GemPharmatech™

Snd1 Cas9-CKO Strategy

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Reviewer: Xingkai Xiao

Design Date: 2023-11-23

Overview

Target Gene Name

- *Snd1*

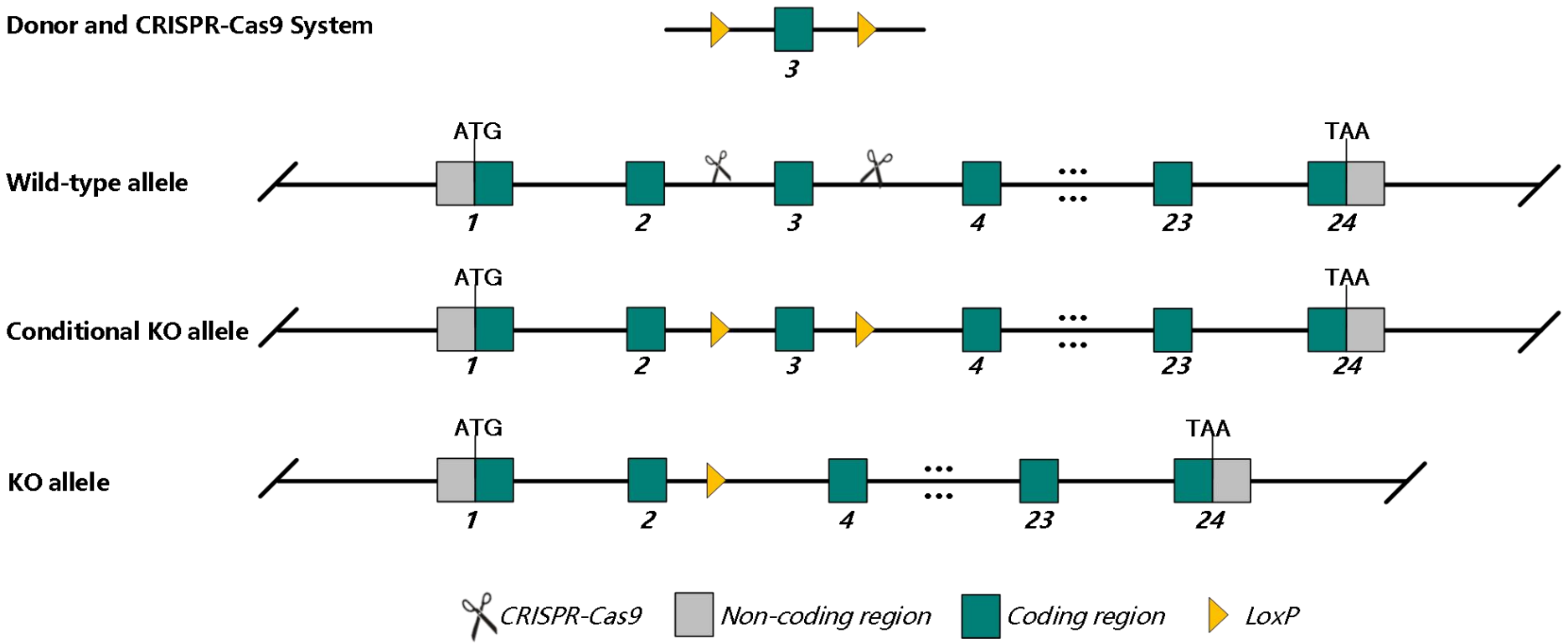
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Snd1* gene.

Technical Information

- The *Snd1* gene has 12 transcripts. According to the structure of *Snd1* gene, exon3 of *Snd1*-201 (ENSMUST00000001460.14) is recommended as the knockout region. The region contains 121 bp of coding sequence. Knocking out the region will result in disruption of gene function.
- In this project we use CRISPR-Cas9 technology to modify *Snd1* 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 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.
- 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.

