

Cdc42bpa Cas9-CKO Strategy

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Overview

Target Gene Name

- Cdc42bpa

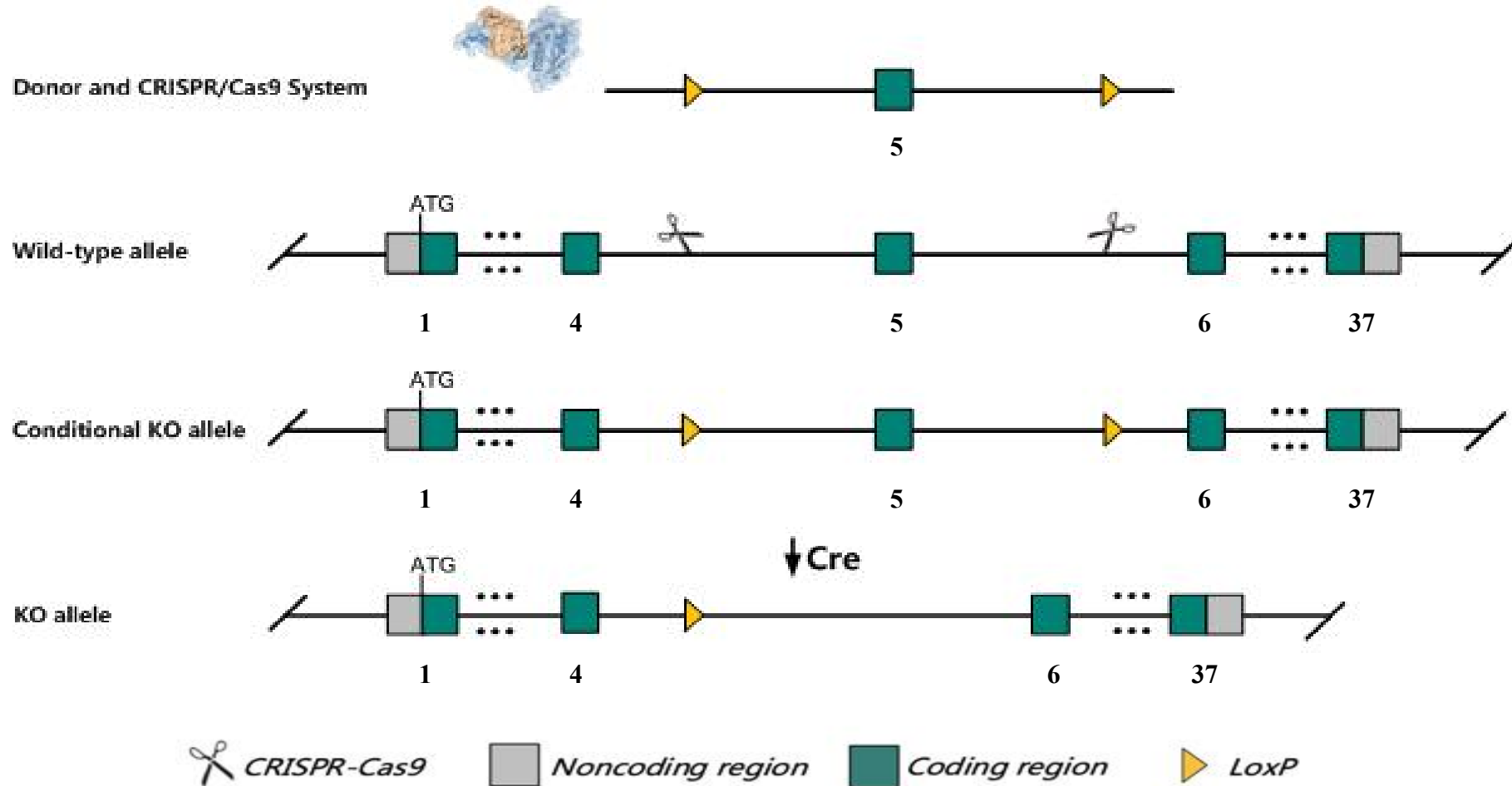
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Cdc42bpa* gene.

