GemPharmatech™

Lypd1 Cas9-CKO Strategy

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Reviewer: Xiangli Bian

Design Date: 2023-12-26

Overview

Target Gene Name

- Lypd1

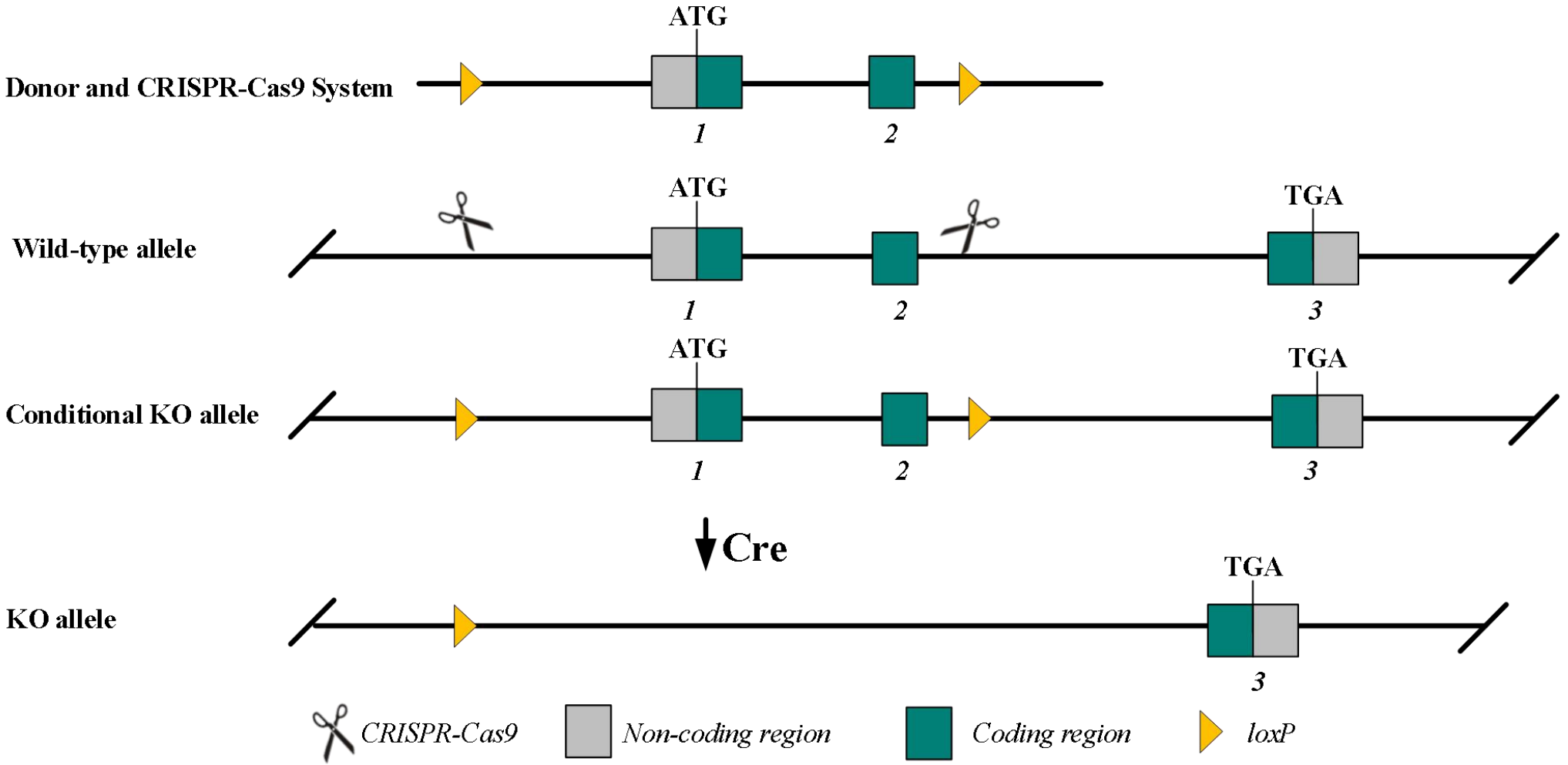
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Lypd1* gene.

