

Nup214 Cas9-KO Strategy

Designer: Xueting Zhang

Reviewer: Yanhua Shen

Design Date: 2021-9-26

Project Overview

Project Name

Nup214

Project type

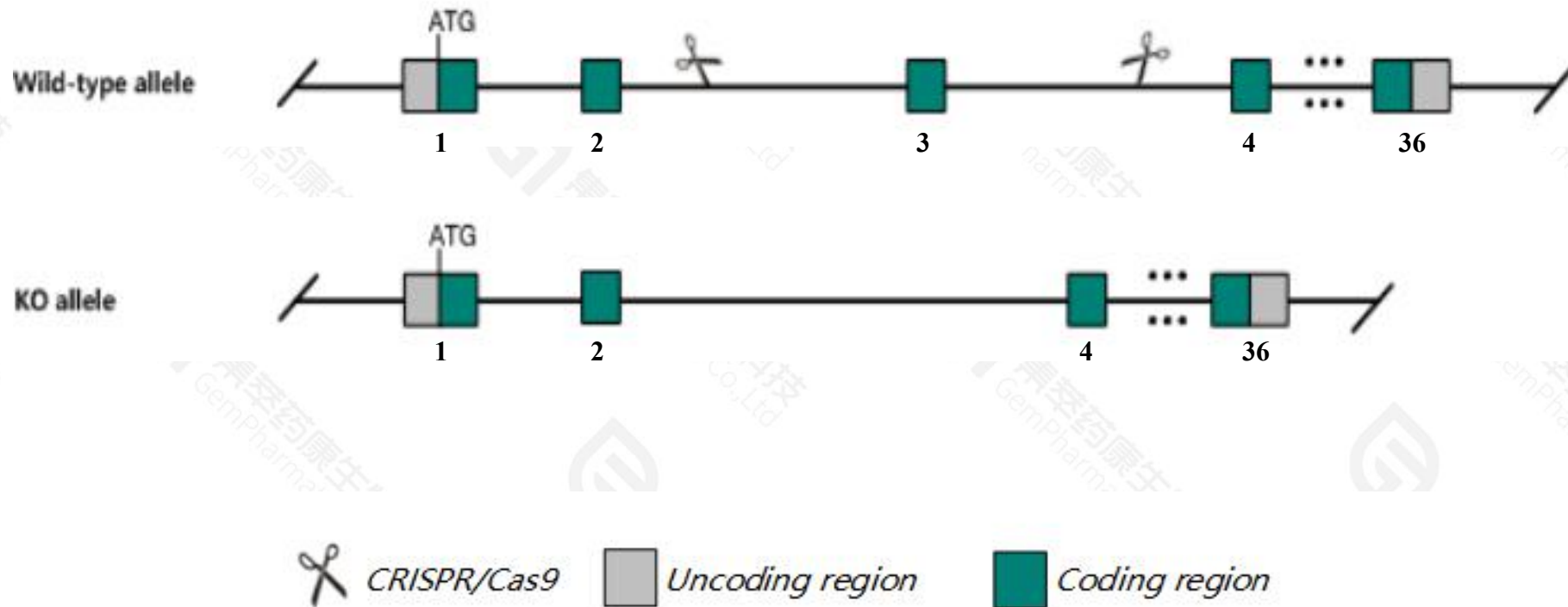
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Nup214* gene. The schematic diagram is as follows:



- The *Nup214* gene has 11 transcripts. According to the structure of *Nup214* gene, exon3 of *Nup214-201*(ENSMUST00000065398.13) transcript is recommended as the knockout region. The region contains 152bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Nup214* 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, embryos homozygous for a null mutation die between 4.0 and 4.5 dpc, following depletion of maternally-derived gene product. In vitro, cultured 3.5-dpc mutant embryos arrest in the G2 phase, and show blastocoel contraction with defects in NLS-mediated protein import and polyadenylated RNA export.
- Transcript *Nup214*-204&208&210 may not be affected.
- The effect on transcript *Nup214*-202&203&205&206&209&211 is unknown.
- The *Nup214* gene is located on the Chr2. 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.

