

Rnf4 Cas9-KO Strategy

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Design Date: 2020-7-20

Project Overview

Project Name

Rnf4

Project type

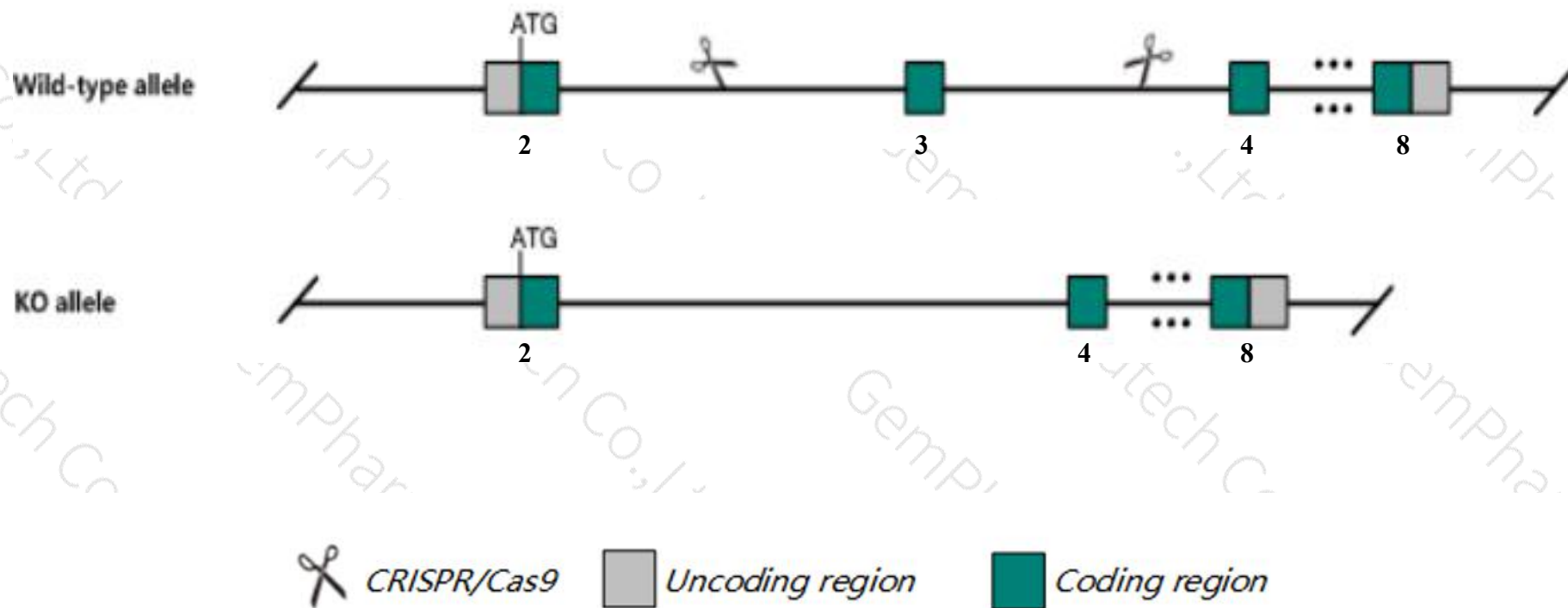
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Rnf4* gene. The schematic diagram is as follows:



➤ The *Rnf4* gene has 12 transcripts. According to the structure of *Rnf4* gene, exon3 of *Rnf4-207*(ENSMUST00000182709.7) transcript is recommended as the knockout region. The region contains 127bp coding sequence. Knock out the region will result in disruption of protein function.

➤ In this project we use CRISPR/Cas9 technology to modify *Rnf4* gene. The brief process is as follows: CRISPR/Cas9 system 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.

