

Usp4 Cas9-CKO Strategy

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Project Overview

Project Name

Usp4

Project type

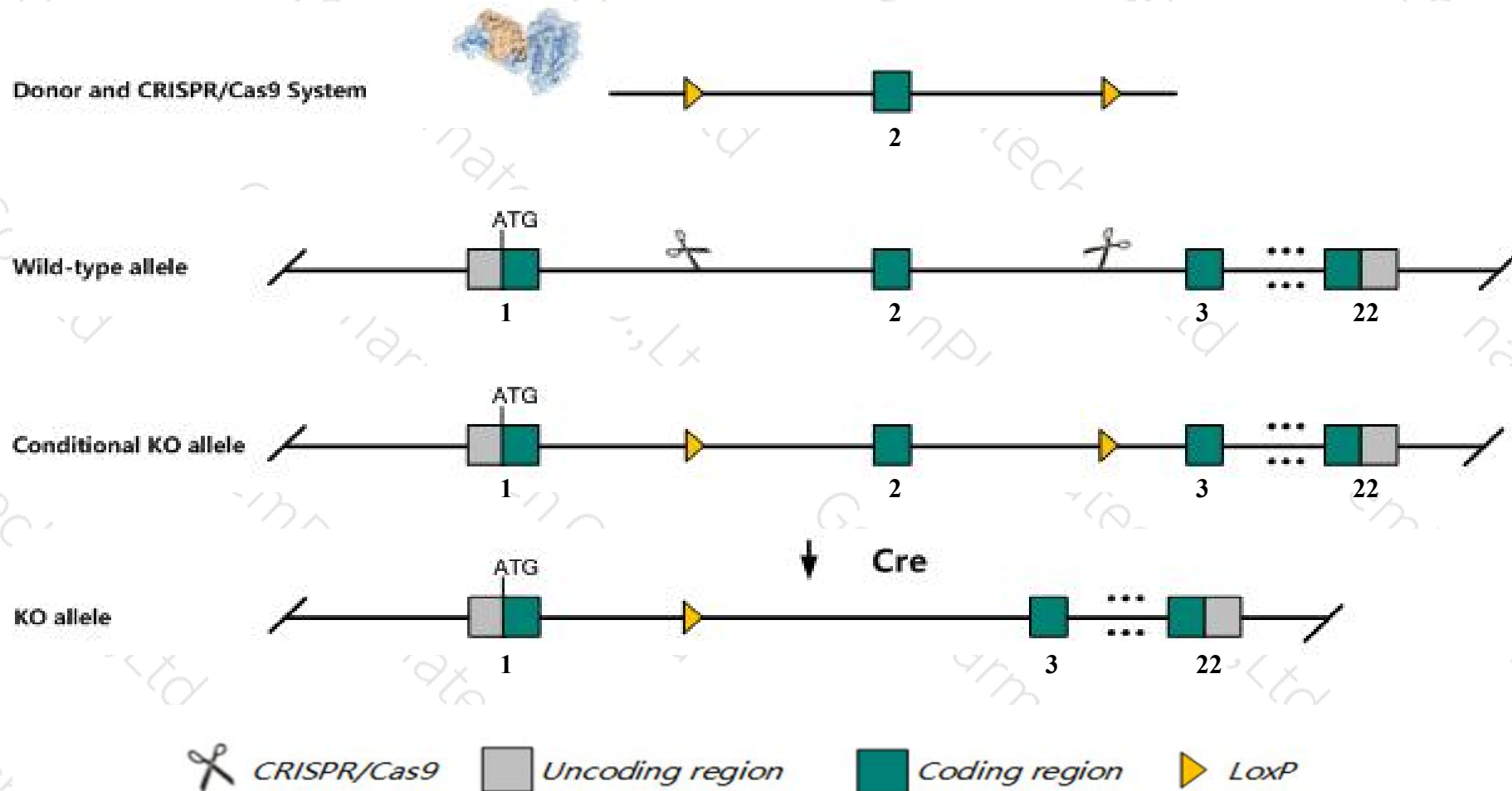
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Usp4* gene. The schematic diagram is as follows:



- The *Usp4* gene has 10 transcripts. According to the structure of *Usp4* gene, exon2 of *Usp4-201* (ENSMUST00000035237.11) transcript is recommended as the knockout region. The region contains 128bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Usp4* 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 sequencing. A stable F1 generation mouse model was obtained by mating positive F0 generation mice with C57BL/6JGpt mice.
- 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.