Technical Information

- The *Lypd1* gene has 5 transcripts. According to the structure of *Lypd1* gene, exon 1-2 of *Lypd1-202* (ENSMUST00000159417.2) transcript is recommended as the knockout region. The region contains 190 bp of coding sequences. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Lypd1* 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

Lypd1 Ly6/Plaur domain containing 1 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 72585, updated on 23-Nov-2023

Summary

Official Symbol	Lypd1 provided by MGI
Official Full Name	Ly6/Plaur domain containing 1 provided by MGI
Primary source	MGI:MGI:1919835
See related	Ensembl:ENSMUSG00000026344 AllianceGenome:MGI:1919835
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	Lynx2; Lypdc1; 2700050C12Rik; C530008O16Rik
Summary	Enables acetylcholine receptor binding activity and acetylcholine receptor inhibitor activity. Acts upstream of or within several processes, including acetylcholine receptor signaling pathway; behavioral fear response; and negative regulation of protein localization to plasma membrane. Located in membrane. Is expressed in several structures, including alimentary system; limb; nervous system; sensory organ; and skin. Orthologous to human LYPD1 (LY6/PLAUR domain containing 1). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Broad expression in CNS E18 (RPKM 5.8), cortex adult (RPKM 5.8) and 24 other tissues See more
Orthologs	human all

NEW Try the new Gene table
Try the new Transcript table

Genomic context

Location: 1 E3; 1 54.7 cM — See Lypd1 in Genome Data Viewer

Exon count: 6

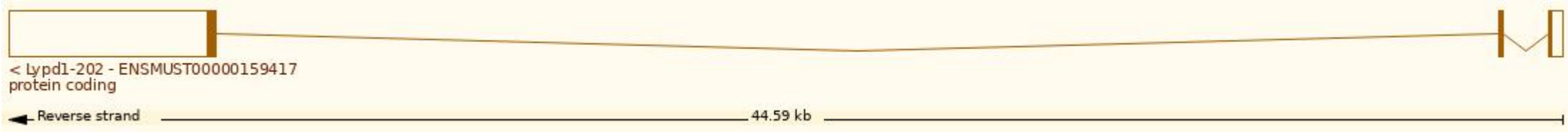
Source: https://www.ncbi.nlm.nih.gov/

Transcript Information

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

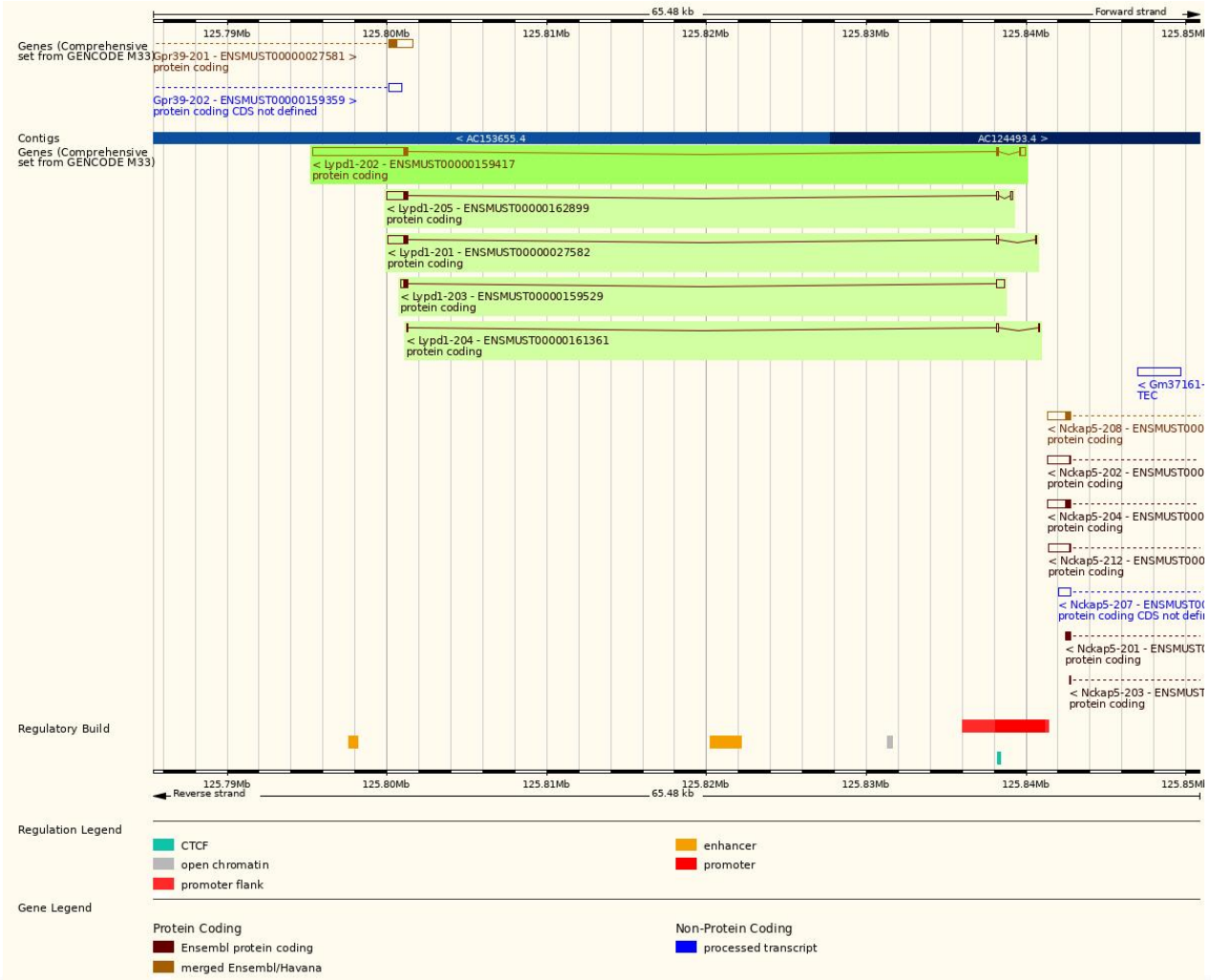
Transcript ID	Name	bp	Protein ▲	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000161361.3	Lypd1-204	245	29aa	Protein coding		F6TKE8	TSL:3 CDS 3' incomplete
ENSMUST00000162899.8	Lypd1-205	1511	89aa	Protein coding	CCDS78672	E0CXP0	GENCODE basic TSL:1
ENSMUST00000027582.10	Lypd1-201	1447	89aa	Protein coding	CCDS78672	E0CXP0	GENCODE basic TSL:1
ENSMUST00000159529.2	Lypd1-203	989	89aa	Protein coding	CCDS78672	E0CXP0	GENCODE basic TSL:2
ENSMUST00000159417.2	Lypd1-202	6464	141aa	Protein coding	CCDS15243	Q8BLC3	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1

