GemPharmatech™

Slc39a7 Cas9-CKO Strategy

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Reviewer: Jia Yu

Design Date: 2023-11-23

Overview

Target Gene Name

- Slc39a7

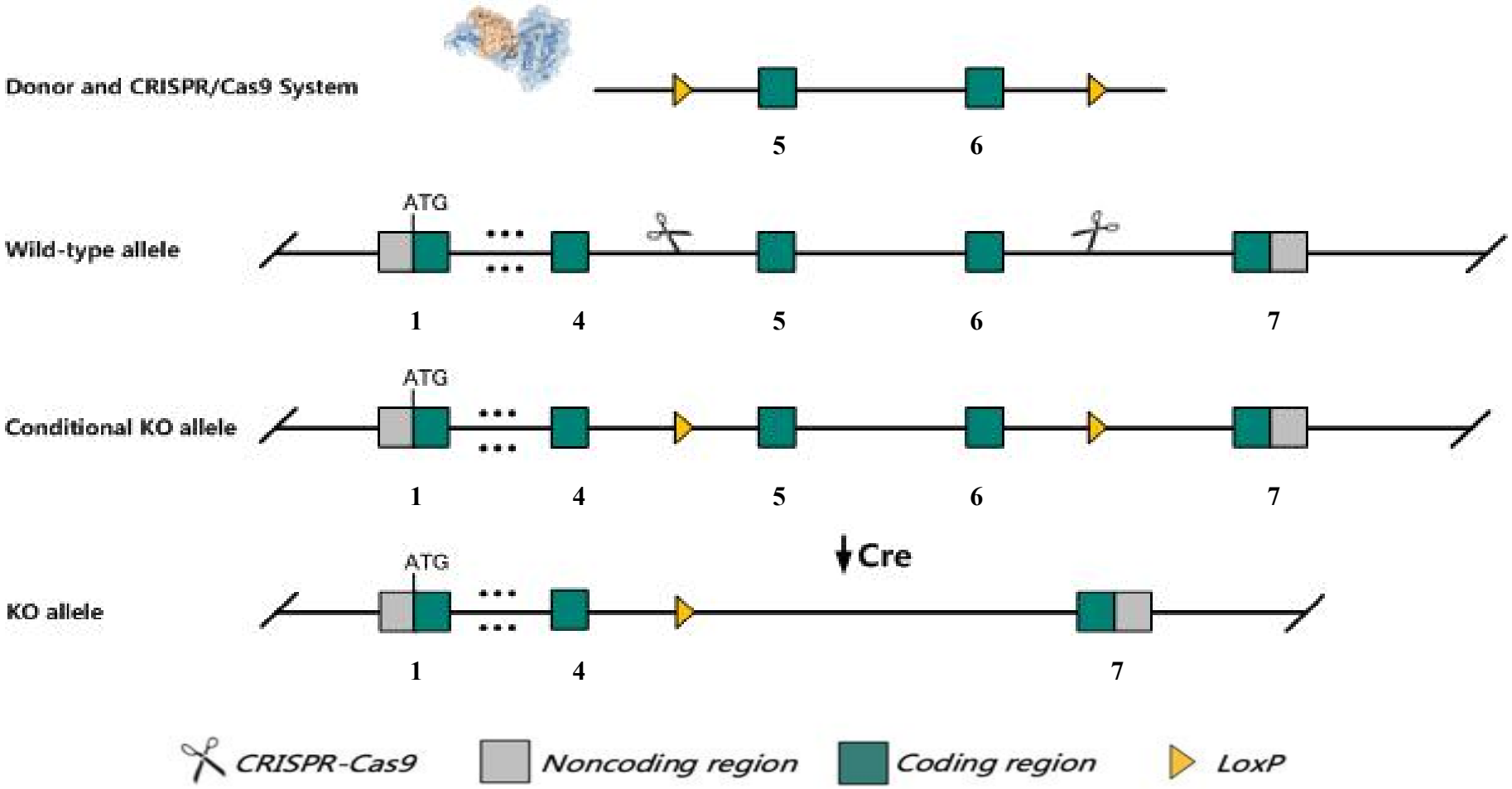
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Slc39a7* gene.

