GemPharmatech™

Unc5a Cas9-CKO Strategy

Designer: Xiangli Bian

Reviewer: Jing Chen

Design Date: 2024-4-1

Overview

Target Gene Name

- *Unc5a*

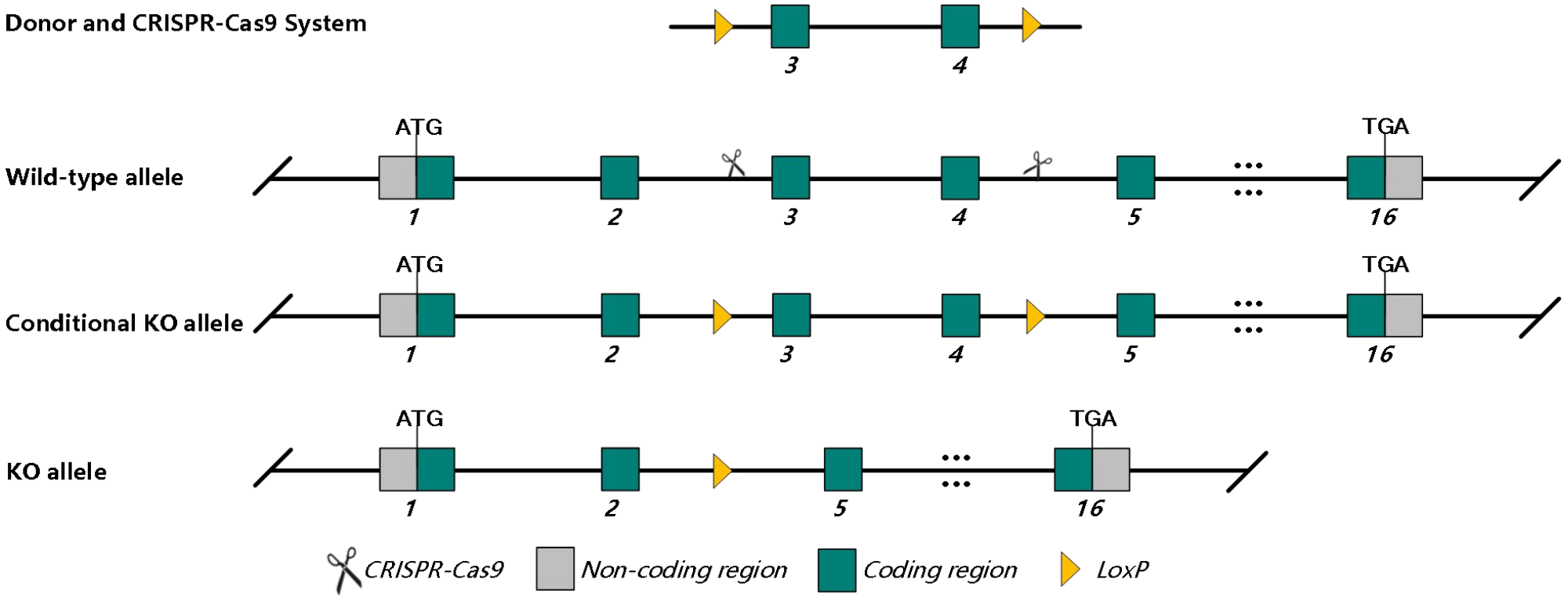
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Unc5a* gene.

Technical Information

- The *Unc5a* gene has 5 transcripts. According to the structure of *Unc5a* gene, exon 3-4 of *Unc5a*-201 (ENSMUST00000026994.14) is recommended as the knockout region. The region contains 187 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 *Unc5a* 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

Unc5a unc-5 netrin receptor A [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 107448, updated on 5-Mar-2024