- According to the existing MGI data, mice homozygous for a null mutation display lethality throughout fetal growth and development with ventricular septal defects and cardiac insufficiency. MEFs from homozygous mice display global DNA hypermethylation.
- The *Rnf4* gene is located on the Chr5. 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 the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

Gene information (NCBI)

Rnf4 ring finger protein 4 [Mus musculus (house mouse)]

Gene ID: 19822, updated on 13-Mar-2020

Summary

Official Symbol Rnf4 provided by [MGI](#)

Official Full Name ring finger protein 4 provided by [MGI](#)

Primary source [MGI:MGI:1201691](#)

See related [Ensembl:ENSMUSG00000029110](#)

Gene type protein coding

RefSeq status REVIEWED

Organism [Mus musculus](#)

Lineage Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus

Also known as AU018689, Gtrgeo8, SNURF

Summary This gene encodes a small nuclear RING finger protein that mediates ubiquitylation of polysumoylated proteins. Deficiency of the encoded protein in mice leads to embryonic lethality and global DNA hypermethylation. A similar protein in humans is required for arsenic-induced degradation of promyelocytic leukemia protein in acute promyelocytic leukemia. Alternative splicing of this gene results in multiple transcript variants. A pseudogene for this gene has been identified on chromosome 10. [provided by RefSeq, Jan 2015]

Expression Ubiquitous expression in placenta adult (RPKM 51.2), CNS E11.5 (RPKM 42.5) and 28 other tissues [See more](#)

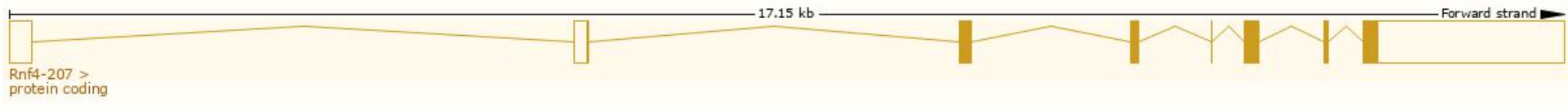
Orthologs [human](#) [all](#)

Transcript information (Ensembl)

