

Macf1 Cas9-CKO Strategy

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Project Overview

Project Name

Macf1

Project type

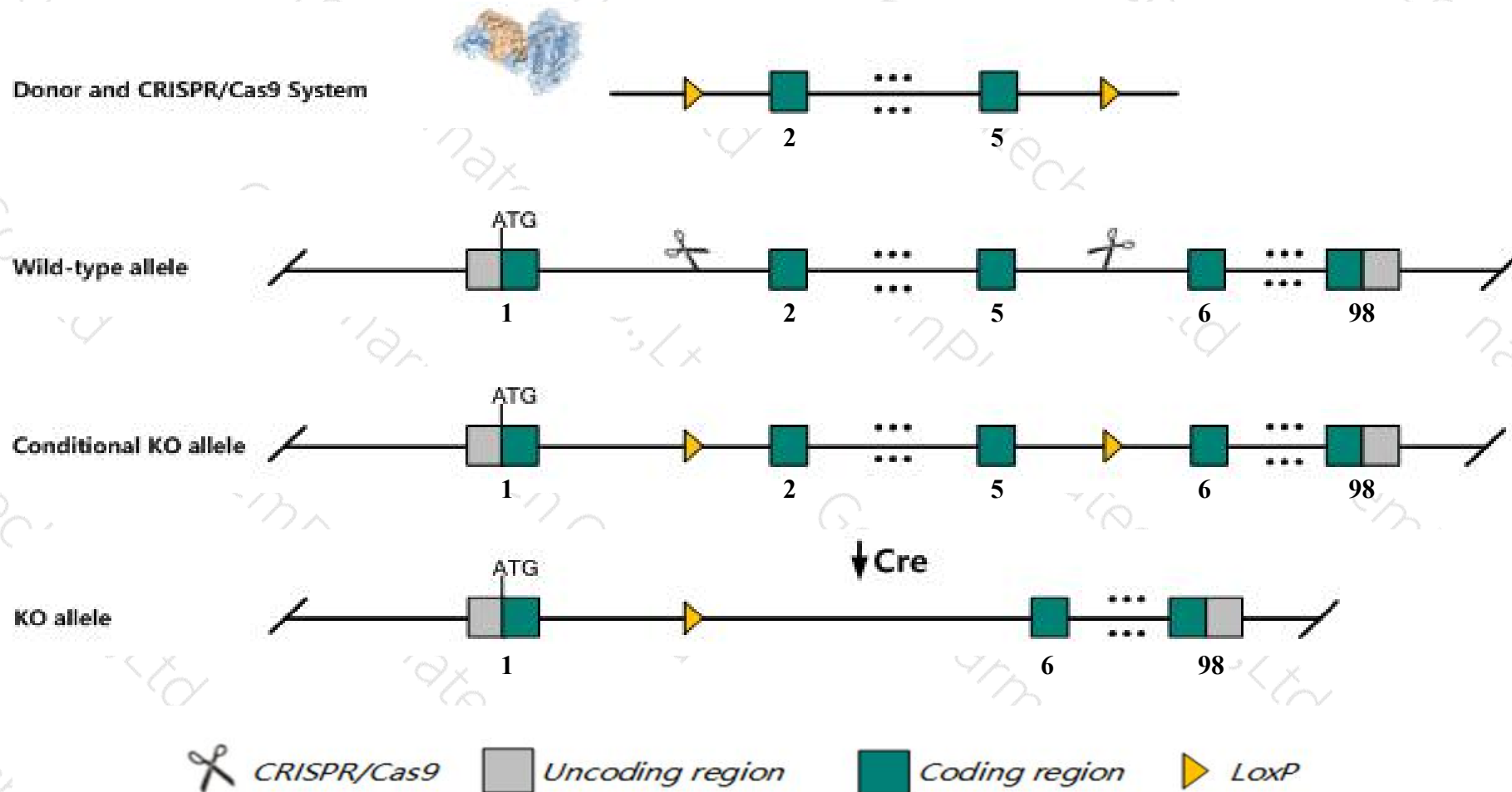
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Macf1* gene. The schematic diagram is as follows:



- The *Macf1* gene has 18 transcripts. According to the structure of *Macf1* gene, exon2-exon5 of *Macf1*-203 (ENSMUST00000097897.10) transcript is recommended as the knockout region. The region contains 323bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Macf1* 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 null allele exhibit lethality before somitogenesis with failure of the primitive streak to form. Mice heterozygous for a knock-out and floxed allele activated in neurons exhibit impaired cortical neuron migration, respiratory distress, and early postnatal lethality.
- Transcript *Macf1*-204,207,208,209,210,214,216 may not be affected.
- The *Macf1* gene is located on the Chr4. 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)