Summary

Official Symbol	Unc5a provided by MGI
Official Full Name	unc-5 netrin receptor A provided by MGI
Primary source	MGI:MGI:894682
See related	Ensembl:ENSMUSG00000025876 AllianceGenome:MGI:894682
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	Unc5h1; mKIAA1976
Summary	Predicted to enable netrin receptor activity. Acts upstream of or within anterior/posterior axon guidance. Predicted to be located in neuron projection membrane and neuronal cell body membrane. Predicted to be intrinsic component of plasma membrane. Is expressed in several structures, including brain; sensory organ; skeleton; ventral grey horn; and vibrissa follicle. Orthologous to human UNC5A (unc-5 netrin receptor A). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Broad expression in mammary gland adult (RPKM 18.5), adrenal adult (RPKM 16.6) and 22 other tissues See more
Orthologs	human all

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

Genomic context

Location: 13 B1; 13 29.8 cM — See Unc5a in Genome Data Viewer

Exon count: 16

https://www.ncbi.nlm.nih.gov/gene/107448

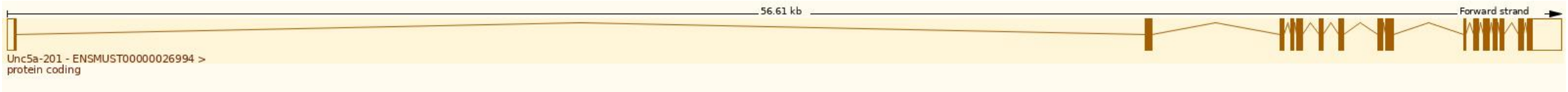
Transcript Information

The gene has 5 transcripts, the transcripts are shown below:

Show/hide columns (1 hidden) Filter

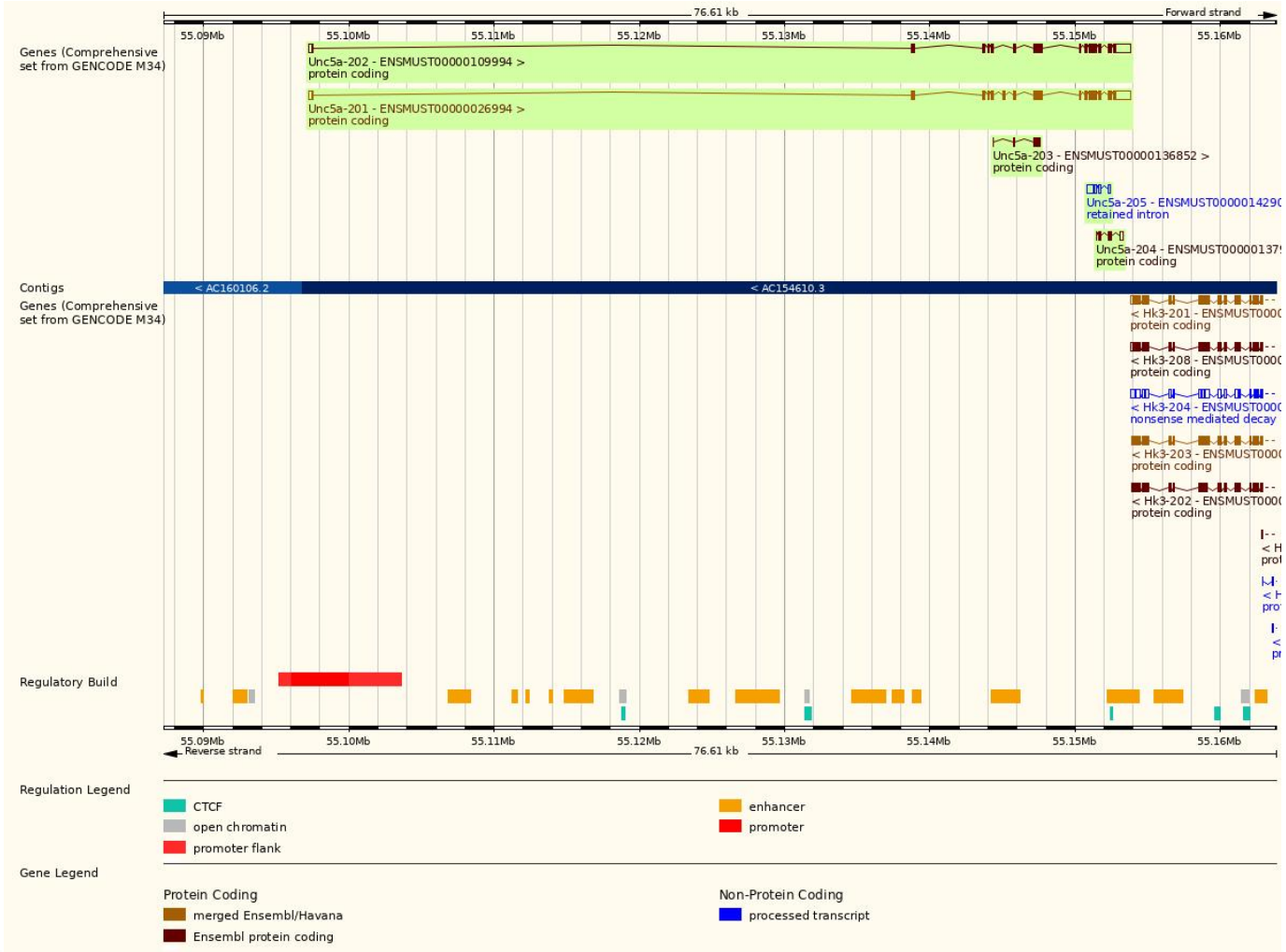
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match ▲	Flags
ENSMUST00000137967.2	Unc5a-204	593	128aa	Protein coding		F6TGW0	TSL:2 CDS 5' incomplete
ENSMUST00000136852.2	Unc5a-203	501	167aa	Protein coding		F7CVI0	TSL:3 CDS 5' and 3' incomplete
ENSMUST00000026994.14	Unc5a-201	3995	898aa	Protein coding	CCDS26537	Q8K1S4	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
ENSMUST00000109994.9	Unc5a-202	3827	842aa	Protein coding	CCDS79188	Q8K1S4-2	GENCODE basic TSL:1
ENSMUST00000142906.2	Unc5a-205	898	No protein	Retained intron		-	TSL:3

