Grk1 Cas9-CKO Strategy

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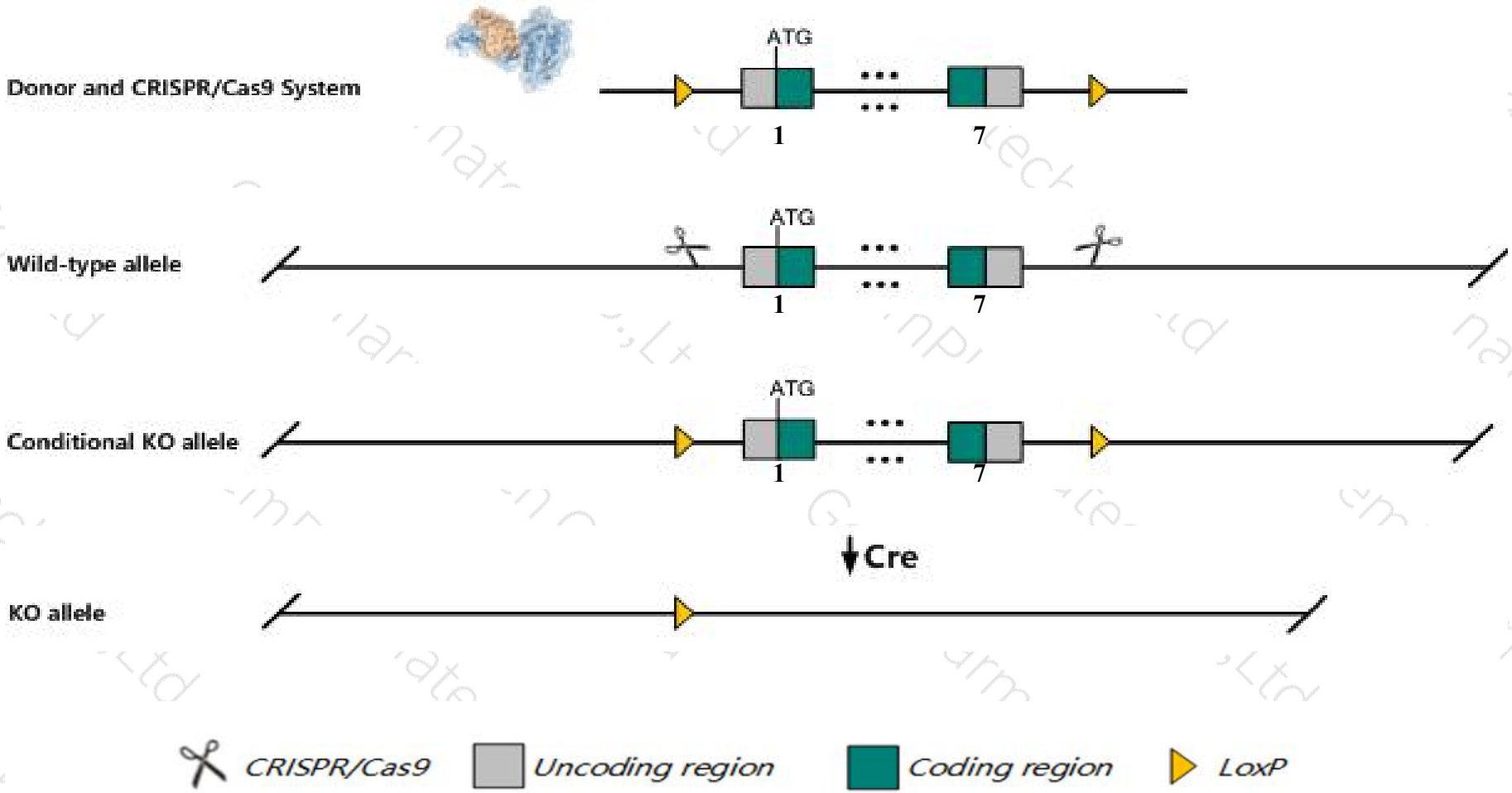
Project Overview

Project Name	***Grk1***
Project type	**Cas9-CKO**
Strain background	**C57BL/6JGpt**

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Grk1* gene. The schematic diagram is as follows:



Technical routes

- The *Grk1* gene has 3 transcripts. According to the structure of *Grk1* gene, exon1-exon7 of *Grk1-201* (ENSMUST00000033827.7) transcript is recommended as the knockout region.The region contains all of the coding sequence.Knock out the region will result in disruption of protein function.

- In this project we use CRISPR/Cas9 technology to modify *Grk1* 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.

Notice

➢ According to the existing MGI data,Analysis of homozygous null mice revealed abnormal photoresponses and light-induced apoptosis in rods. Mutant mice may serve as models of Oguchi disease and retinal degeneration.

➢The floxed region is near to the N-terminal of *Atp4b* gene,this strategy may influence the regulatory function of the N-terminal of *Atp4b* gene.