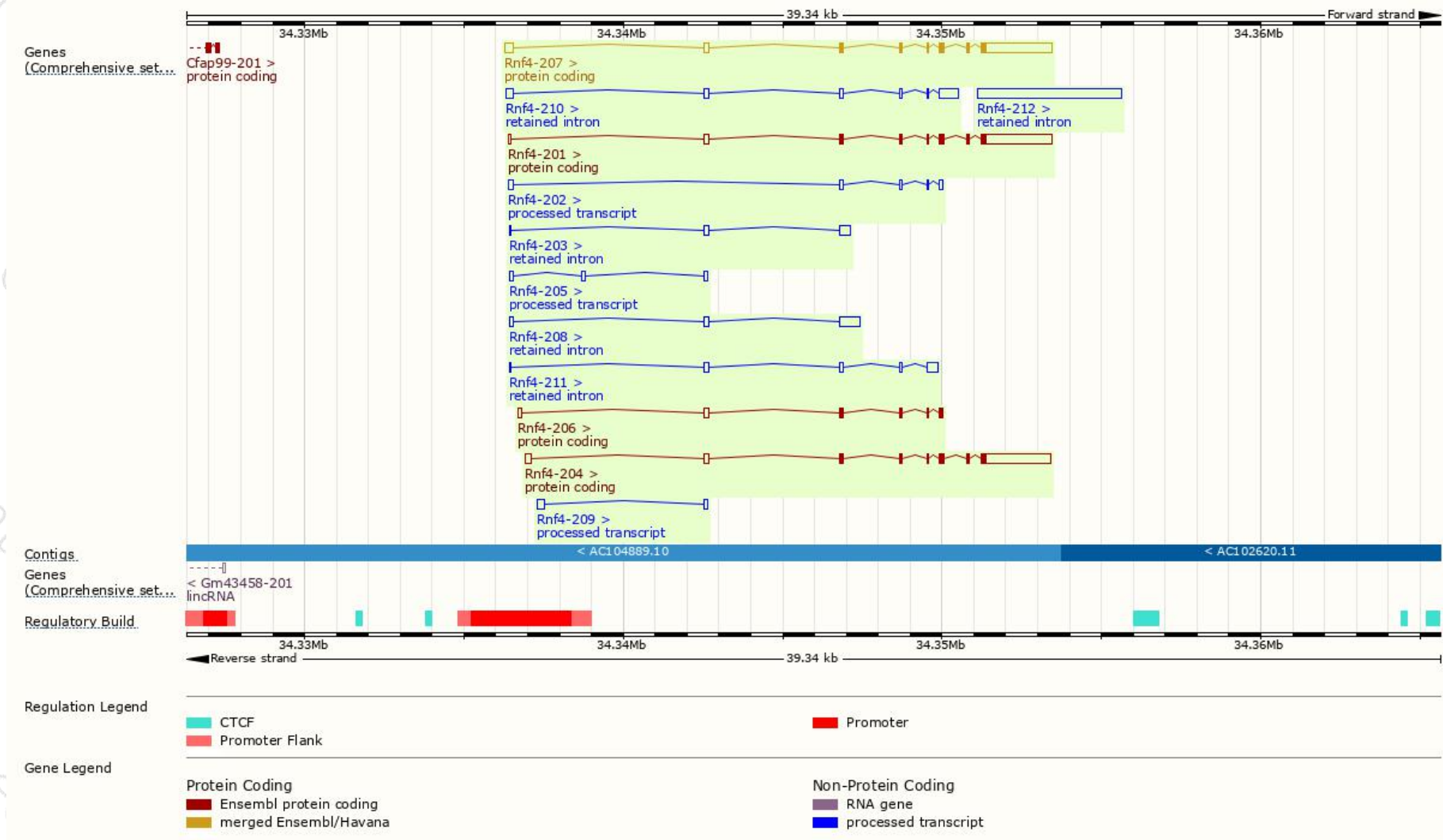
The gene has 12 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Rnf4-206	ENSMUST00000182583.7	619	115aa	Protein coding	-	S4R2C9	CDS 3' incomplete TSL:5
Rnf4-207	ENSMUST00000182709.7	3046	194aa	Protein coding	CCDS57336	Q9QZS2	TSL:1 GENCODE basic APPRIS P1
Rnf4-204	ENSMUST00000182047.1	2944	194aa	Protein coding	CCDS57336	Q9QZS2	TSL:1 GENCODE basic APPRIS P1
Rnf4-201	ENSMUST00000030992.12	2895	194aa	Protein coding	CCDS57336	Q9QZS2	TSL:1 GENCODE basic APPRIS P1
Rnf4-202	ENSMUST00000181991.7	491	No protein	Processed transcript	-	-	TSL:2
Rnf4-205	ENSMUST00000182582.1	371	No protein	Processed transcript	-	-	TSL:3
Rnf4-209	ENSMUST00000182810.1	357	No protein	Processed transcript	-	-	TSL:3
Rnf4-212	ENSMUST00000183265.1	4514	No protein	Retained intron	-	-	TSL:NA
Rnf4-210	ENSMUST00000182970.7	1205	No protein	Retained intron	-	-	TSL:2
Rnf4-208	ENSMUST00000182772.7	928	No protein	Retained intron	-	-	TSL:1
Rnf4-211	ENSMUST00000183071.1	723	No protein	Retained intron	-	-	TSL:3
Rnf4-203	ENSMUST00000181999.7	586	No protein	Retained intron	-	-	TSL:2

