

Nphp1 Cas9-CKO Strategy

Designer:

Huan Wang

Reviewer:

Huan Fan

Design Date:

2020-4-16

Project Overview

Project Name

Nphp1

Project type

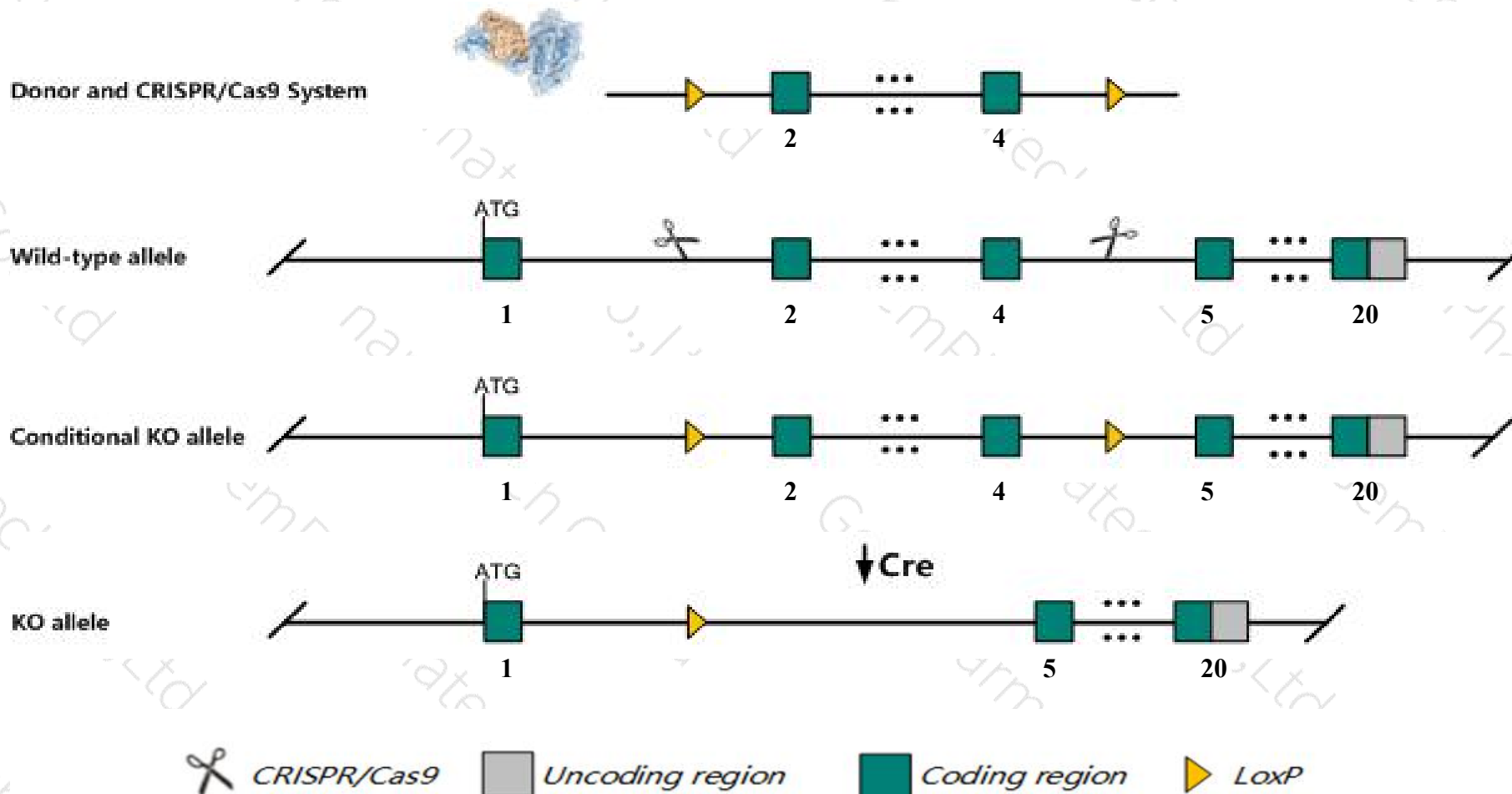
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Nphp1* gene. The schematic diagram is as follows:



- The *Nphp1* gene has 4 transcripts. According to the structure of *Nphp1* gene, exon2-exon4 of *Nphp1-201* (ENSMUST00000028857.13) transcript is recommended as the knockout region. The region contains 260bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Nphp1* gene. The brief process is as follows: gRNA was transcribed in vitro, donor was constructed. Cas9, gRNA 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, homozygotes for a targeted null mutation exhibit male infertility due to defects in sperm maturation. Mice homozygous for another knock-out allele exhibit absent photoreceptor outer segment and photoreceptor degeneration.
- The *Nphp1* 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information (NCBI)

Nphp1 nephronophthisis 1 (juvenile) homolog (human) [Mus musculus (house mouse)]

Gene ID: 53885, updated on 28-Mar-2019

Summary



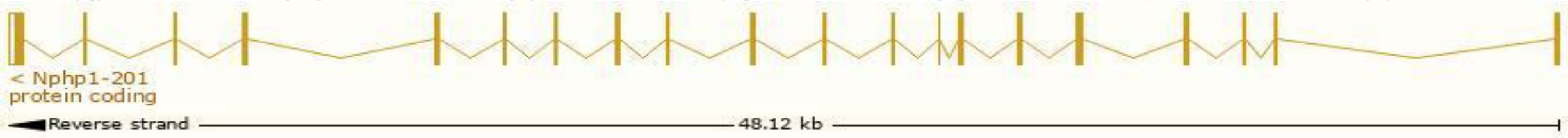
Official Symbol	Nphp1 provided by MGI
Official Full Name	nephronophthisis 1 (juvenile) homolog (human) provided by MGI
Primary source	MGI:MGI:1858233
See related	Ensembl:ENSMUSG000000027378
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Expression	Biased expression in testis adult (RPKM 216.9) and CNS E11.5 (RPKM 14.7) See more
Orthologs	human all

Transcript information (Ensembl)

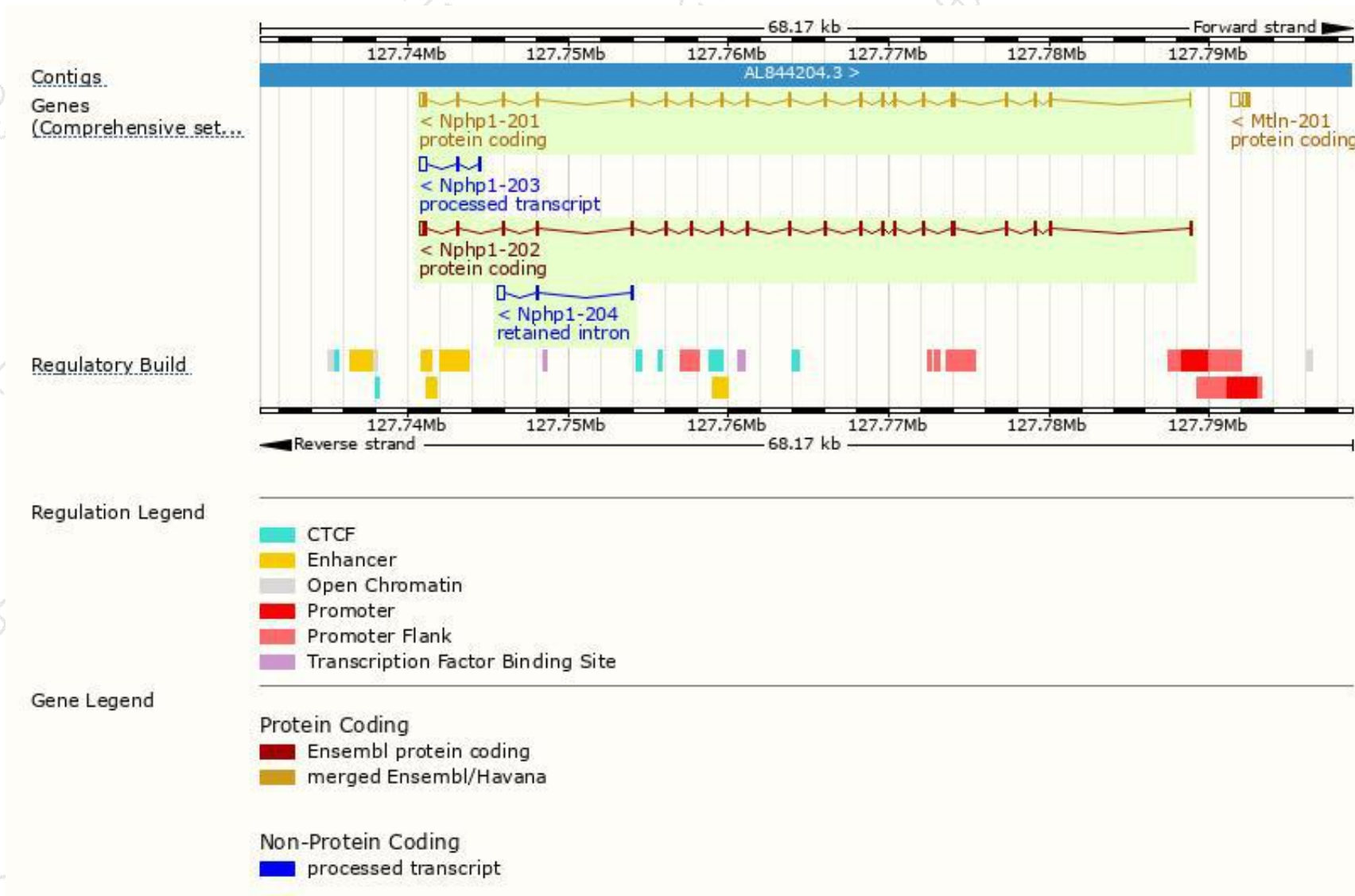
The gene has 4 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Nphp1-202	ENSMUST00000110357.1	2296	690aa	Protein coding	CCDS71140	Q3TWM5	TSL:1 GENCODE basic APPRIS ALT2
Nphp1-201	ENSMUST00000028857.13	2260	691aa	Protein coding	CCDS16709	A2APS1	TSL:1 GENCODE basic APPRIS P3
Nphp1-204	ENSMUST00000148033.1	559	No protein	Retained intron	-	-	TSL:3
Nphp1-203	ENSMUST00000144938.1	631	No protein	lncRNA	-	-	TSL:1