Nup214 nucleoporin 214 [Mus musculus (house mouse)]

Gene ID: 227720, updated on 17-Dec-2020

Summary



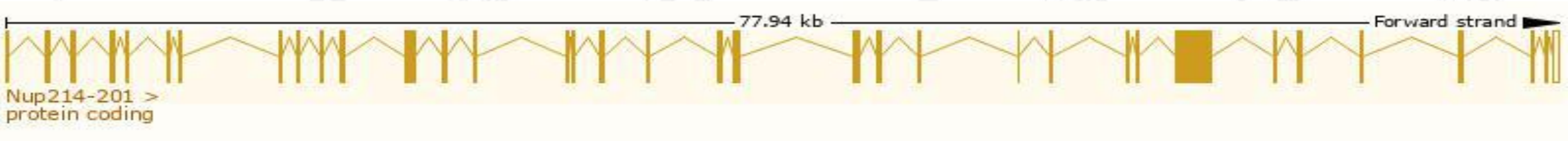
Official Symbol	Nup214 provided by MGI
Official Full Name	nucleoporin 214 provided by MGI
Primary source	MGI:MGI:1095411
See related	Ensembl:ENSMUSG00000001855
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	BC039282, C, CAN, D2H9S46, D2H9S46E
Expression	Ubiquitous expression in testis adult (RPKM 23.6), thymus adult (RPKM 16.1) and 28 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

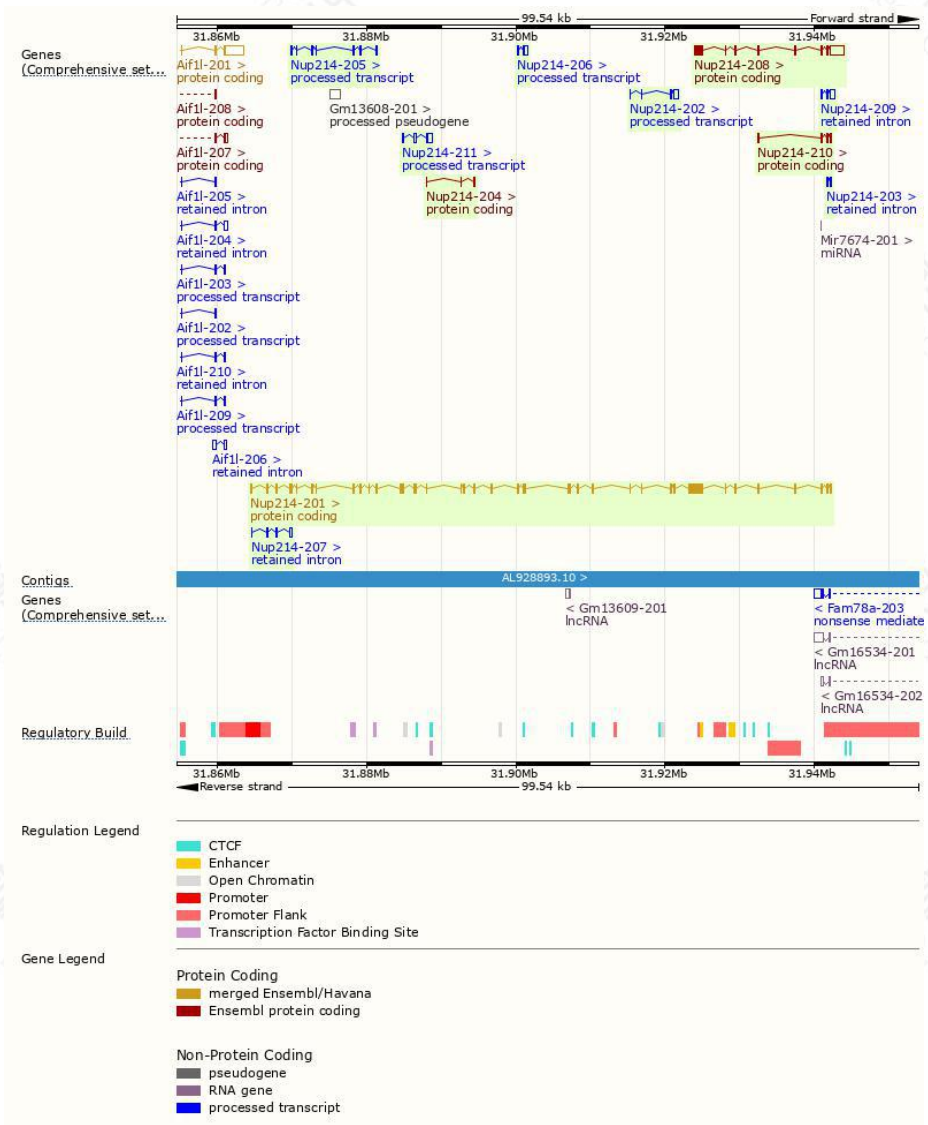
The gene has 11 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Nup214-201	ENSMUST00000065398.13	6605	2085aa	Protein coding	CCDS38098		TSL:1 , GENCODE basic , APPRIS P1 ,
Nup214-208	ENSMUST00000138012.2	3569	581aa	Protein coding	-		CDS 5' incomplete , TSL:1 ,
Nup214-210	ENSMUST00000152791.4	466	147aa	Protein coding	-		CDS 5' incomplete , TSL:3 ,
Nup214-204	ENSMUST00000126301.3	295	98aa	Protein coding	-		CDS 5' and 3' incomplete , TSL:5 ,
Nup214-211	ENSMUST00000153096.2	925	No protein	Processed transcript	-		TSL:3 ,
Nup214-202	ENSMUST00000123062.2	667	No protein	Processed transcript	-		TSL:5 ,
Nup214-206	ENSMUST00000130185.2	629	No protein	Processed transcript	-		TSL:3 ,
Nup214-205	ENSMUST00000129496.2	628	No protein	Processed transcript	-		TSL:2 ,
Nup214-209	ENSMUST00000146138.3	915	No protein	Retained intron	-		TSL:2 ,
Nup214-207	ENSMUST00000130975.2	738	No protein	Retained intron	-		TSL:2 ,
Nup214-203	ENSMUST00000124455.2	354	No protein	Retained intron	-		TSL:2 ,