The strategy is based on the design of *Unc5a*-201 transcript, the transcription is shown below:



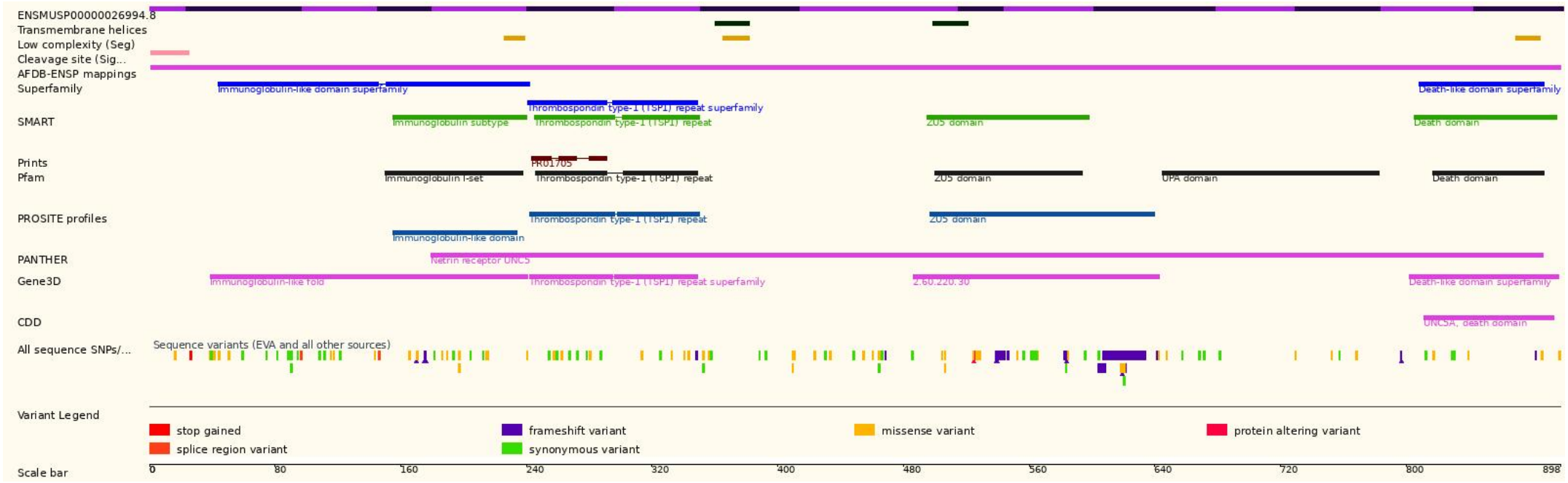
Source: http://asia.ensembl.org/

Genomic Information



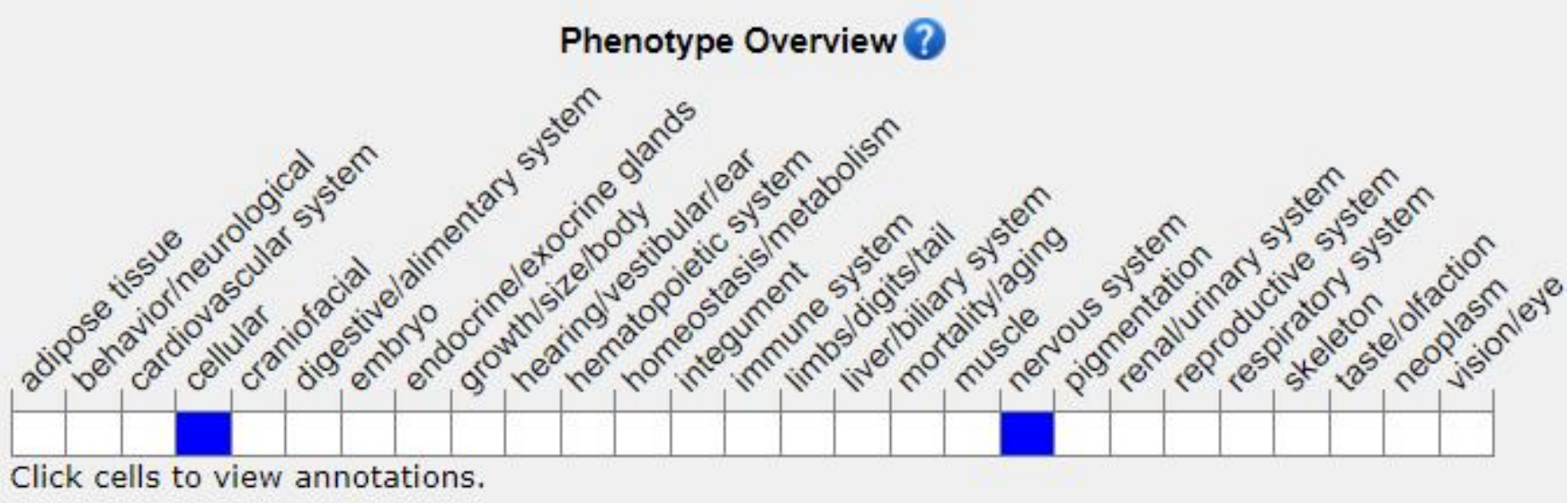
Source: http://asia.ensembl.org/

Protein Information



Source: https://www.ensembl.org

Mouse Phenotype Information (MGI)



Homozygous null mice are viable through adulthood but display decreased apoptotic cell death, supernumerary neurons and morphological alterations in the embryonic cervical spinal cord.

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

Important Information

- The intron 4-5 of *Unc5a*-201 is 140 bp, the loxp insertion may affect the regulation of this gene.
- This stratergy may not affect *Unc5a*-203, *Unc5a*-204 and *Unc5a*-205 transcript.
- *Unc5a* is located on Chr 13. 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.