- According to the existing MGI data, Mice homozygous for a knock-out allele exhibit increased irradiation-induced apoptosis, slow cellular growth, resistance to oncogenic transformation, and early cellular replicative senescence.
- The *Usp4* gene is located on the Chr9. 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.

Gene information (NCBI)

Usp4 ubiquitin specific peptidase 4 (proto-oncogene) [Mus musculus (house mouse)]

Gene ID: 22258, updated on 31-Jan-2019

Summary



Official Symbol	Usp4 provided by MGI
Official Full Name	ubiquitin specific peptidase 4 (proto-oncogene) provided by MGI
Primary source	MGI:MGI:98905
See related	Ensembl:ENSMUSG00000032612
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	F730026I20Rik, Unp, mKIAA4155
Expression	Ubiquitous expression in testis adult (RPKM 35.9), CNS E11.5 (RPKM 25.1) and 28 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

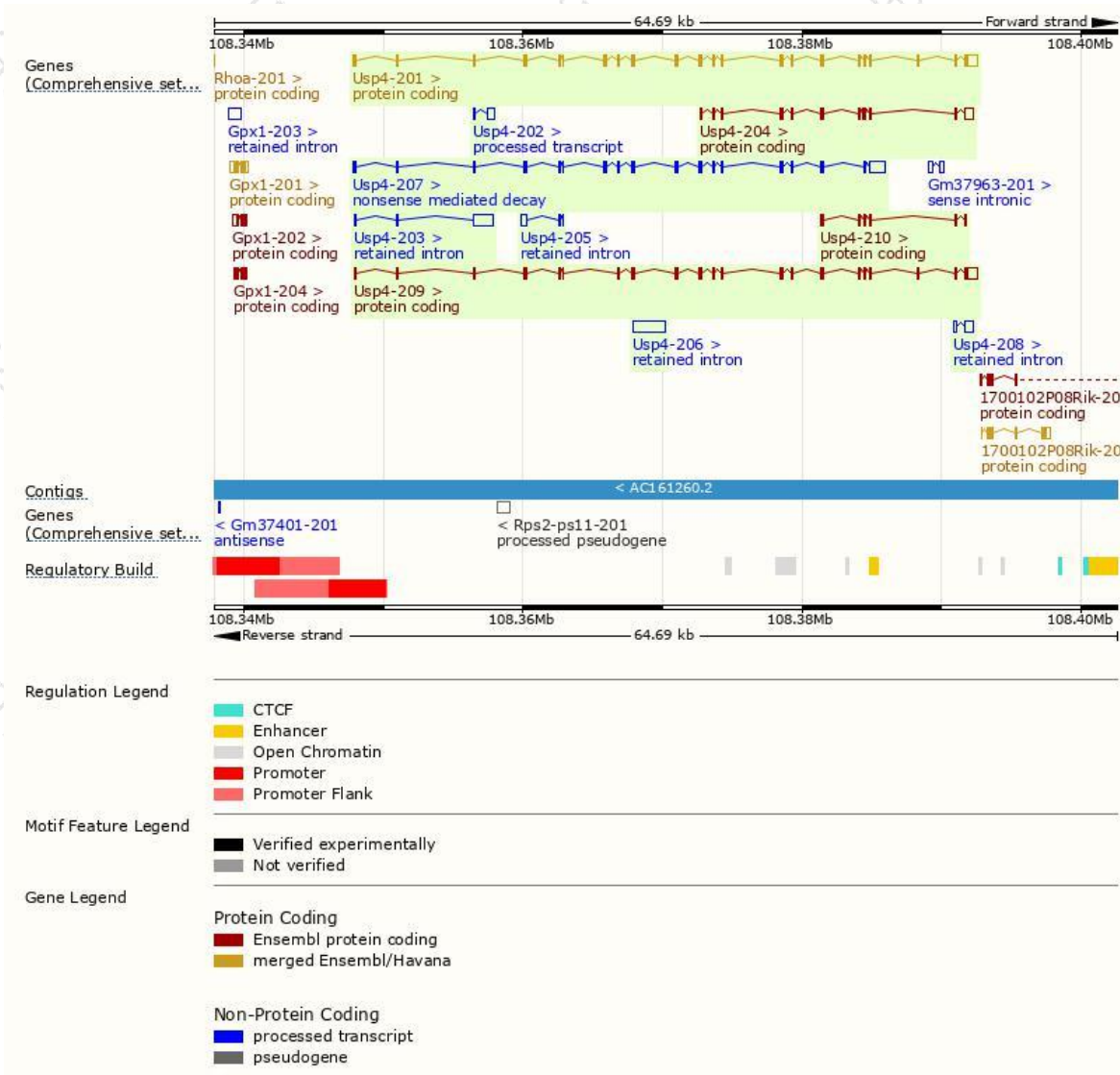
The gene has 10 transcripts, all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Usp4-201	ENSMUST00000035237.11	3662	962aa	Protein coding	CCDS23523	P35123	TSL:1 GENCODE basic APPRIS P3
Usp4-209	ENSMUST00000194959.5	3436	915aa	Protein coding	CCDS81074	A0A0A6YW28	TSL:1 GENCODE basic APPRIS ALT1
Usp4-204	ENSMUST00000193288.5	1804	394aa	Protein coding	-	A0A0A6YWM7	CDS 5' incomplete TSL:1
Usp4-210	ENSMUST00000195608.1	725	190aa	Protein coding	-	A0A0A6YW63	CDS 5' incomplete TSL:3
Usp4-207	ENSMUST00000194224.5	3457	734aa	Nonsense mediated decay	-	A0A0A6YVY7	TSL:1
Usp4-202	ENSMUST00000192750.1	562	No protein	Processed transcript	-	-	TSL:3
Usp4-206	ENSMUST00000194065.1	2319	No protein	Retained intron	-	-	TSL:NA
Usp4-203	ENSMUST00000193093.1	1665	No protein	Retained intron	-	-	TSL:1
Usp4-208	ENSMUST00000194939.1	760	No protein	Retained intron	-	-	TSL:2
Usp4-205	ENSMUST00000194034.1	550	No protein	Retained intron	-	-	TSL:3