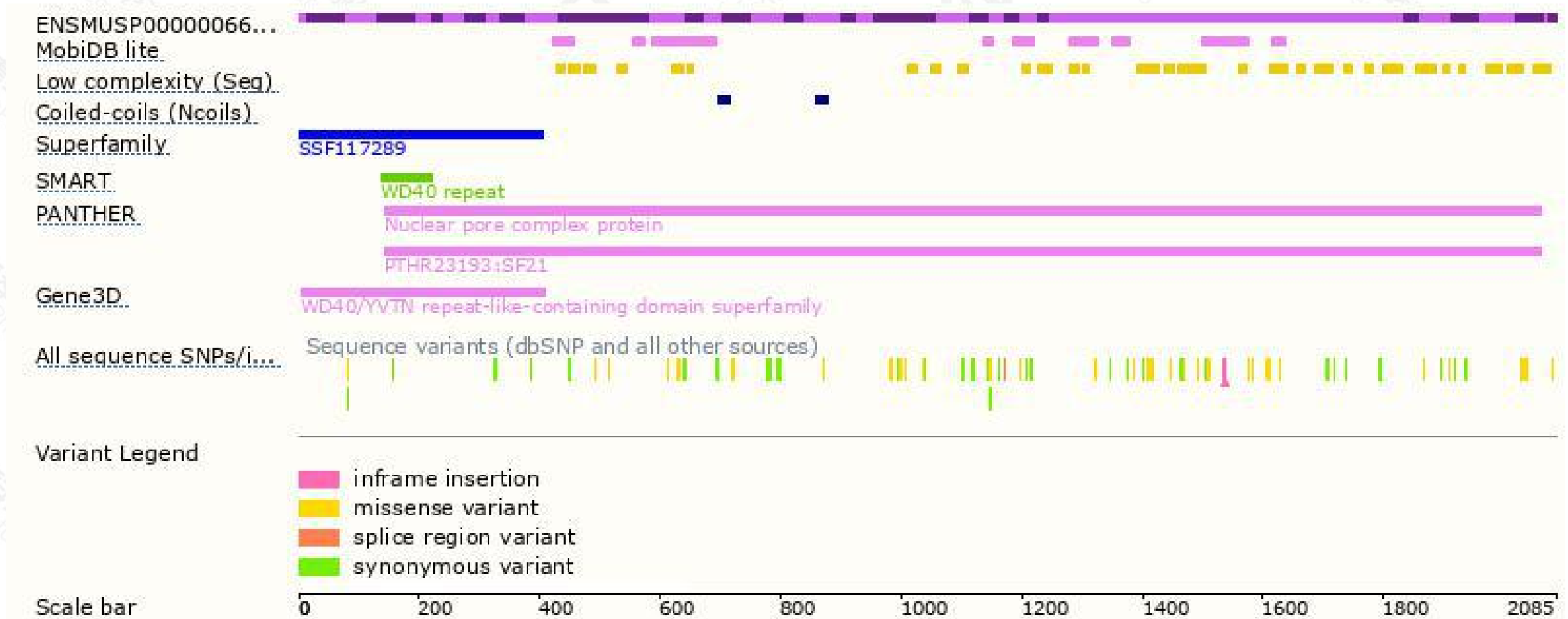
The strategy is based on the design of *Nup214-201* transcript,the transcription is shown below:



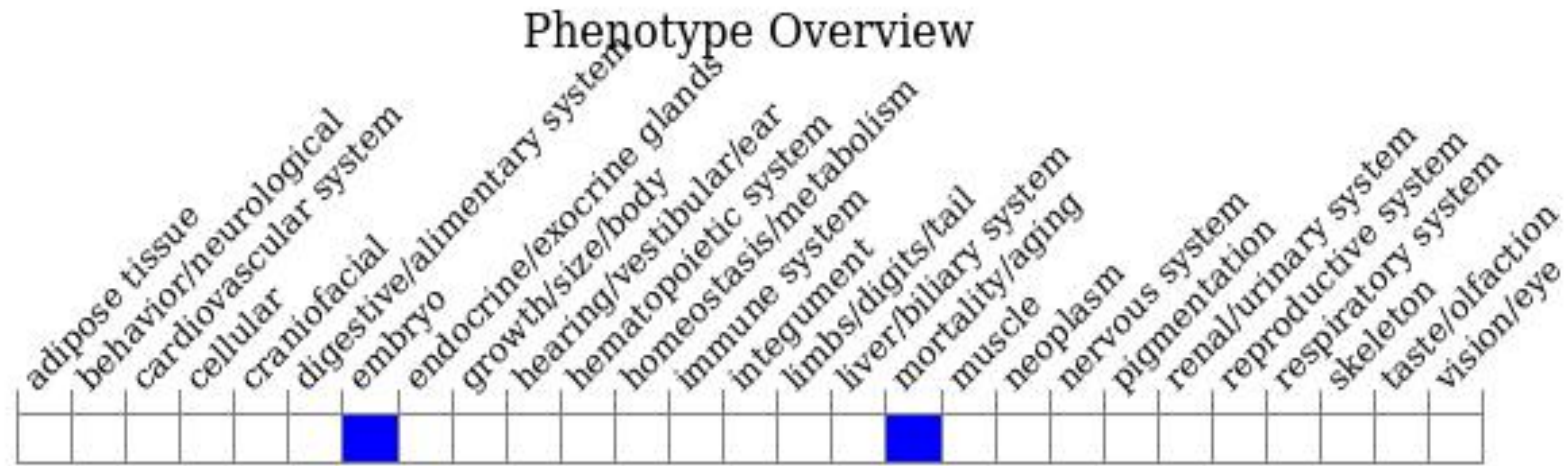
Genomic location distribution



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, embryos homozygous for a null mutation die between 4.0 and 4.5 dpc, following depletion of maternally-derived gene product. In vitro, cultured 3.5-dpc mutant embryos arrest in the G2 phase, and show blastocoel contraction with defects in NLS-mediated protein import and polyadenylated RNA export.

If you have any questions, you are welcome to inquire.
Tel: 400-9660890