Gene Information

Snd1 staphylococcal nuclease and tudor domain containing 1 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 56463, updated on 21-Nov-2023

Summary

Official Symbol	Snd1 provided by MGI
Official Full Name	staphylococcal nuclease and tudor domain containing 1 provided by MGI
Primary source	MGI:MGI:1929266
See related	Ensembl:ENSMUSG00000001424 AllianceGenome:MGI:1929266
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	Tudor-SN
Summary	Predicted to enable RISC complex binding activity; RNA binding activity; and endoribonuclease activity. Predicted to be involved in mRNA catabolic process; miRNA catabolic process; and regulation of cell cycle process. Located in dense body and nucleus. Is expressed in several structures, including central nervous system; early conceptus; limb mesenchyme; reproductive system; and sensory organ. Orthologous to human SND1 (staphylococcal nuclease and tudor domain containing 1). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Ubiquitous expression in adrenal adult (RPKM 40.7), ovary adult (RPKM 37.4) and 28 other tissues See more
Orthologs	human all

NEW **Try the new Gene table**

Try the new Transcript table

Genomic context

Location: 6 A3.3; 6 11.99 cM — See Snd1 in Genome Data Viewer

Exon count: 27

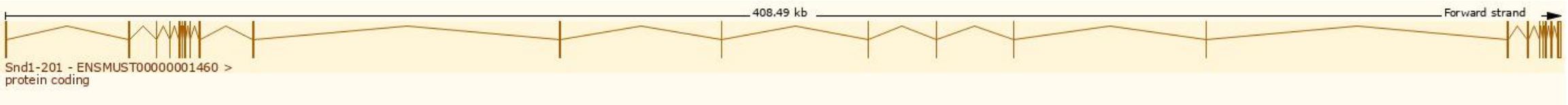
https://www.ncbi.nlm.nih.gov/gene/56463

Transcript Information

The gene has 12 transcripts, all transcripts are shown below:

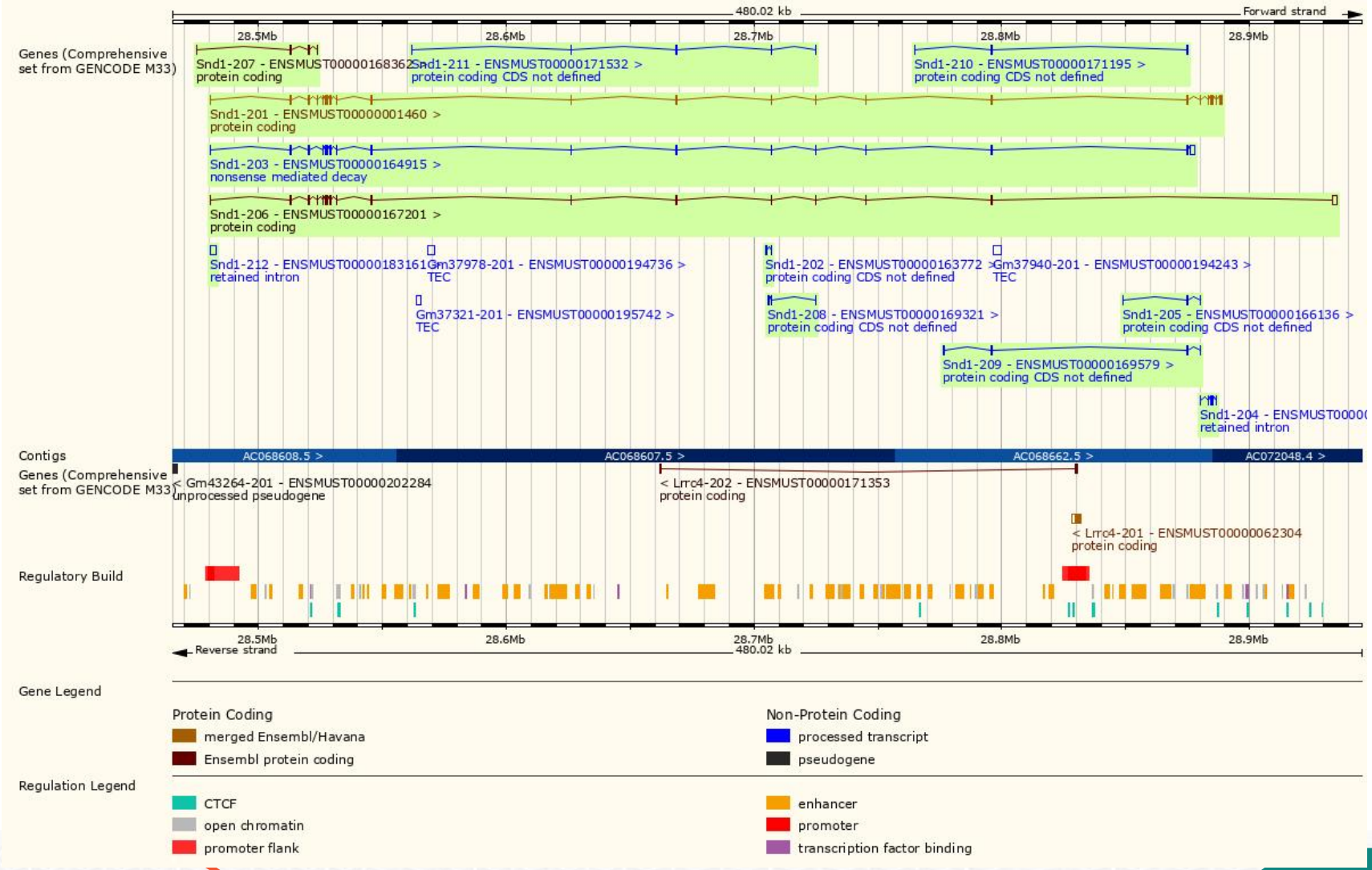
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000164915.8	Snd1-203	3688	262aa	Nonsense mediated decay		E9Q3E9	TSL:1
ENSMUST00000001460.14	Snd1-201	3482	910aa	Protein coding	CCDS19953	Q78PY7	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
ENSMUST00000167201.2	Snd1-206	3781	608aa	Protein coding		Q3TJ56	GENCODE basic TSL:1
ENSMUST00000168362.2	Snd1-207	351	10aa	Protein coding		A0A1C7ZN09	TSL:5 CDS 3' incomplete
ENSMUST00000183161.2	Snd1-212	2420	No protein	Retained intron		-	TSL:NA
ENSMUST00000165151.2	Snd1-204	718	No protein	Retained intron		-	TSL:2
ENSMUST00000171532.8	Snd1-211	420	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000169579.8	Snd1-209	392	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000166136.2	Snd1-205	366	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000171195.8	Snd1-210	337	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000169321.2	Snd1-208	320	No protein	Protein coding CDS not defined		-	TSL:2
ENSMUST00000163772.2	Snd1-202	110	No protein	Protein coding CDS not defined		-	TSL:1

The strategy is based on the design of *Snd1*-201 transcript, the transcription is shown below:



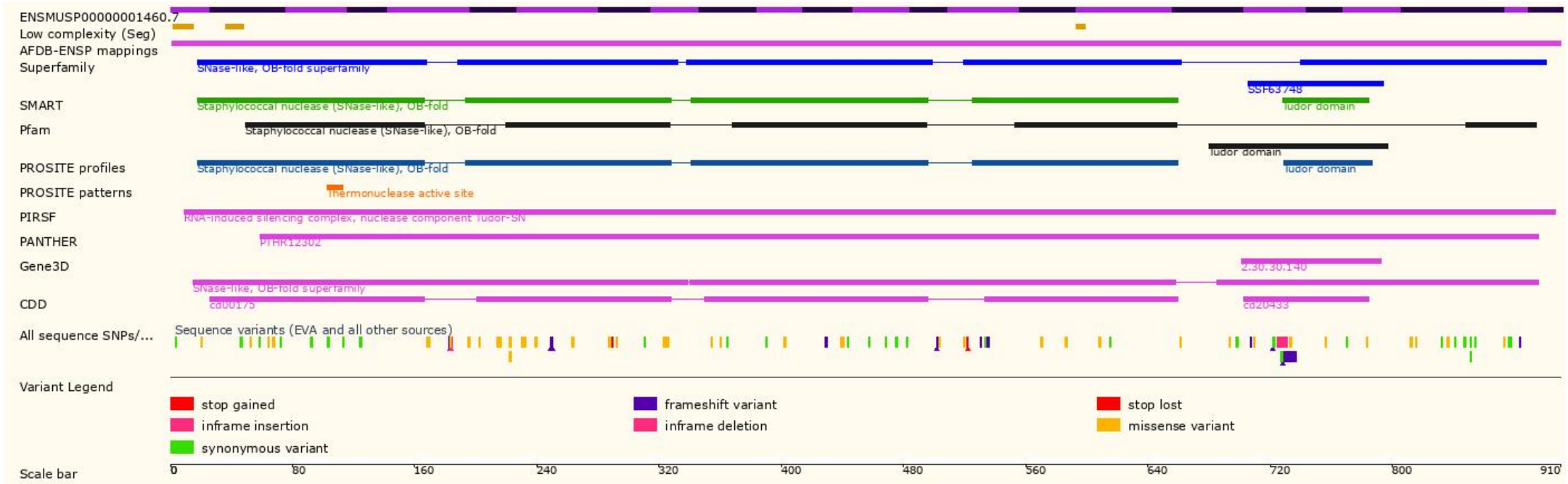
Source: http://asia.ensembl.org/

Genomic Information



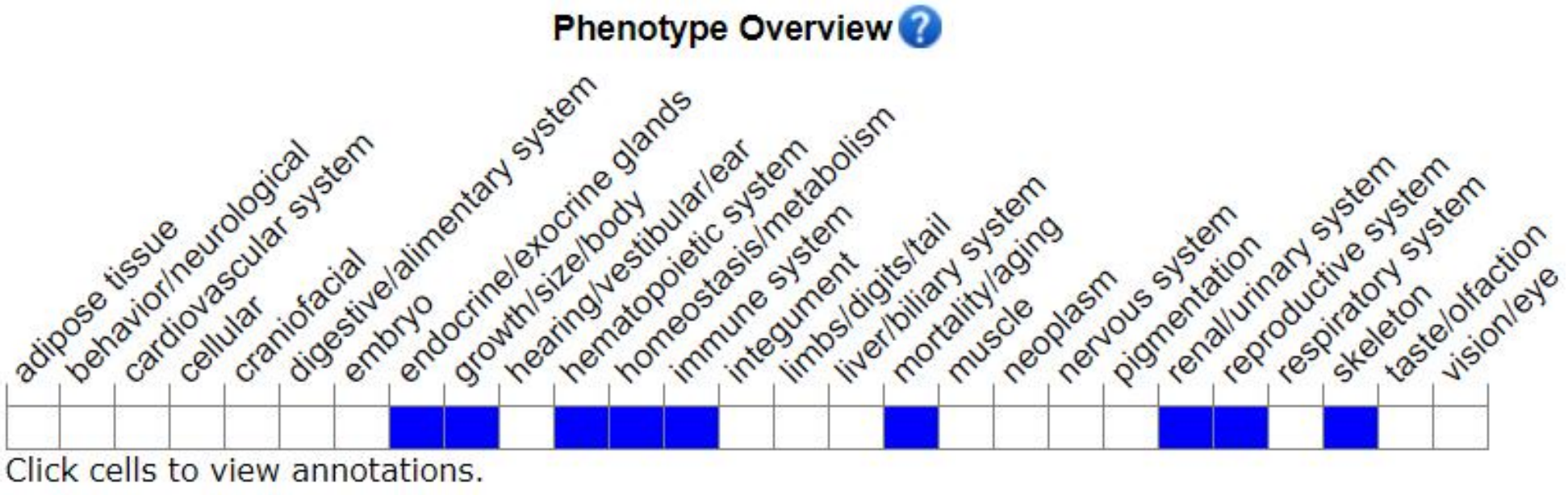
Source: http://asia.ensembl.org/

Protein Information



Source: https://www.ensembl.org

Mouse Phenotype Information (MGI)