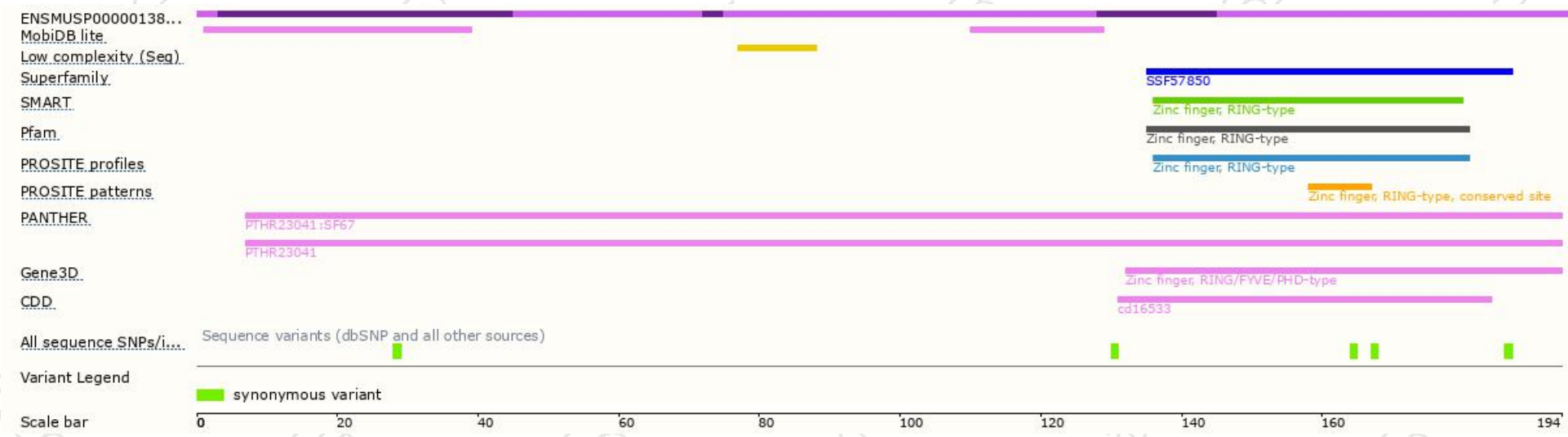
The strategy is based on the design of *Rnf4-207* transcript,the transcription is shown below:



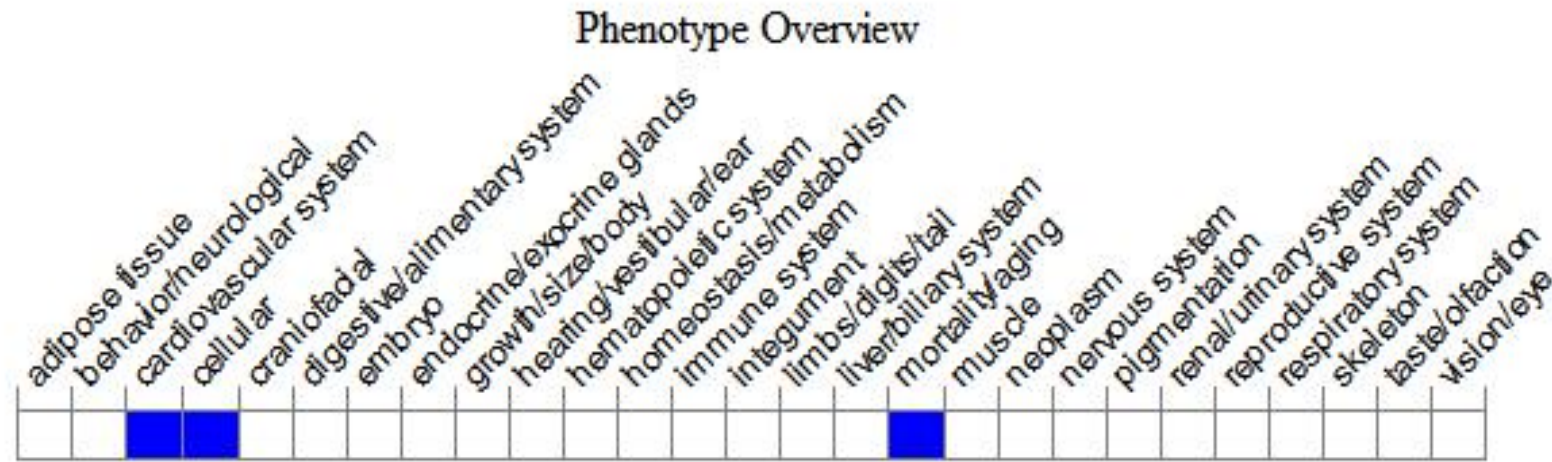
Genomic location distribution



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 mutation display lethality throughout fetal growth and development with ventricular septal defects and cardiac insufficiency. MEFs from homozygous mice display global DNA hypermethylation.

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

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