Technical Information

- The *Slc39a7* gene has 6 transcripts. According to the structure of *Slc39a7* gene, exon 5-exon 6 of *Slc39a7*-201 (ENSMUST00000025186.16) transcript is recommended as the knockout region. The region contains 335 bp coding sequence. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Slc39a7* 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

Slc39a7 solute carrier family 39 (zinc transporter), member 7 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 14977, updated on 7-Sep-2023

Summary

Official Symbol	Slc39a7 provided by MGI
Official Full Name	solute carrier family 39 (zinc transporter), member 7 provided by MGI
Primary source	MGI:MGI:95909
See related	Ensembl:ENSMUSG00000024327 AllianceGenome:MGI:95909
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	Ke4; Ke-4; Zip7; Ring5; H-2Ke4; H2-Ke4
Summary	Predicted to enable zinc ion transmembrane transporter activity. Predicted to be involved in cellular zinc ion homeostasis and zinc ion transmembrane transport. Predicted to act upstream of or within zinc ion transport. Predicted to be located in endoplasmic reticulum and nucleoplasm. Is expressed in several structures, including adipose tissue; alimentary system; genitourinary system; immune system; and nervous system. Orthologous to human SLC39A7 (solute carrier family 39 member 7). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Ubiquitous expression in ovary adult (RPKM 99.5), adrenal adult (RPKM 66.7) and 28 other tissues See more
Orthologs	human all

