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Ddx41 Cas9-CKO Strategy

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Reviewer: Yanhua Shen

Design Date: 2022-09-20

Overview

Target Gene Name

- Ddx41

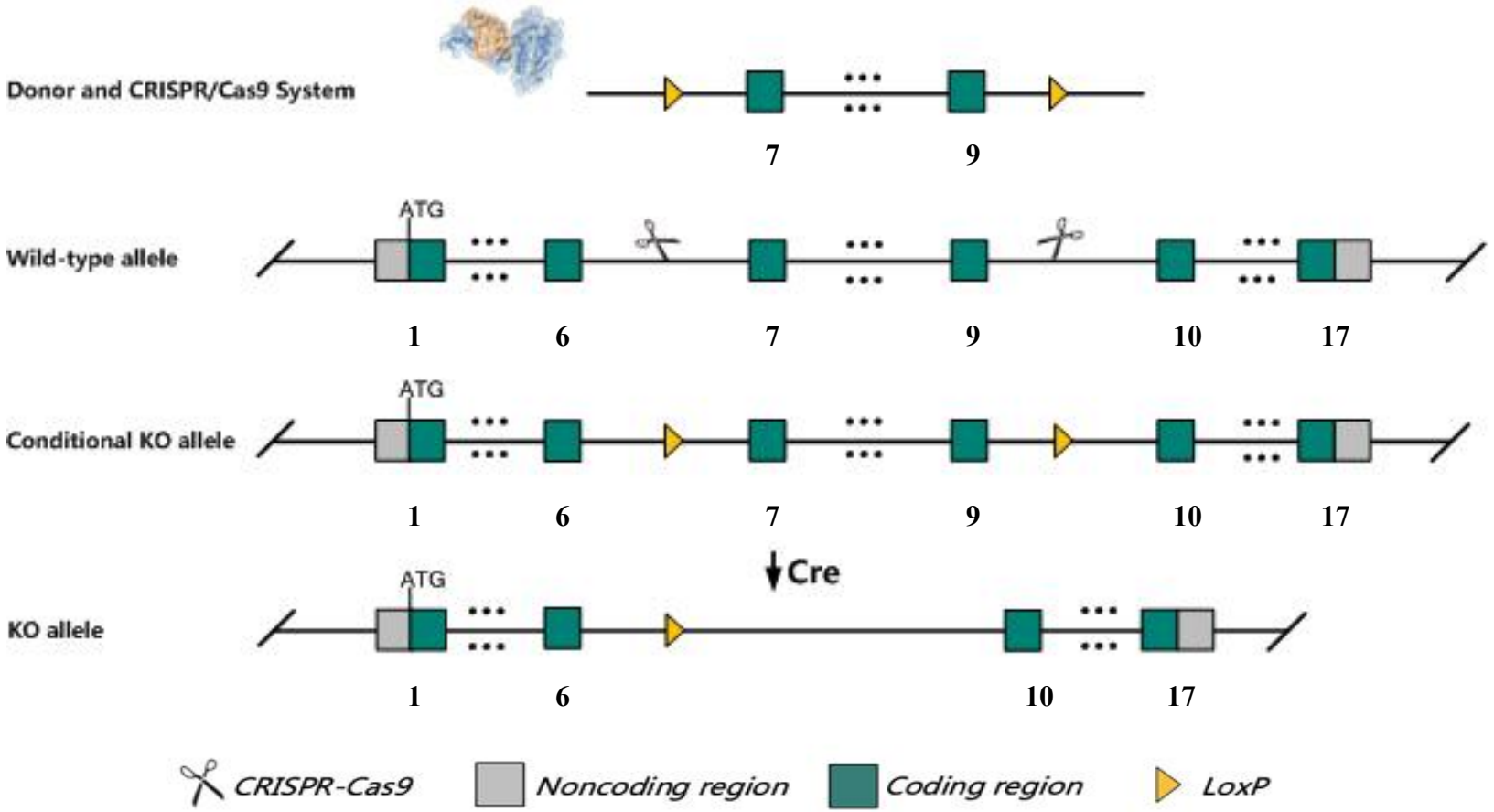
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Ddx41* gene.

