GemPharmatech™

Pank4 Cas9-KO Strategy

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Design Date: 2023-11-14

Overview

Target Gene Name

- *Pank4*

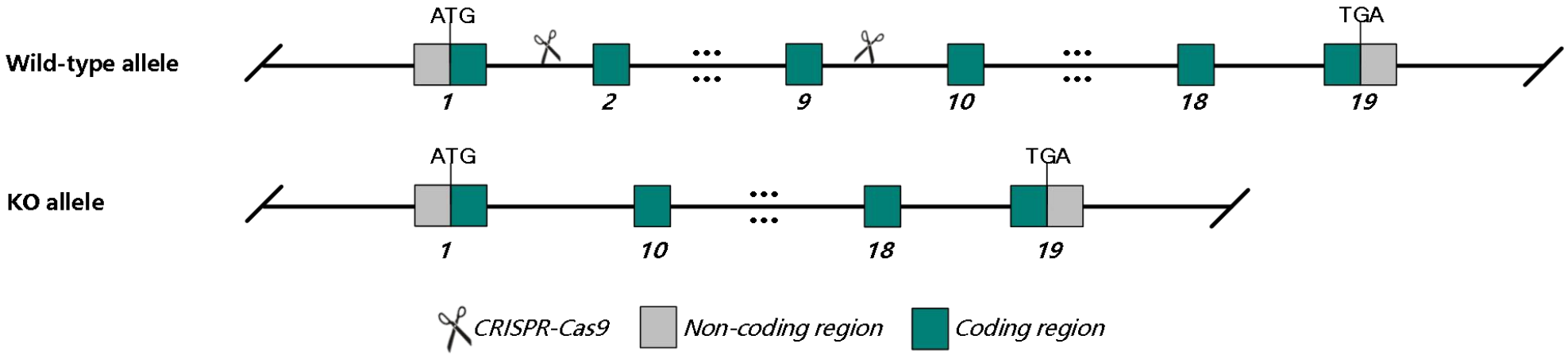
Project Type

- Cas9-KO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Pank4* gene.

Technical Information

- The *Pank4* gene has 7 transcripts. According to the structure of *Pank4* gene, exon 2-9 of *Pank4*-201 (ENSMUST00000030931.11) is recommended as the knockout region. The region contains 1094 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 *Pank4* 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

Pank4 pantothenate kinase 4 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 269614, updated on 7-Sep-2023

Summary

Official Symbol	Pank4 provided by MGI
Official Full Name	pantothenate kinase 4 provided by MGI
Primary source	MGI:MGI:2387466
See related	Ensembl:ENSMUSG00000029056 AllianceGenome:MGI:2387466
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	Gm42363; D030031I12Rik
Summary	Predicted to enable pantothenate kinase activity. Predicted to be involved in coenzyme A biosynthetic process. Predicted to be located in cytoplasm. Predicted to be active in cytosol and nucleus. Is expressed in several structures, including alimentary system; ear; genitourinary system; nervous system; and respiratory system. Used to study cataract. Orthologous to human PANK4 (pantothenate kinase 4 (inactive)). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Ubiquitous expression in thymus adult (RPKM 28.3), ovary adult (RPKM 20.5) and 28 other tissues See more
Orthologs	human all

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

Genomic context

Location: 4; 4 E2

See Pank4 in Genome Data Viewer

Exon count: 21

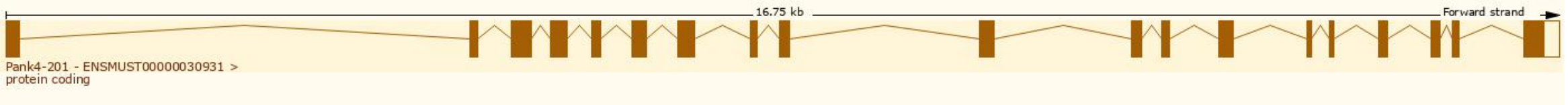
https://www.ncbi.nlm.nih.gov/gene/68477

Transcript Information

The gene has 7 transcripts, all transcripts are shown below:

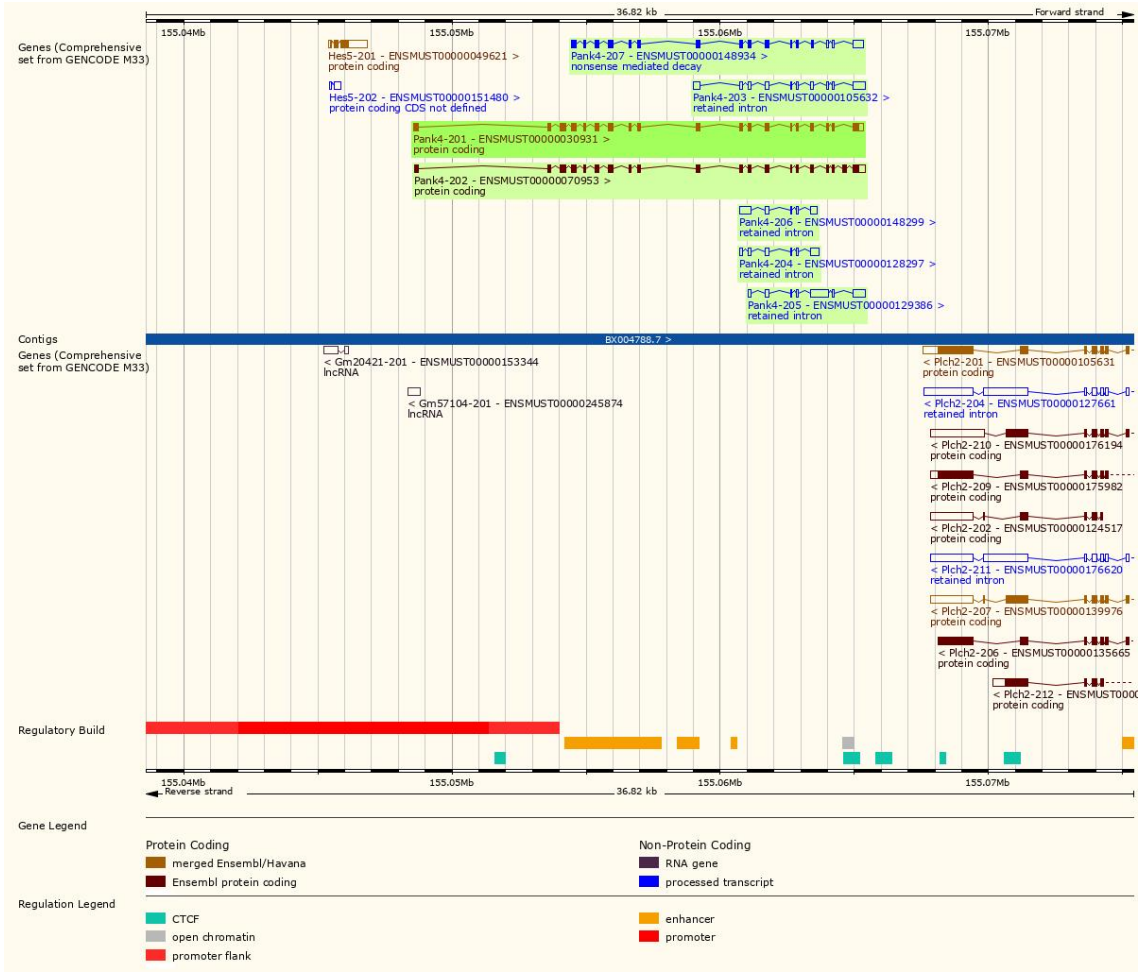
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000070953.11	Pank4-202	2706	820aa	Protein coding	CCDS84834	Q80YV4-1	Ensembl Canonical GENCODE basic TSL:1
ENSMUST00000030931.11	Pank4-201	2508	773aa	Protein coding	CCDS19019	Q80YV4-2	GENCODE basic APPRIS P1 TSL:1
ENSMUST00000148934.8	Pank4-207	2042	473aa	Nonsense mediated decay		F7B6K4	TSL:1 CDS 5' incomplete
ENSMUST00000129386.2	Pank4-205	1532	No protein	Retained intron		-	TSL:2
ENSMUST00000105632.8	Pank4-203	1431	No protein	Retained intron		-	TSL:5
ENSMUST00000148299.8	Pank4-206	892	No protein	Retained intron		-	TSL:3
ENSMUST00000128297.8	Pank4-204	737	No protein	Retained intron		-	TSL:3

The strategy is based on the design of *Pank4*-201 transcript, the transcription is shown below:



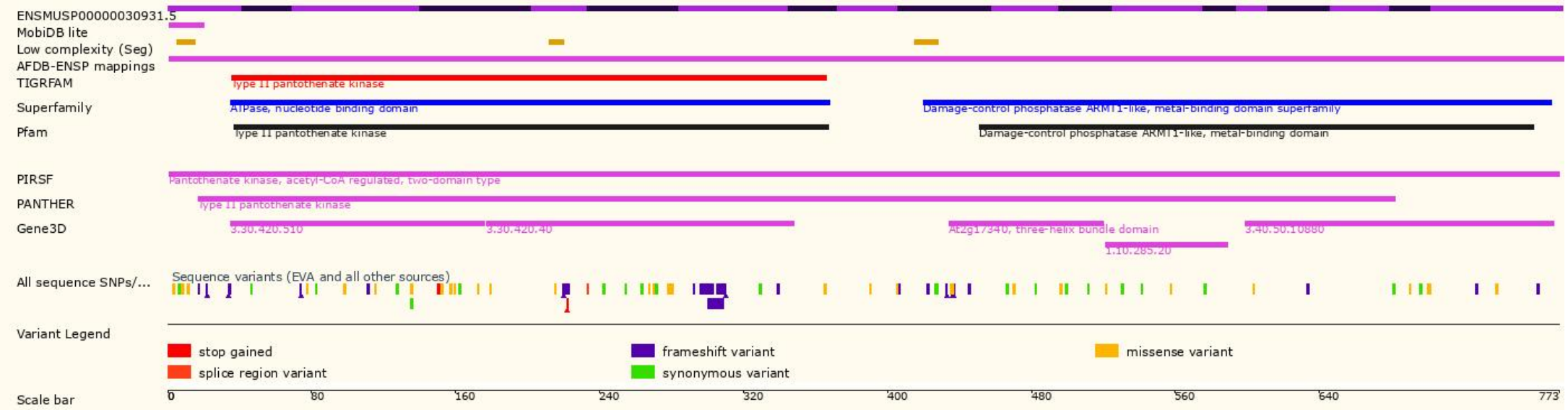
Source: http://asia.ensembl.org/

Genomic Information



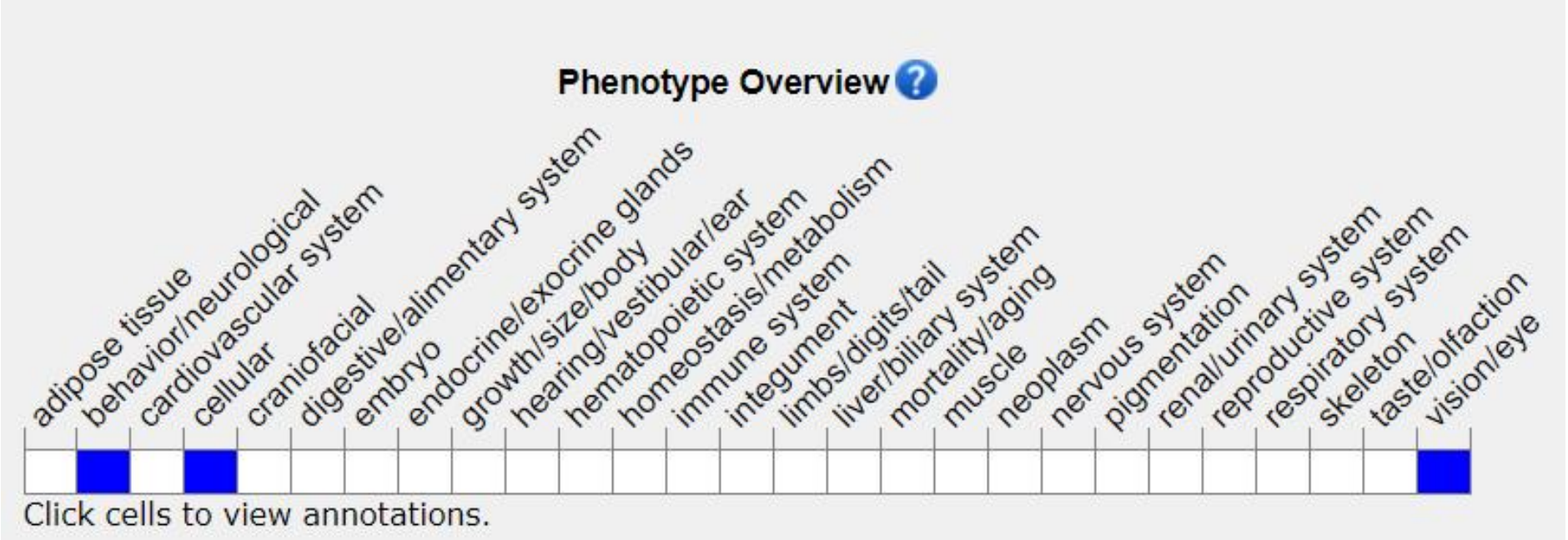
Source: http://asia.ensembl.org/

Protein Information



Source: https://www.ensembl.org

Mouse Phenotype Information (MGI)



Mice homozygous for a null allele develop cataracts, with increased lens epithelial cell apoptosis, decreased lens epithelium thickness, and lens fiber abnormalities.

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

Important Information

- The knockout region is 4.4 kb away from the 5’ of *Gm57104* gene, which may affect the 5’ regulation of *Gm57104* gene.
- The knockout region is 6.9 kb away from the 5’ of *Gm20421* gene, which may affect the 5’ regulation of *Gm20421* gene.
- This stratergy may not affect *Pank4*-203, *Pank4*-204, *Pank4*-205 and *Pank4*-206 transcript.
- *Pank4* is located on Chr 4. 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.