Technical Information

- The *Cdc42bpa* gene has 18 transcripts. According to the structure of *Cdc42bpa* gene, exon5 of *Cdc42bpa*-204 (ENSMUST00000111117.8) transcript is recommended as the knockout region. The region contains 149bp coding sequence. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Cdc42bpa* 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

Cdc42bpa CDC42 binding protein kinase alpha [Mus musculus (house mouse)]

Gene ID: 226751, updated on 12-Apr-2023

Summary

Official Symbol	Cdc42bpa provided by MGI
Official Full Name	CDC42 binding protein kinase alpha provided by MGI
Primary source	MGI:MGI:2441841
See related	Ensembl:ENSMUSG00000026490
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	A930014J19Rik, DMPK-like
Summary	Predicted to enable several functions, including ATP binding activity; identical protein binding activity; and magnesium ion binding activity. Acts upstream of or within microtubule cytoskeleton organization and nuclear migration. Located in lamellipodium. Orthologous to human CDC42BPA (CDC42 binding protein kinase alpha). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Broad expression in cerebellum adult (RPKM 17.3), cortex adult (RPKM 15.0) and 26 other tissues See more
Orthologs	human all

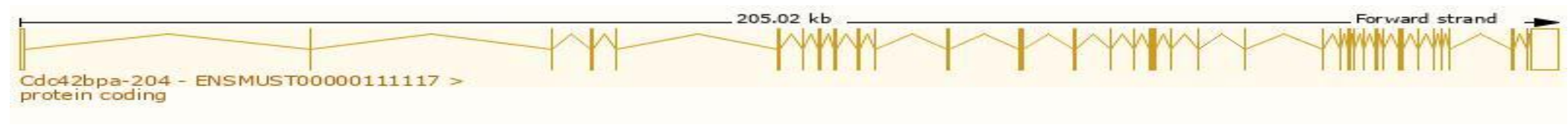
Source: <https://www.ncbi.nlm.nih.gov/>

Transcript Information

The gene has 18 transcripts,all transcripts are shown below:

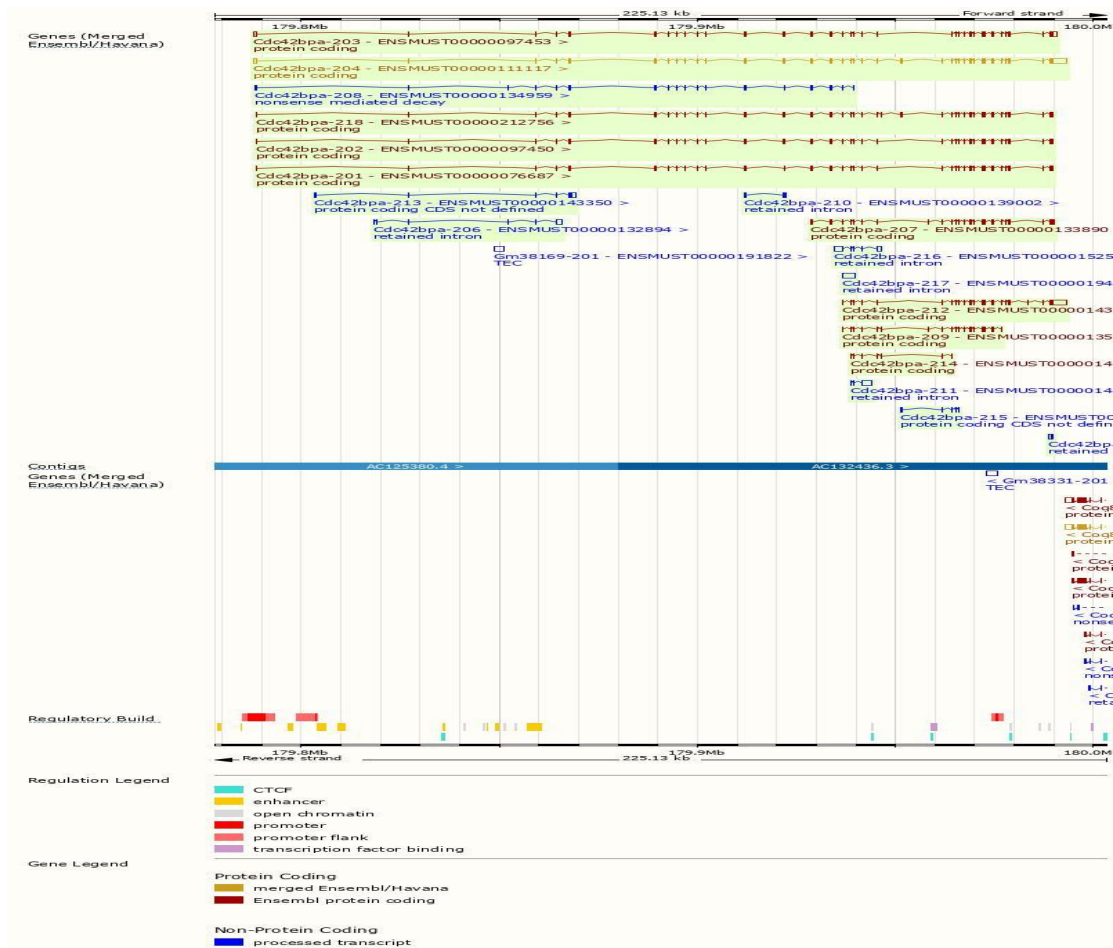
Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Cdc42bpa-218	ENSMUST00000212756.2	5247	1788aa	Protein coding			A single transcript chosen for a gene which is the most conserved, most highly expressed, has the longest coding sequence and is represented in other key resources, such as NCBI and UniProt. This is defined in detail on http://www.ensembl.org/info/genome/genebuild/canonical.html Ensembl Canonical. The GENCODE set is the gene set for human and mouse. GENCODE basic , TSL5 ,
Cdc42bpa-204	ENSMUST00000111117.8	9161	1732aa	Protein coding	CCD648466		The GENCODE set is the gene set for human and mouse. GENCODE basic , APPRIS ALT1 , TSL1 ,
Cdc42bpa-203	ENSMUST00000097453.9	6704	1693aa	Protein coding			The GENCODE set is the gene set for human and mouse. GENCODE basic , TSL5 ,
Cdc42bpa-212	ENSMUST00000143176.8	6389	986aa	Protein coding			TSL5 , CDS 5' incomplete ,
Cdc42bpa-202	ENSMUST00000097450.10	5160	1713aa	Protein coding	CCD683649		The GENCODE set is the gene set for human and mouse. GENCODE basic , APPRIS P4 , TSL1 ,
Cdc42bpa-201	ENSMUST00000076687.12	4917	1638aa	Protein coding	CCD683950		The GENCODE set is the gene set for human and mouse. GENCODE basic , TSL5 ,
Cdc42bpa-207	ENSMUST00000133890.8	3567	1048aa	Protein coding			TSL5 , CDS 5' incomplete ,
Cdc42bpa-209	ENSMUST00000135056.8	2197	732aa	Protein coding			TSL5 , CDS 5' and 3' incomplete ,
Cdc42bpa-214	ENSMUST00000145181.2	554	185aa	Protein coding			TSL2 , CDS 5' and 3' incomplete ,
Cdc42bpa-208	ENSMUST00000134959.8	2892	93aa	Nonsense mediated decay			TSL5 ,
Cdc42bpa-213	ENSMUST00000143350.8	1298	No protein	Protein coding CDS not defined			TSL3 ,
Cdc42bpa-215	ENSMUST00000145274.2	645	No protein	Protein coding CDS not defined			TSL3 ,
Cdc42bpa-216	ENSMUST00000151582.8	3900	No protein	Retained intron			TSL1 ,
Cdc42bpa-217	ENSMUST00000194974.2	3175	No protein	Retained intron			TSLNA ,
Cdc42bpa-211	ENSMUST00000143161.3	2447	No protein	Retained intron			TSL1 ,
Cdc42bpa-206	ENSMUST00000132094.3	2129	No protein	Retained intron			TSL1 ,
Cdc42bpa-205	ENSMUST00000129754.2	951	No protein	Retained intron			TSL2 ,
Cdc42bpa-210	ENSMUST00000130002.2	732	No protein	Retained intron			TSL5 ,

The strategy is based on the design of *Cdc42bpa-204* transcript, the transcription is shown below:



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

Genomic Information



Protein Information



Important Information

- *Cdc42bpa* is located on Chr1. 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.
- The transcripts Cdc42bpa-207,Cdc42bpa-209,Cdc42bpa-212,Cdc42bpa-214 may not be affected by deleting this cKO region.