Macf1 microtubule-actin crosslinking factor 1 [*Mus musculus* (house mouse)]

Gene ID: 11426, updated on 12-Aug-2019

Summary

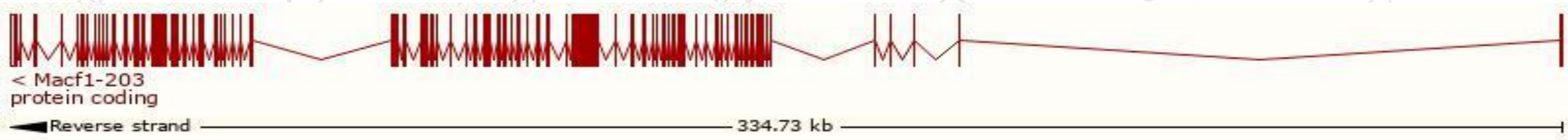
Official Symbol	Macf1 provided by MGI
Official Full Name	microtubule-actin crosslinking factor 1 provided by MGI
Primary source	MGI:MGI:108559
See related	Ensembl:ENSMUSG00000028649
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Acf7; MACF; AcIp7; ABP620; R74989; mKIAA0465
Expression	Ubiquitous expression in lung adult (RPKM 15.9), CNS E18 (RPKM 10.5) and 28 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

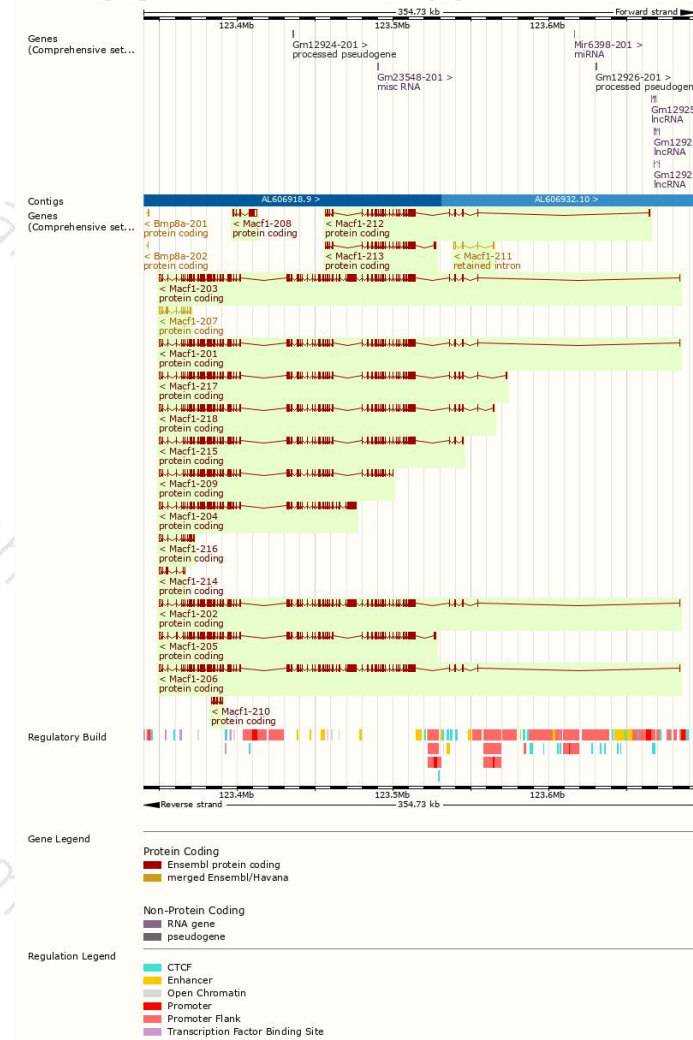
The gene has 18 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Macf1-203	ENSMUST00000097897.10	23495	7355aa	Protein coding	CCDS57295	E9PVY8	TSL:1 GENCODE basic APPRIS P2
Macf1-201	ENSMUST00000082108.11	17331	5328aa	Protein coding	CCDS57294	A0A0A0MQA6	TSL:1 GENCODE basic
Macf1-206	ENSMUST000000106224.7	23402	7353aa	Protein coding	-	B1ARU4	TSL:5 GENCODE basic APPRIS ALT2
Macf1-202	ENSMUST00000084301.11	23398	7351aa	Protein coding	-	E9QA63	TSL:5 GENCODE basic APPRIS ALT2
Macf1-204	ENSMUST000000106213.7	18957	5895aa	Protein coding	-	B1ARU1	TSL:5 GENCODE basic
Macf1-205	ENSMUST000000106220.8	17608	5478aa	Protein coding	-	E9QNP1	TSL:5 GENCODE basic
Macf1-217	ENSMUST000000238555.1	17480	5323aa	Protein coding	-	-	GENCODE basic
Macf1-218	ENSMUST000000238731.1	17268	5309aa	Protein coding	-	-	GENCODE basic
Macf1-215	ENSMUST000000151346.7	17175	5333aa	Protein coding	-	F7ACR9	CDS 5' incomplete TSL:5
Macf1-209	ENSMUST000000134458.7	14463	4429aa	Protein coding	-	F6Q750	CDS 5' incomplete TSL:5
Macf1-213	ENSMUST000000147228.7	6281	2030aa	Protein coding	-	F6SHS0	CDS 3' incomplete TSL:1
Macf1-212	ENSMUST000000147030.1	5706	1837aa	Protein coding	-	F6XCT0	CDS 3' incomplete TSL:1
Macf1-208	ENSMUST000000125447.2	5597	1358aa	Protein coding	-	A0A286YD76	CDS 3' incomplete TSL:5
Macf1-216	ENSMUST000000154824.7	2808	544aa	Protein coding	-	F6YKN8	CDS 5' incomplete TSL:1
Macf1-207	ENSMUST000000123765.7	2613	452aa	Protein coding	-	F6RCJ3	CDS 5' incomplete TSL:1
Macf1-214	ENSMUST000000149022.7	2222	349aa	Protein coding	-	F6RL59	CDS 5' incomplete TSL:5
Macf1-210	ENSMUST000000140596.1	1109	369aa	Protein coding	-	A0A0A0MQH5	CDS 5' and 3' incomplete TSL:5
Macf1-211	ENSMUST000000146000.1	1378	No protein	Retained intron	-	-	TSL:1