Technical Information

- The *Ddx41* gene has 5 transcripts. According to the structure of *Ddx41* gene, exon7-9 of *Ddx41*-201 (ENSMUST00000021956.9) transcript is recommended as the knockout region. The region contains 364 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 *Ddx41* 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

Ddx41 DEAD box helicase 41 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 72935, updated on 23-Aug-2022

Summary

Official Symbol	Ddx41 provided by MGI
Official Full Name	DEAD box helicase 41 provided by MGI
Primary source	MGI:MGI:1920185
See related	Ensembl:ENSMUSG00000021494 AllianceGenome:MGI:1920185
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	ABS; 2900024F02Rik
Summary	Enables DNA binding activity. Acts upstream of or within cellular response to interferon-beta; defense response to virus; and positive regulation of transcription by RNA polymerase II. Located in endoplasmic reticulum and nucleus. Is expressed in hippocampus; pancreas; and testis. Orthologous to human DDX41 (DEAD-box helicase 41). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Ubiquitous expression in ovary adult (RPKM 33.6), spleen adult (RPKM 30.7) and 28 other tissues See more
Orthologs	human all

NEW Try the new Gene table
Try the new Transcript table

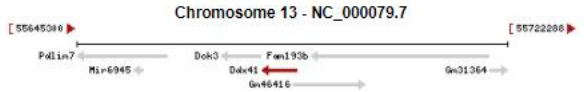
Genomic context

Location: 13; 13 B1

See Ddx41 in Genome Data Viewer

Exon count: 17

Annotation release	Status	Assembly	Chr	Location
109	current	GRCm39 (GCF_000001635.27)	13	NC_000079.7 (55678223..55684471, complement)
108.20200622	previous assembly	GRCm38.p6 (GCF_000001635.26)	13	NC_000079.6 (55530410..55536658, complement)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	13	NC_000079.5 (55631771..55638019, complement)



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

Transcript Information

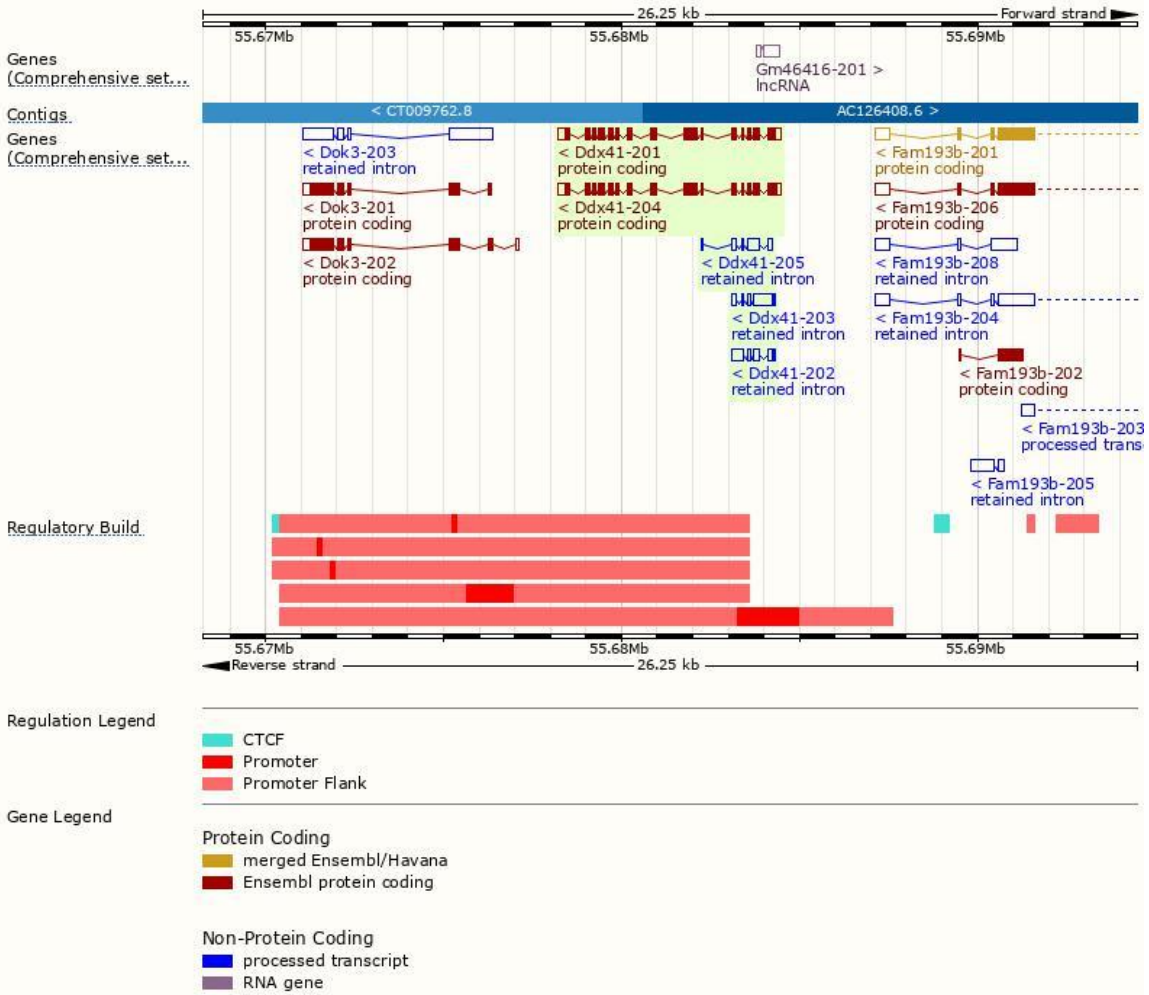
The gene has 5 transcripts, all transcripts are shown below:

Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000224765.2	Ddx41-204	2199	633aa	Protein coding		A0A1S6GWJ4	Ensembl Canonical GENCODE basic
ENSMUST00000224686.2	Ddx41-203	835	No protein	Retained intron		-	-
ENSMUST00000225783.2	Ddx41-205	710	No protein	Retained intron		-	-
ENSMUST00000224125.2	Ddx41-202	705	No protein	Retained intron		-	-
ENSMUST00000021956.9	Ddx41-201	2205	622aa	Protein coding	CCDS26549	Q91VN6	GENCODE basic APPRIS P1 TSL:1

The strategy is based on the design of *Ddx41*-201 transcript, the transcription is shown below:

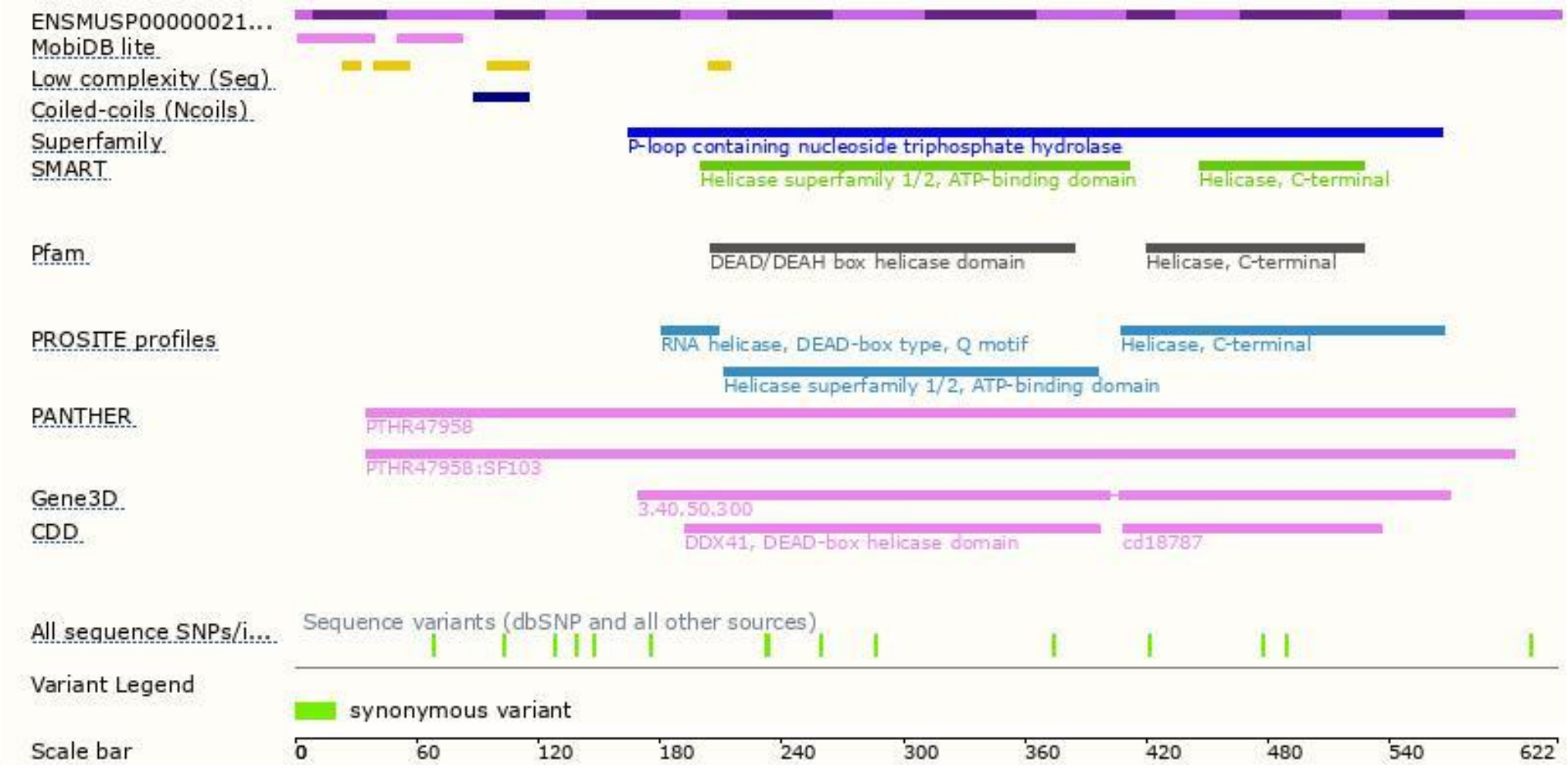
Source: https://www.ensembl.org

Genomic Information



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

Protein Information



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

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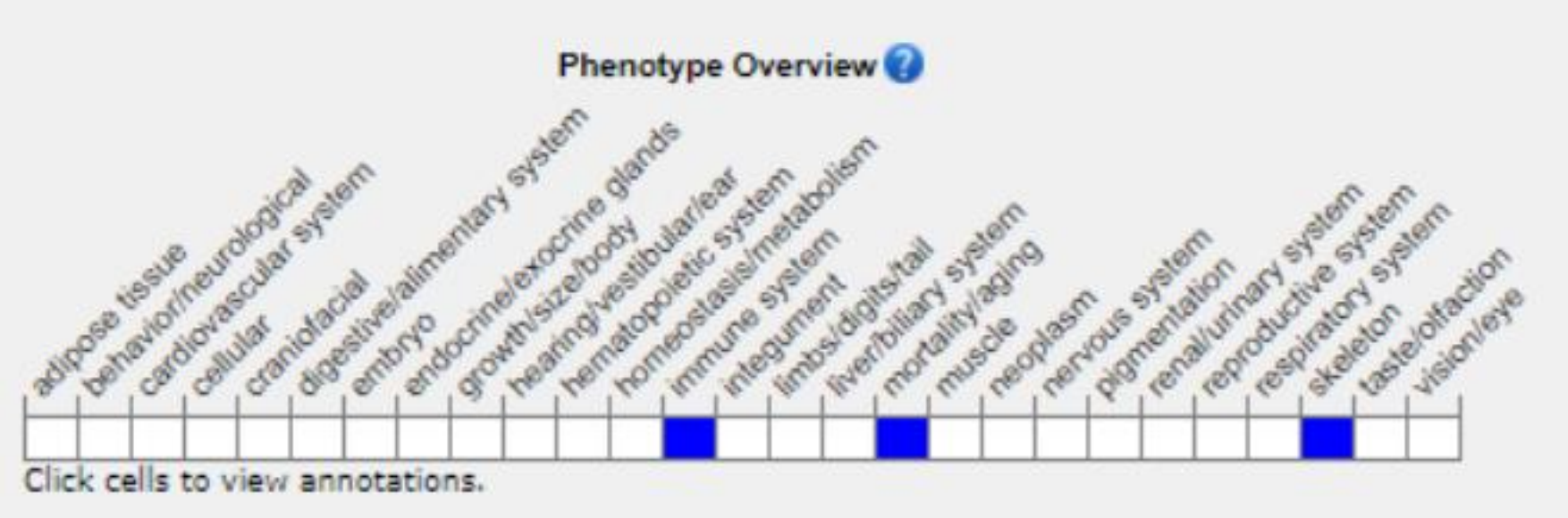
Mouse Phenotype Information (MGI)



- Constitutive homozygous knockout is embryonic lethal. Conditional homozygous KO in macrophages and DCs (dendritic cells) leads to a depressed immune response to viral infection.

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

Important Information

- According to the existing MGI data,constitutive homozygous knockout is embryonic lethal. Conditional homozygous KO in macrophages and DCs (dendritic cells) leads to a depressed immune response to viral infection.
- This strategy may affect the 5-terminal regulation of *Dok3* gene and *Gm46416* gene.
- The Ddx41 gene is located on the Chr13. If the knockout mice are crossed with other mice strains to obtain double gene positive homozygous mouse offspring, please avoid the two genes 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 existing technological level.