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Katnal2 Cas9-KO Strategy

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Reviewer: Jia Yu

Design Date: 2022-12-14

Overview

Target Gene Name

- Katnal2

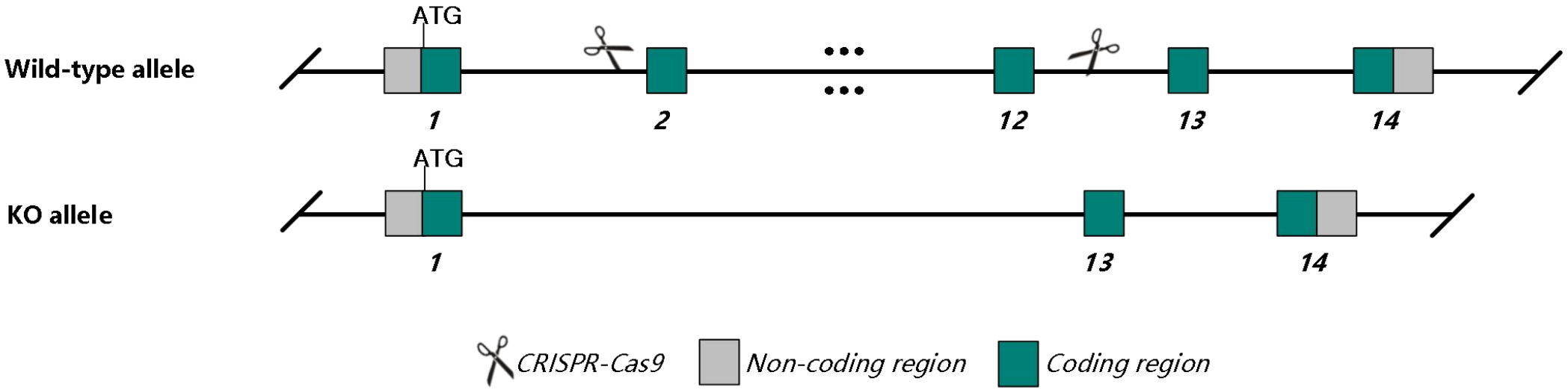
Project Type

- Cas9-KO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Katnal2* gene.

Technical Information

- The *Katnal2* gene has 11 transcripts. According to the structure of *Katnal2* gene, exon2-exon12 of *Katnal2*-201 (ENSMUST00000026486.13) transcript is recommended as the knockout region. The region contains 1052bp of coding sequences. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Katnal2* gene. The brief process is as follows: gRNAs were transcribed in vitro. Cas9 and gRNAs 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 on-target amplicon sequencing. A stable F1-generation mouse strain was obtained by mating positive F0-generation mice with C57BL/6JGpt mice and confirmation of the desired mutant allele was carried out by PCR and on-target amplicon sequencing.

Gene Information

Katnal2 katanin p60 subunit A-like 2 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 71206, updated on 26-Sep-2022

Summary

Official Symbol	Katnal2 provided by MGI
Official Full Name	katanin p60 subunit A-like 2 provided by MGI
Primary source	MGI:MGI:1924234
See related	Ensembl:ENSMUSG00000025420 AllianceGenome:MGI:1924234
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	3110023G01Rik; 4933439B08Rik
Summary	Predicted to enable several functions, including ATP binding activity; ATP hydrolysis activity; and microtubule-severing ATPase activity. Predicted to be located in cytoplasm; microtubule; and spindle pole. Orthologous to human KATNAL2 (katanin catalytic subunit A1 like 2). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Biased expression in testis adult (RPKM 8.9), CNS E11.5 (RPKM 2.5) and 5 other tissues See more
Orthologs	human all

NEW **Try the new Gene table**

Try the new Transcript table

Genomic context

Location: 18; 18 E3

See Katnal2 in Genome Data Viewer

Exon count: 18

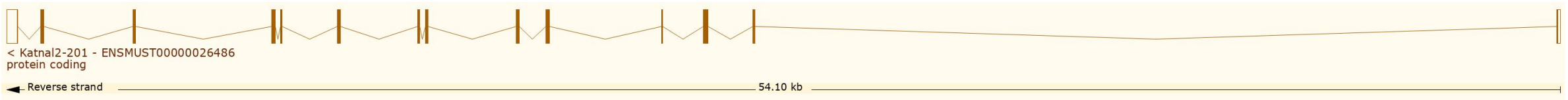
Source: https://www.ncbi.nlm.nih.gov/

Transcript Information

The gene has 11 transcripts, all transcripts are shown below:

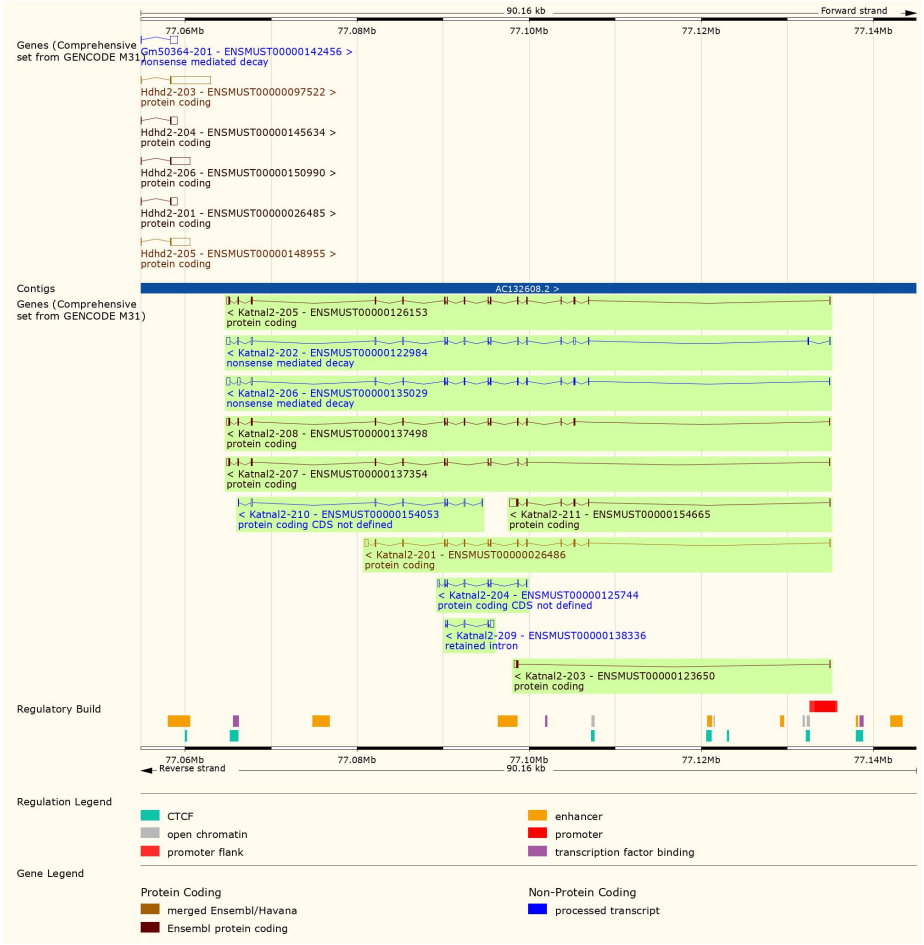
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000126153.8	Katnal2-205	1942	539aa	Protein coding		Q9D3R6-1	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
ENSMUST00000137498.8	Katnal2-208	1824	495aa	Protein coding		D3Z4J2	GENCODE basic TSL:5
ENSMUST00000026486.13	Katnal2-201	1674	409aa	Protein coding	CCDS37865	Q9D3R6-3	GENCODE basic TSL:1
ENSMUST00000154665.2	Katnal2-211	1515	217aa	Protein coding		Q9D3R6-2	GENCODE basic TSL:1
ENSMUST00000137354.8	Katnal2-207	1482	277aa	Protein coding		D3Z0U5	GENCODE basic TSL:5
ENSMUST00000123650.2	Katnal2-203	638	85aa	Protein coding		D3Z087	GENCODE basic TSL:1
ENSMUST00000122984.8	Katnal2-202	2039	39aa	Nonsense mediated decay		D6RI39	TSL:5
ENSMUST00000135029.8	Katnal2-206	2003	372aa	Nonsense mediated decay		D6RGM7	TSL:2
ENSMUST00000154053.8	Katnal2-210	792	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000125744.8	Katnal2-204	768	No protein	Protein coding CDS not defined		-	TSL:5
ENSMUST00000138336.2	Katnal2-209	668	No protein	Retained intron		-	TSL:2

The strategy is based on the design of *Katnal2*-201 transcript, the transcription is shown below:



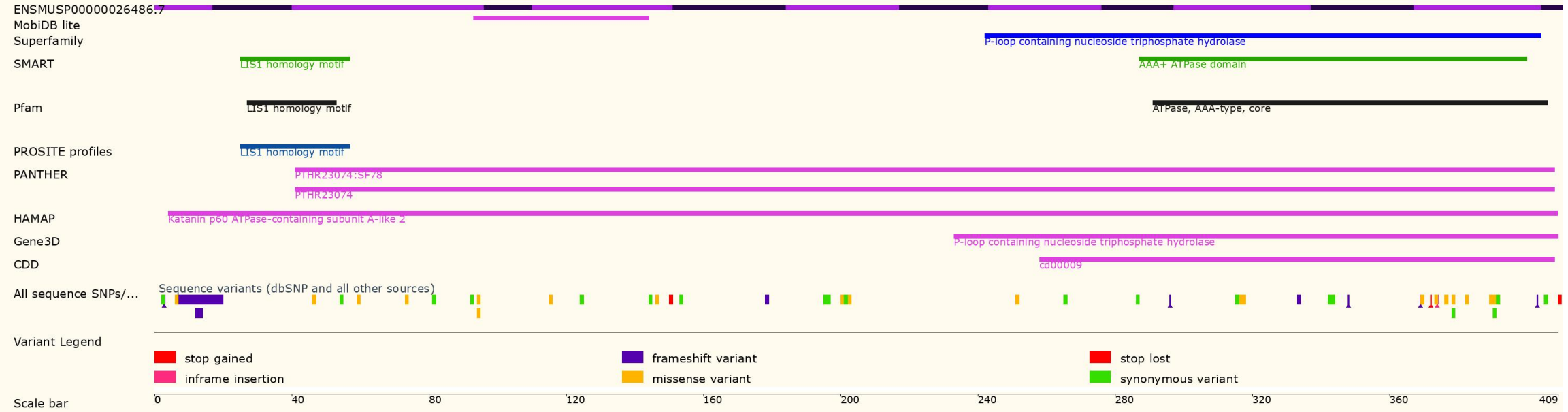
Source: https://www.ensembl.org

Genomic Information



Source: : https://www.ensembl.org

Protein Information



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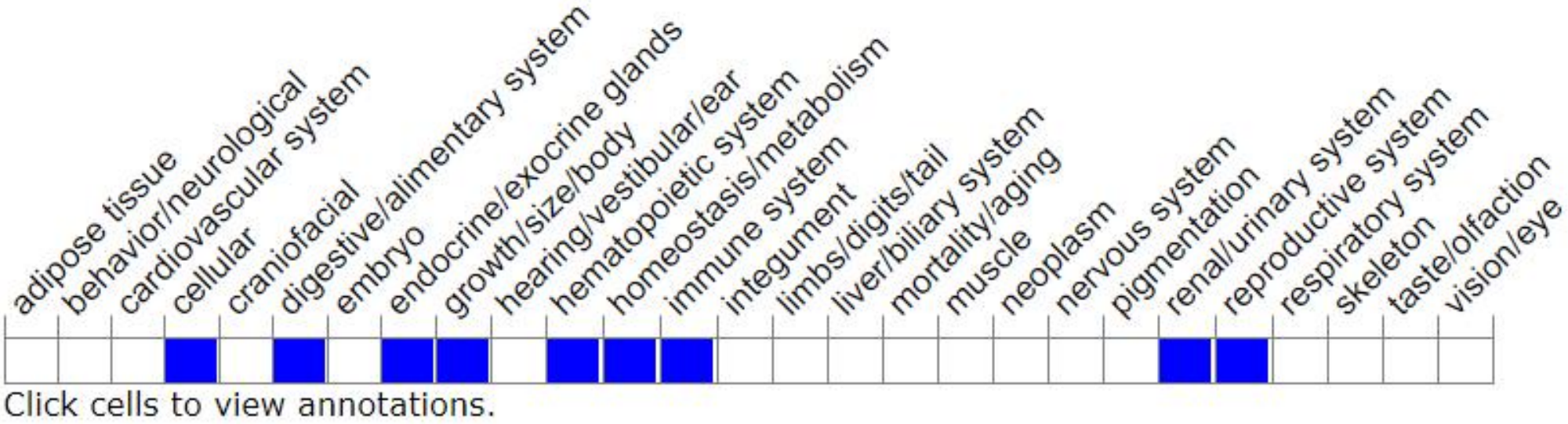
Source: : https://www.ensembl.org

Mouse Phenotype Information (MGI)



- Homozygous mutations in this gene result in male sterility associated with multiple anomalies in spermatogenesis, including defects in sperm tail growth, sperm head shaping, acrosome attachment, and sperm release. Males homozygous for a null allele are sterile and show oligoasthenoteratozoospermia.

Source: https://www.informatics.jax.org

Important Information

- According to the existing MGI data, homozygous null mutations in this gene result in male sterilityassociated with defects in several aspects of spermatogenesis, including abnormalities in the initiation of spermtail growth from the basal body, sperm head shaping, manchette movement and dissolution, acrosome attachmentto the nucleus, and sperm release via spermiation.
- According to breeding data, homozygotes with *Katnal2* gene knockout have lethal phenotype.
- *Katnal2* is located on Chr18. If the knockout mice are crossed with other mouse strains to obtain double homozygous mutant offspring, please avoid the situation that the second gene is on the same chromosome.
- This Strategy is designed based on genetic information in existing databases. Due to the complexity of biological processes, all risks of the mutation on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.