The strategy is based on the design of *Macf1-203* transcript,The transcription is shown below



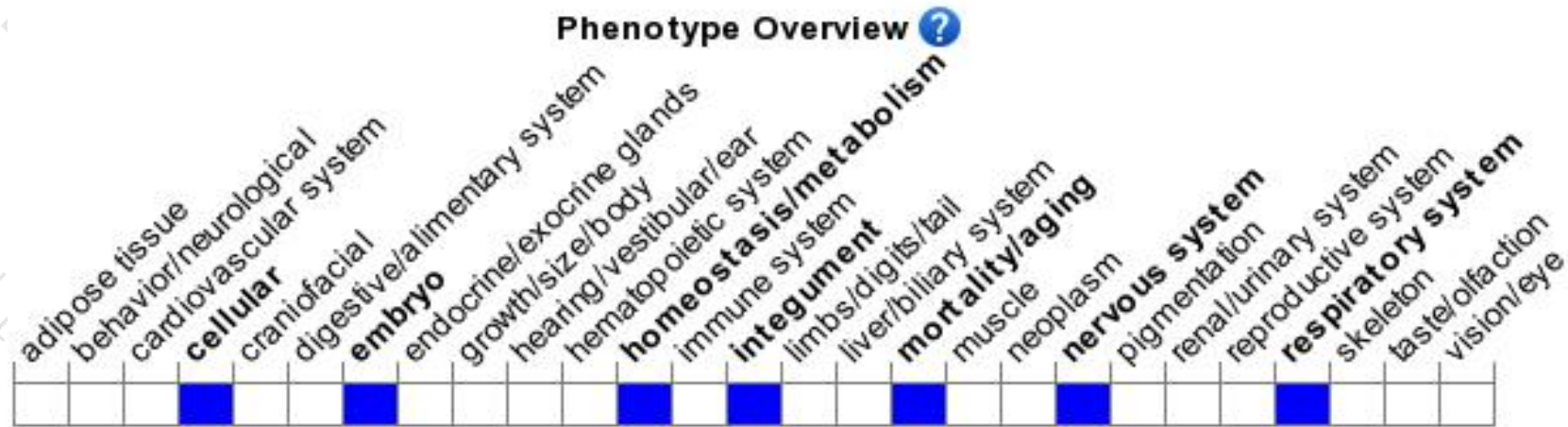
Genomic location distribution



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 null allele exhibit lethality before somitogenesis with failure of the primitive streak to form. Mice heterozygous for a knock-out and floxed allele activated in neurons exhibit impaired cortical neuron migration, respiratory distress, and early postnatal lethality.

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

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