NEW **Try the new Gene table**
Try the new Transcript table

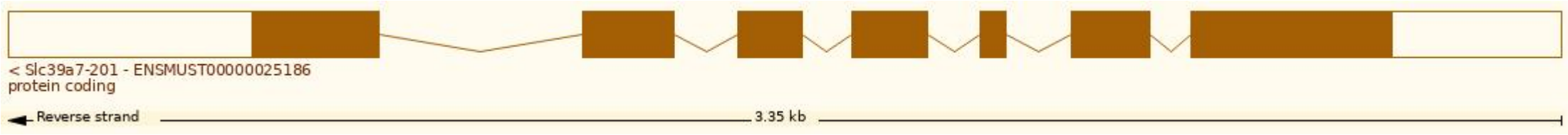
Source: https://www.ncbi.nlm.nih.gov/

Transcript Information

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

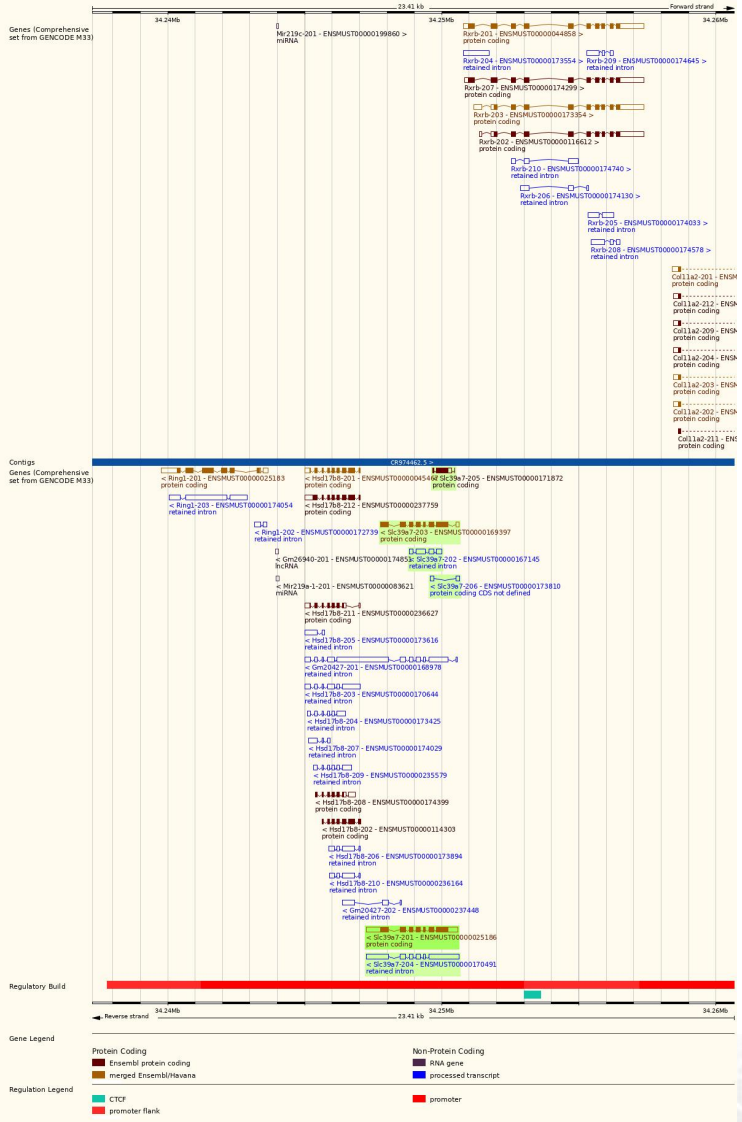
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000025186.16	Slc39a7-201	2320	476aa	Protein coding	CCDS37576	A0A068BIT0 Q31125	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
ENSMUST00000169397.9	Slc39a7-203	1550	476aa	Protein coding	CCDS37576	A0A068BIT0 Q31125	GENCODE basic APPRIS P1 TSL:5
ENSMUST00000171872.3	Slc39a7-205	620	161aa	Protein coding		E9PV10	TSL:5 CDS 3' incomplete
ENSMUST00000170491.8	Slc39a7-204	2433	No protein	Retained intron		-	TSL:1
ENSMUST00000167145.2	Slc39a7-202	844	No protein	Retained intron		-	TSL:5
ENSMUST00000173810.2	Slc39a7-206	277	No protein	Protein coding CDS not defined		-	TSL:5

The strategy is based on the design of *Slc39a7*-201 transcript, the transcription is shown below:



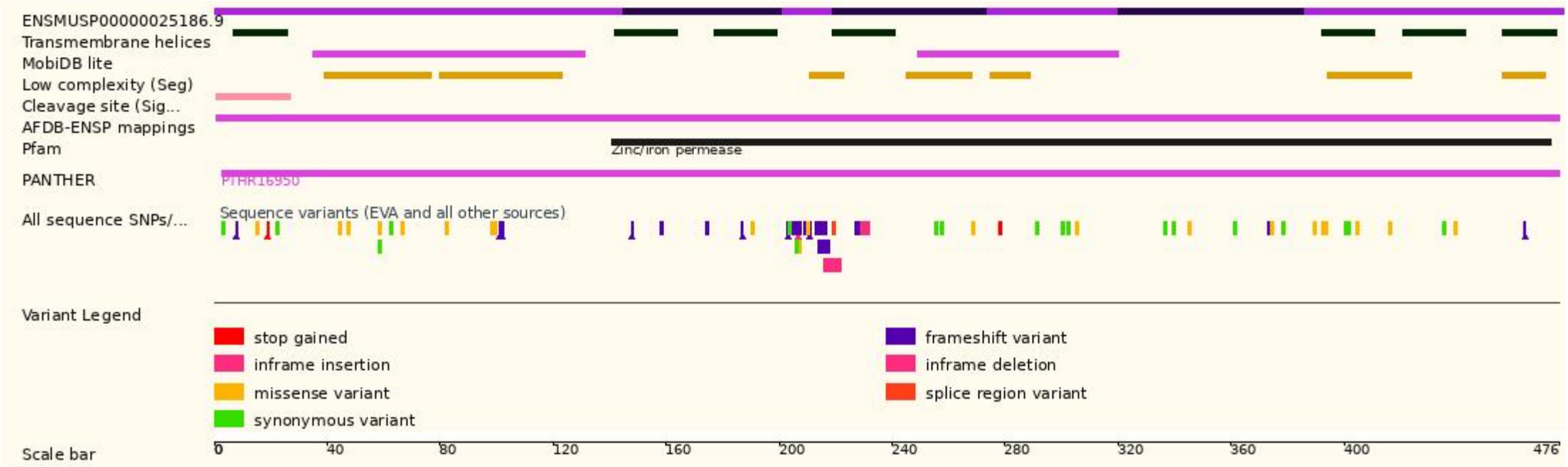
Source: https://www.ensembl.org

Genomic Information



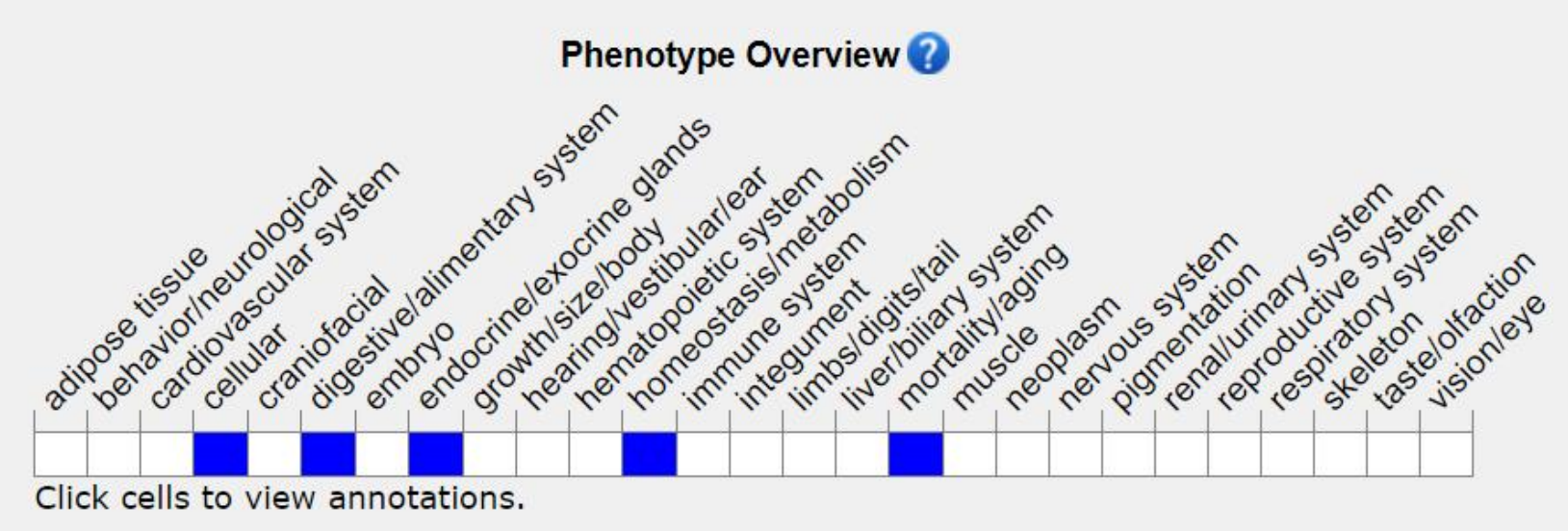
Source: : https://www.ensembl.org

Protein Information



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

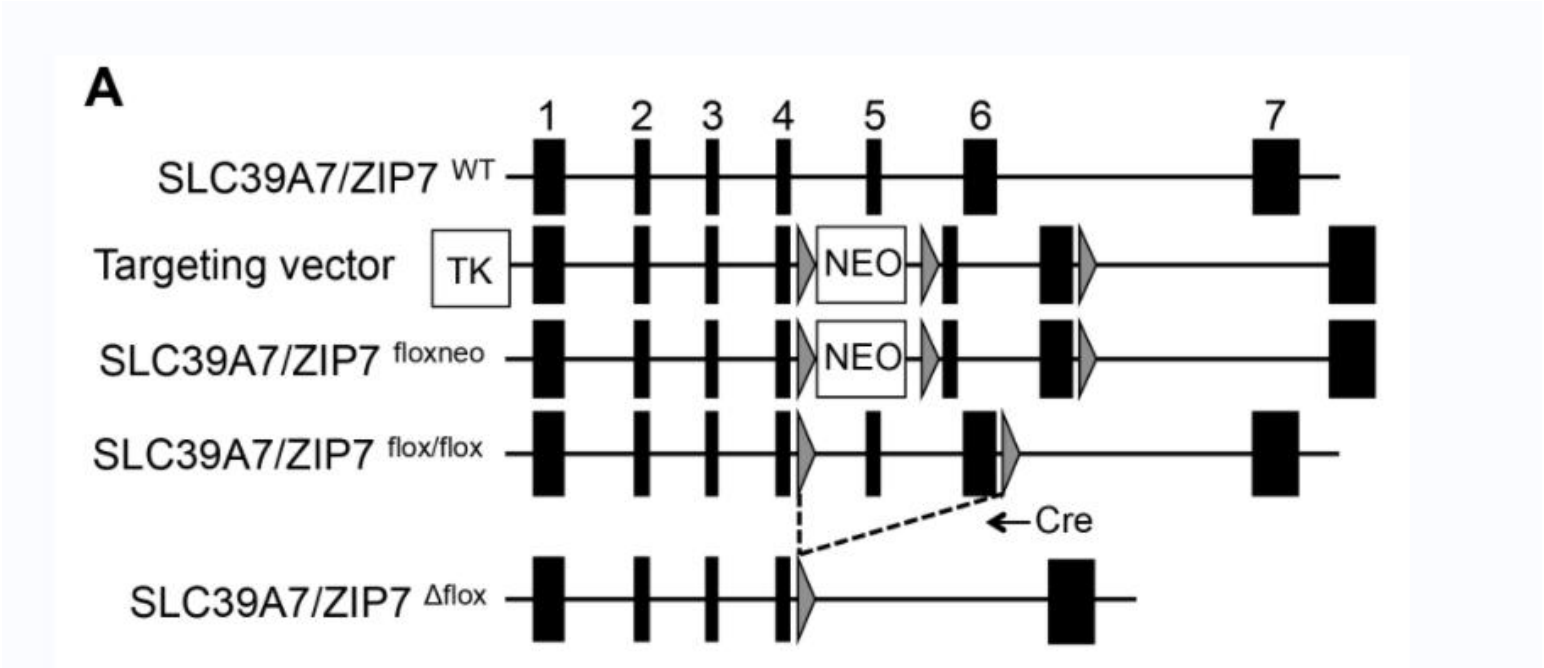
Mouse Phenotype Information (MGI)



- Mice homozygous for a conditional allele activated in intestinal epithelial cells exhibit premature death, loss of epithelial integrity, reduced enterocyte proliferation and increased enterocyte apoptosis.

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

References



[1] Ohashi W , Kimura S , Iwanaga T ,et al.Zinc Transporter SLC39A7/ZIP7 Promotes Intestinal Epithelial Self-Renewal by Resolving ER Stress[J].PLoS Genetics, 2016, 12(10):e1006349.DOI:10.1371/journal.pgen.1006349.

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

Important Information

- According to the existing MGI data， mice homozygous for a conditional allele activated in intestinal epithelial cells exhibit premature death, loss of epithelial integrity, reduced enterocyte proliferation and increased enterocyte apoptosis.
- The intron 4-5 and intron 6-7 are only 106 bp and 441 bp， loxp insertion may affect mRNA splicing.
- The KO region contains the functional region of the *Gm20427* gene.Knockout the region may affect its function of *Gm20427* gene.
- The KO region is approximately 1.1 kb away from the 5-terminal of the side gene *Hsd17b8*, knockout the region may affect its function of *Hsd17b8* gene.
- The KO region is approximately 1.7 kb away from the 5-terminal of the side gene *Rxrb*, knockout the region may affect its function of *Rxrb* gene.
- This strategy has no effect on the transcript Slc39a7-205.
- *Slc39a7* is located on Chr17. 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.