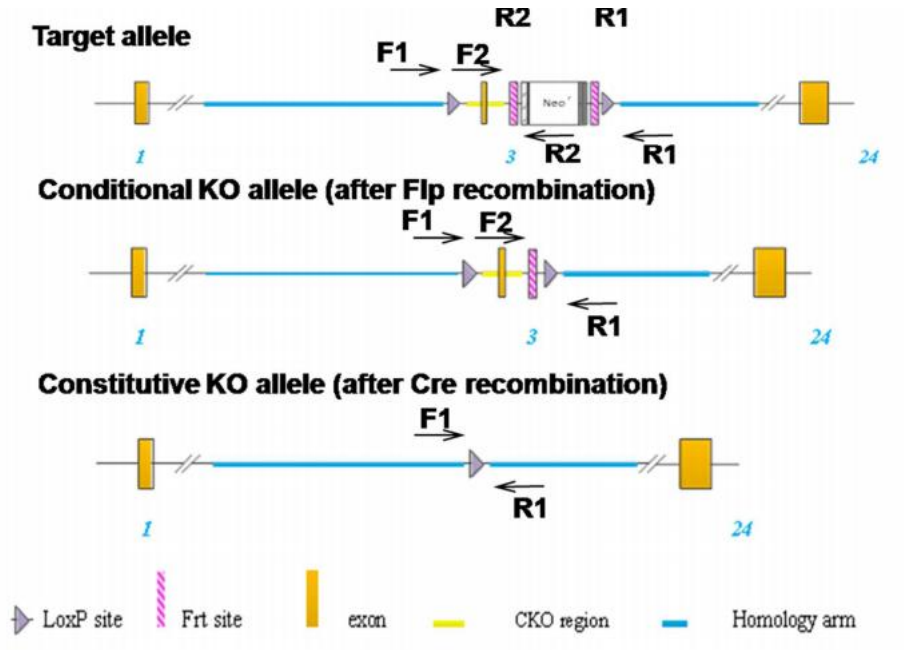
Mice homozygous for a null allele exhibit normal splenic T and B cell ratios and TH1 activity.

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

Important Information

- This stratergy may not affect *Snd1*-202, *Snd1*-204, *Snd1*-205, *Snd1*-208~*Snd1*-212 transcript.
- *Snd1* is located on Chr 6. 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 risk of loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

Reference



S1 Fig. Construction of constitutive SND1 KO mice.
The mSnd1 gene (GenBank accession number: NM_019776.2, Ensembl: ENSMUSG00000001424) is located on mouse chromosome 6. Twenty-four exons have been identified, with the ATG start codon in exon 1 and TAA stop codon in exon 24 (Transcript: Snd1-001 ENSMUST00000001460). Exon 3 was selected as conditional knockout region. Deletion of exon 3 should result in the loss of function of the mSnd1 gene. To engineer the targeting vector, homology arms and CKO (conditional KO) region were generated by PCR using BAC clone RP24-333L16 from the C57BL/6J library as template. In the targeting vector, the Neo cassette was flanked by Frt sites, and CKO region was flanked by LoxP sites. DTA will be used for negative selection. The conditional KO allele was obtained after Flp-mediated recombination and the constitutive KO allele was then obtained after Cre-mediated recombination.
https://doi.org/10.1371/journal.ppat.1009295.s001
(PDF)

[1] Wang X, Zhang C, Wang S, Rashu R, Thomas R, Yang J, Yang X. SND1 promotes Th1/17 immunity against chlamydial lung infection through enhancing dendritic cell function. PLoS Pathog. 2021 Feb 26;17(2):e1009295. doi: 10.1371/journal.ppat.1009295. PMID: 33635920; PMCID: PMC7946287.