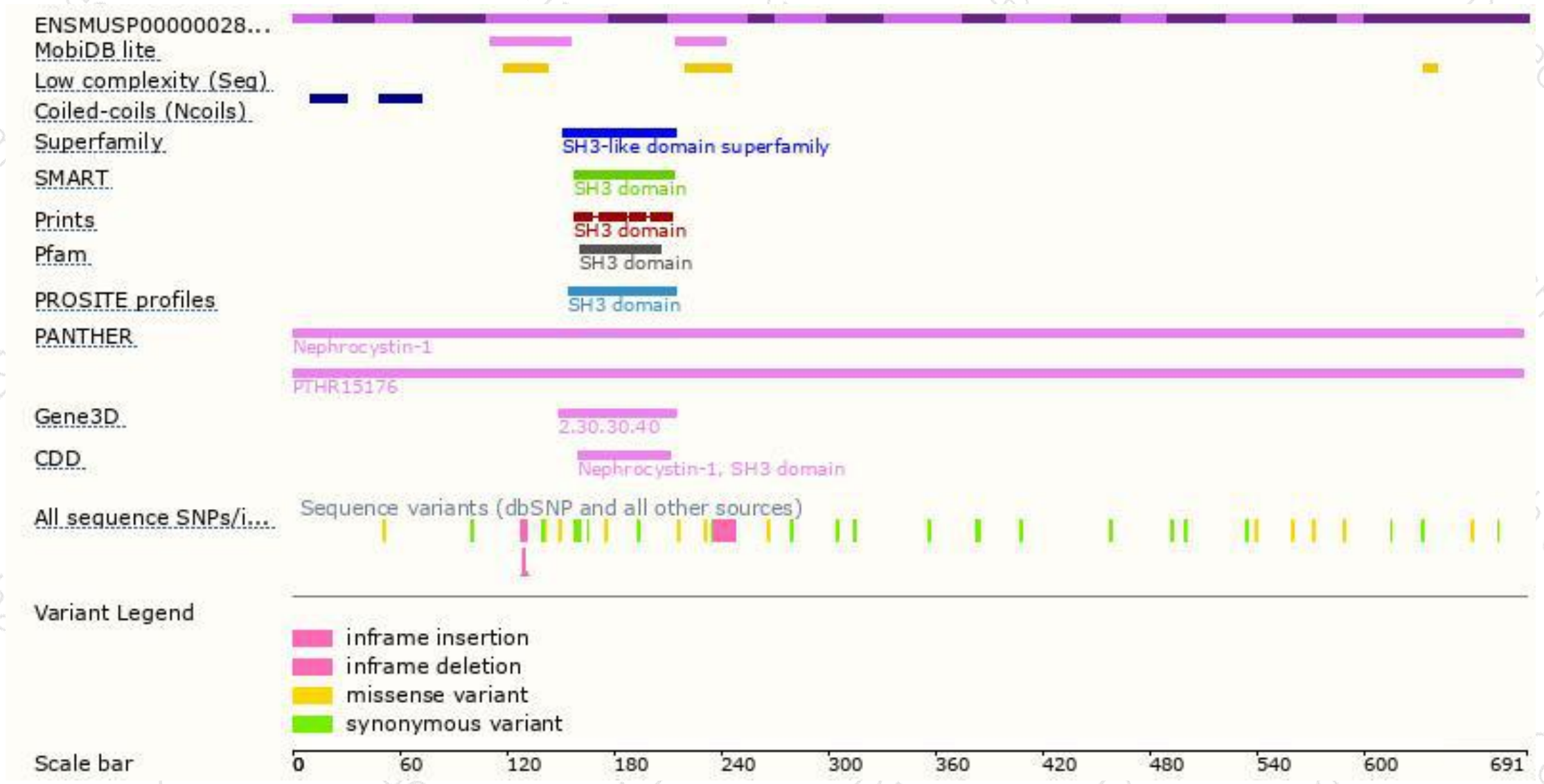
The strategy is based on the design of *Nphp1-201* transcript,the transcription is shown below