The strategy is based on the design of *Lypd1*-202 transcript, the transcription is shown below:



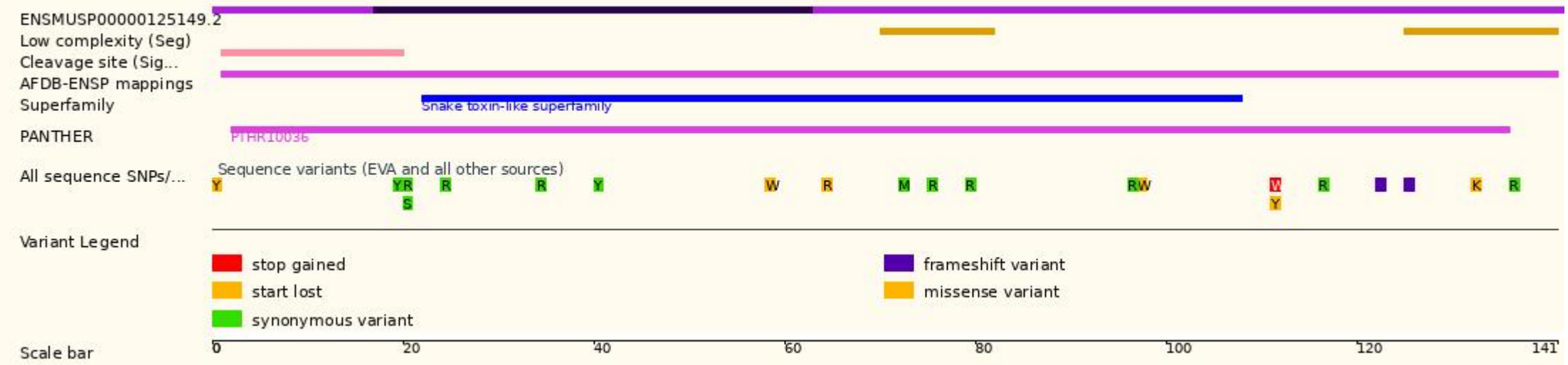
Source: https://www.ensembl.org

Genomic Information



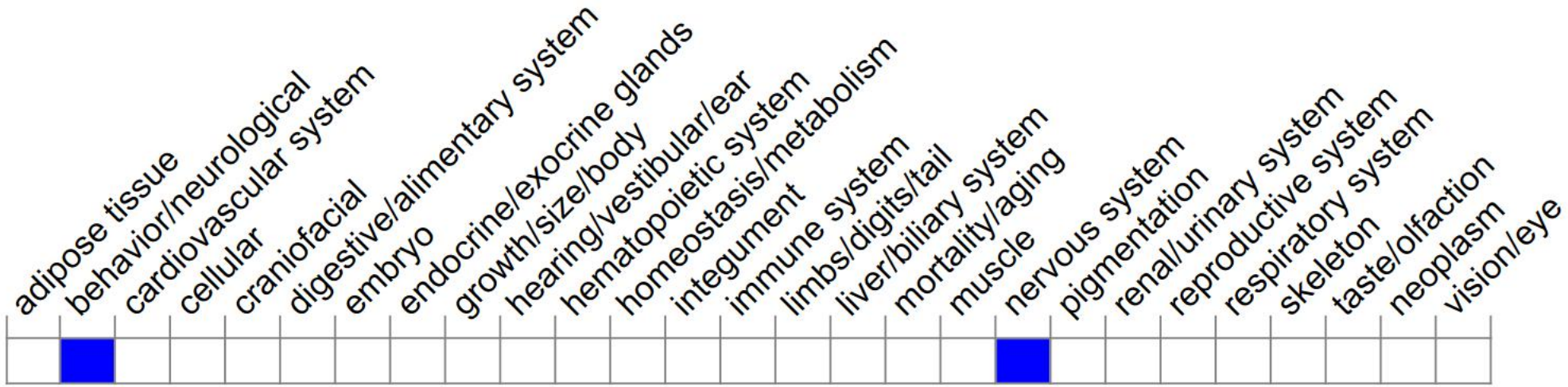
Source: : https://www.ensembl.org

Protein Information



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

Mouse Phenotype Information (MGI)



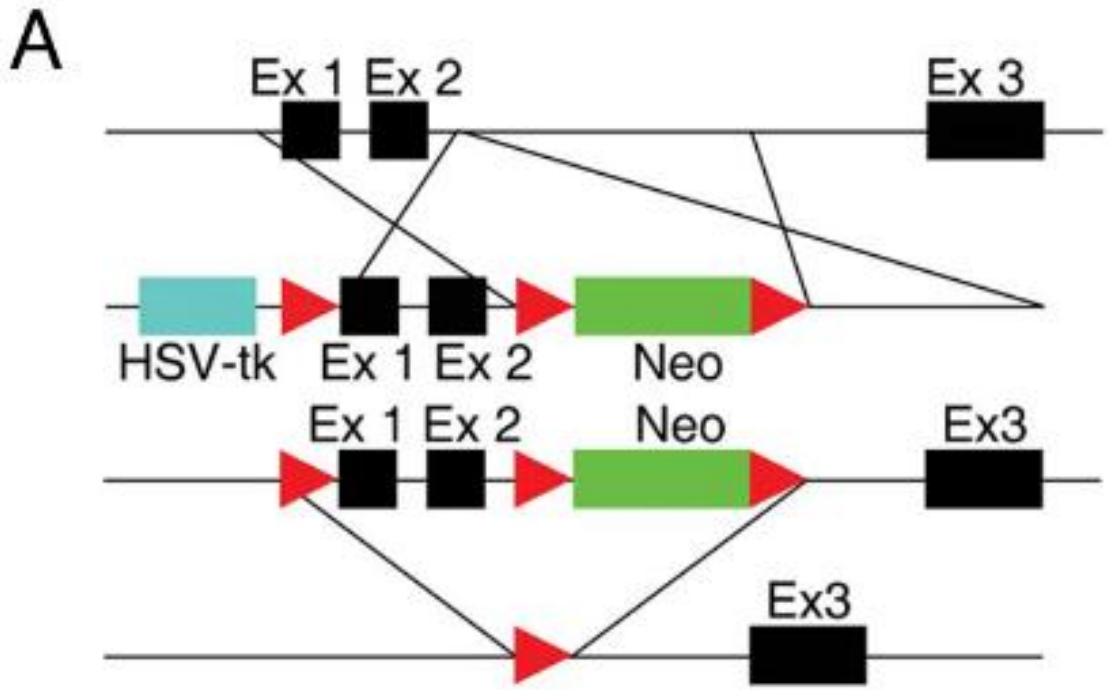
Mice homozygous for a null allele exhibit increased fear and anxiety behaviors with increased spontaneous excitatory postsynaptic current following nicotine treatment.

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

Important Information

- Mice homozygous for a null allele exhibit increased fear and anxiety behaviors with increased spontaneous excitatory postsynaptic current following nicotine treatment.
- The knockout region contains start codon, translation may recognize new start codon and form new unknown protein.
- The knockout region is about 0.1 kb away from the 3' of *Nckap5*, which may affect the regulation of this gene.
- Repeated structures 'CA' are present in the targeting region and mutations may be introduced.
- *Lypd1* is located on Chr 1. 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 dsigned 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.

Existing model



Tekinay AB, Nong Y, Miwa JM, Lieberam I, Ibanez-Tallon I, Greengard P, Heintz N. A role for LYNX2 in anxiety-related behavior. Proc Natl Acad Sci U S A. 2009 Mar 17;106(11):4477-82. doi: 10.1073/pnas.0813109106. Epub 2009 Feb 25.