The strategy is based on the design of *Usp4-201* transcript, The transcription is shown below



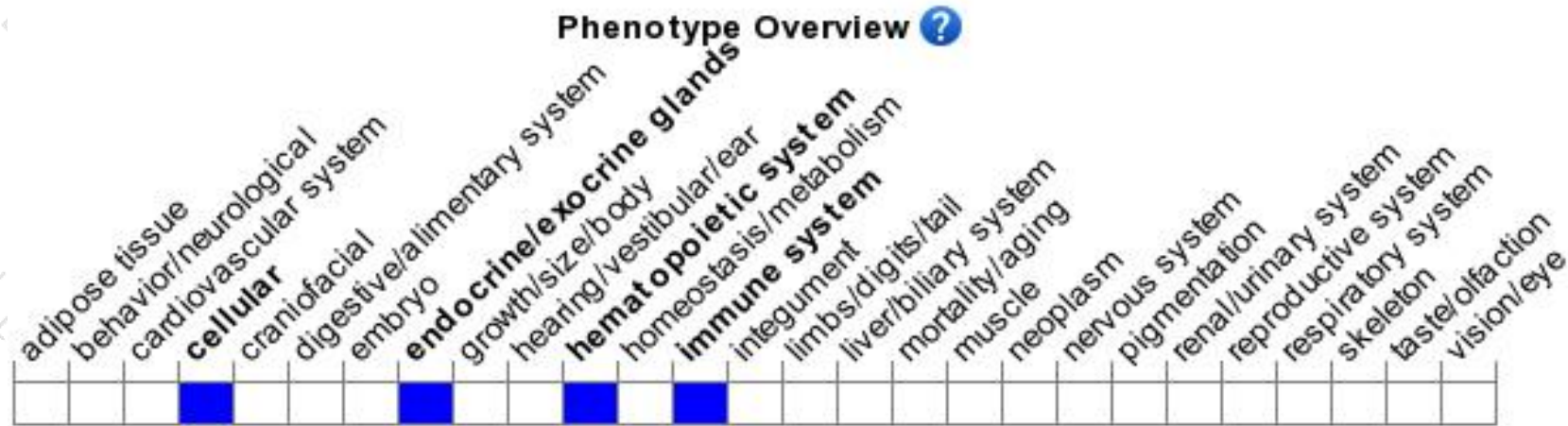
Genomic location distribution



Protein domain



Mouse phenotype description(MGI)



Phenotypes affected by the gene are marked in blue. Data quoted from MGI database(<http://www.informatics.jax.org/>).

According to the existing MGI data, Mice homozygous for a knock-out allele exhibit increased irradiation-induced apoptosis, slow cellular growth, resistance to oncogenic transformation, and early cellular replicative senescence.

If you have any questions, you are welcome to inquire.

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