUST00000237933.1	611	No protein	Retained intron	-	-	
Atad1-210	ENSMUST00000238016.1	1905	No protein	lncRNA	-	-	
Atad1-205	ENSMUST00000236546.1	624	No protein	lncRNA	-	-	

The strategy is based on the design of *Atad1-201* transcript,The transcription is shown below



Genomic location distribution



Protein domain

ENSMUSP00000069...

Low complexity (Seq)

Superfamily

SMART

Pfam

PROSITE patterns

PANTHER

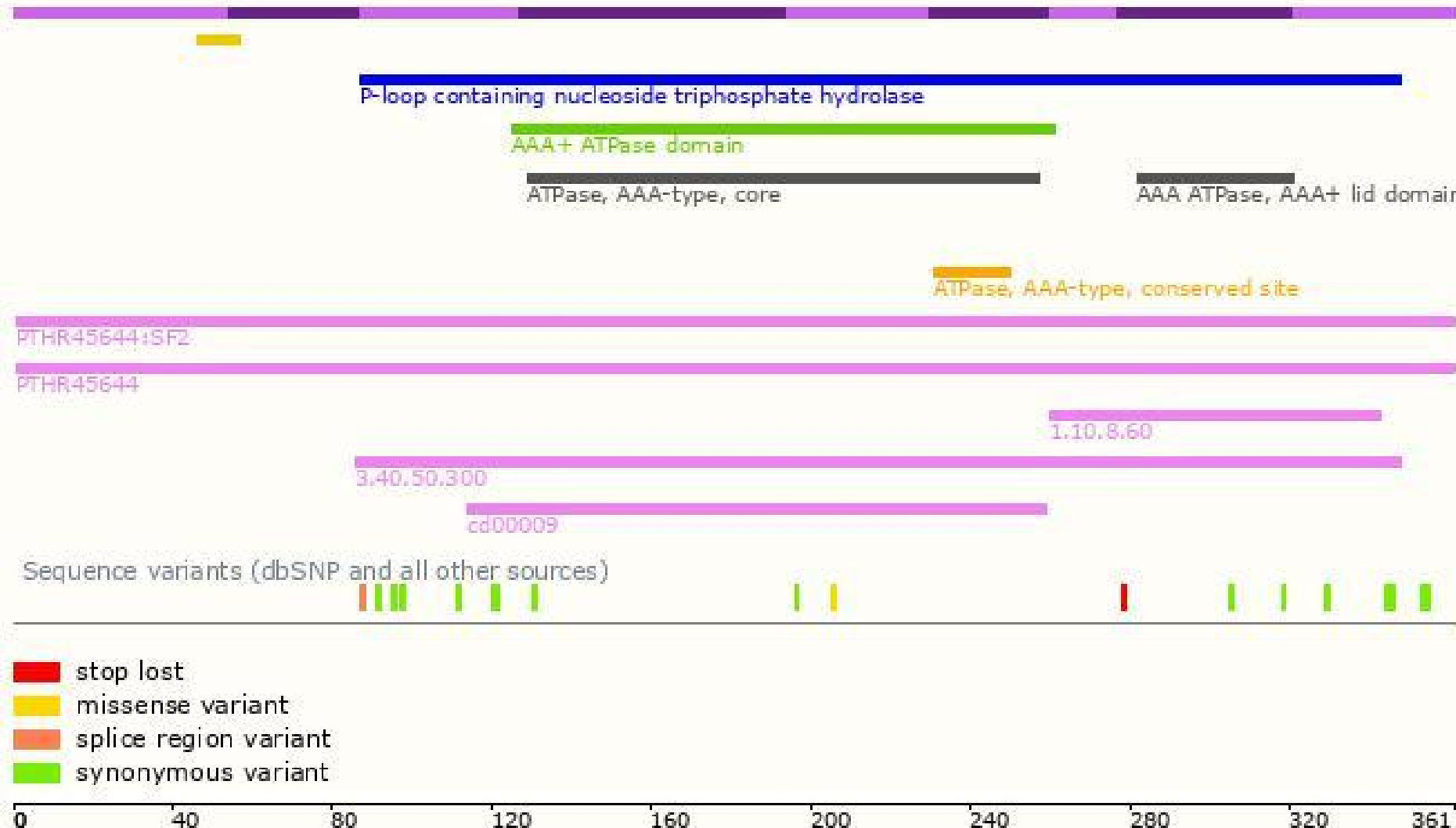
Gene3D

CDD

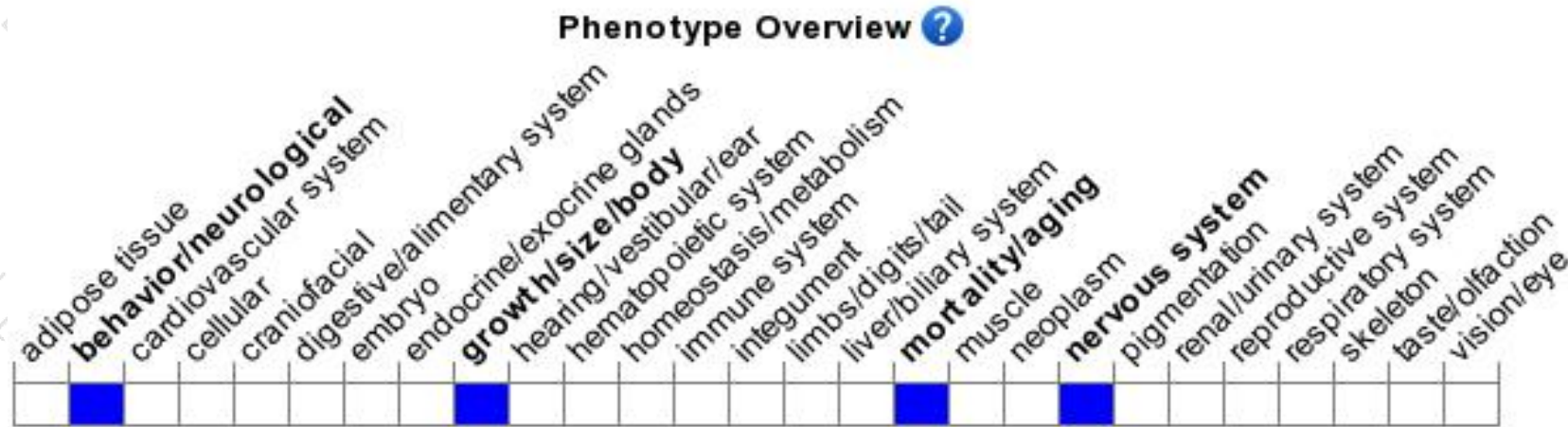
All sequence SNPs/i....

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 decreased body size, seizure, absent LTD, enhanced LTP, enhanced AMPA-mediated currents, and premature death.

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

Tel: 400-9660890