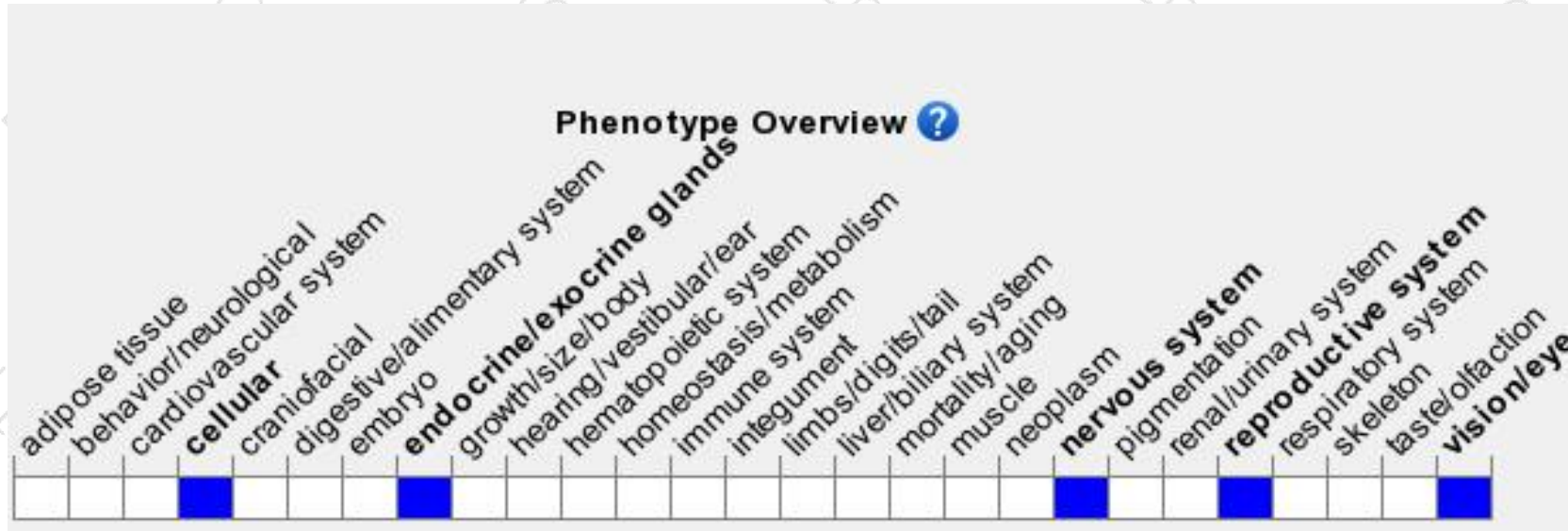
Genomic location distribution



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, homozygotes for a targeted null mutation exhibit male infertility due to defects in sperm maturation. Mice homozygous for another knock-out allele exhibit absent photoreceptor outer segment and photoreceptor degeneration.

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

Tel: 400-9660890