➢ The *Grk1* gene is located on the Chr8. 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）

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Grk1 G protein-coupled receptor kinase 1 [*Mus musculus* (house mouse)]

Gene ID: 24013, updated on 12-Aug-2019

Summary

Official Symbol	Grk1 provided by MGI
Official Full Name	G protein-coupled receptor kinase 1 provided by MGI
Primary source	MGI:MGI:1345146
See related	Ensembl:ENSMUSG00000031450
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	Rk; Rhok; Gprk1
Expression	Low expression observed in reference dataset See more
Orthologs	human all

Genomic context

Location: 8; 8 A1.1

See Grk1 in Genome Data Viewer

Exon count: 7

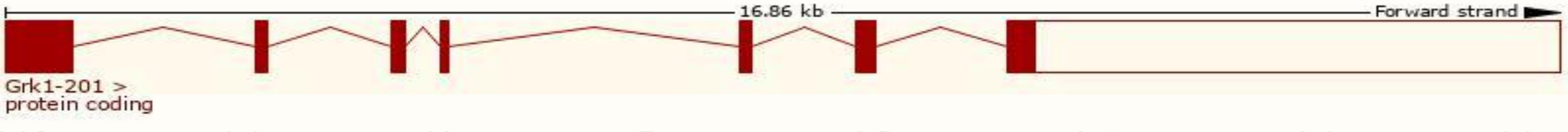
Annotation release	Status	Assembly	Chr	Location
108	current	GRCm38.p6 (GCF_000001635.26)	8	NC_000074.6 (13405081..13421951)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	8	NC_000074.5 (13405081..13421951)

Transcript information（Ensembl）

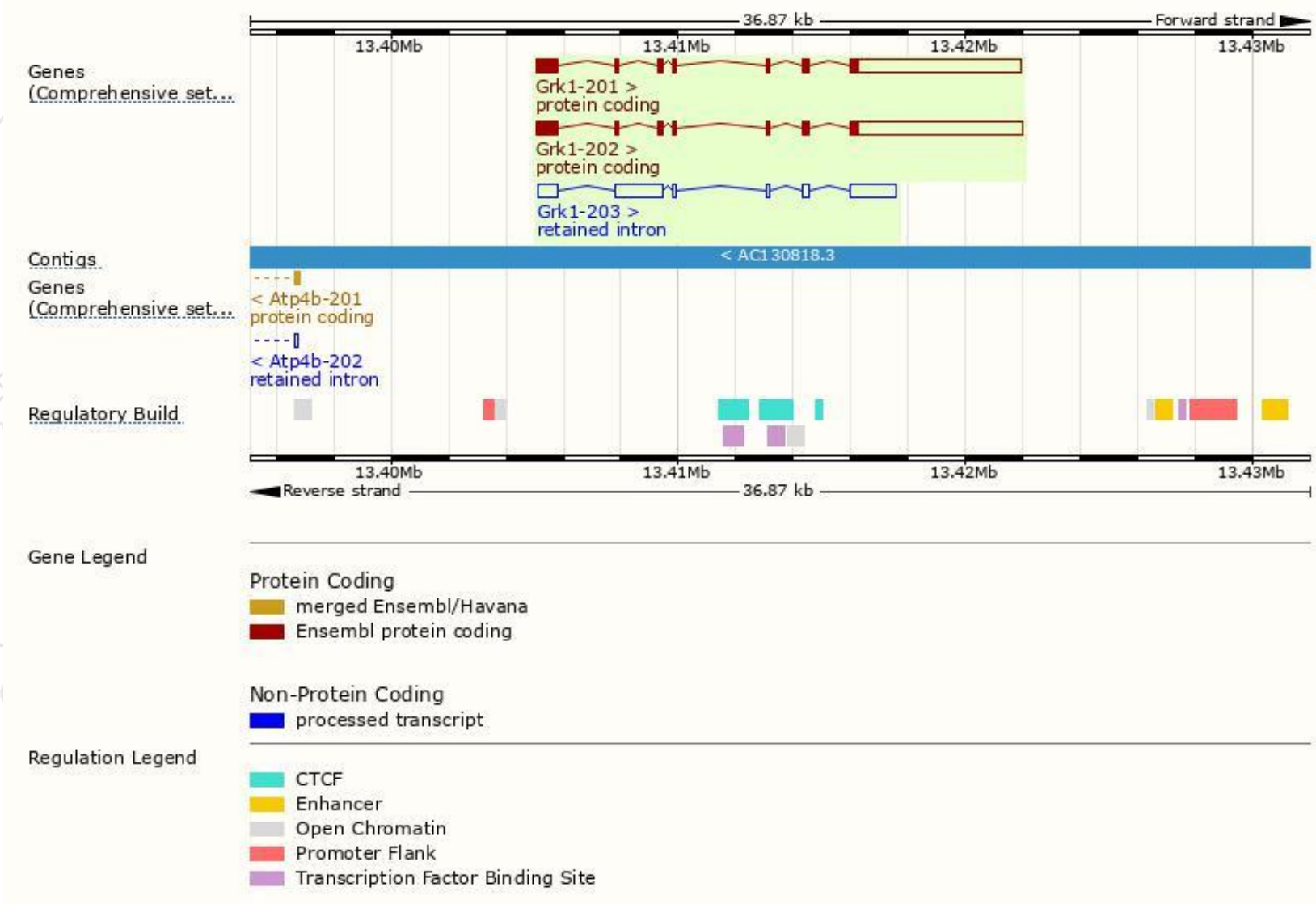
The gene has 3 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Grk1-201	ENSMUST00000033827.7	7425	564aa	Protein coding	CCDS22112	G3X905	TSL:1 GENCODE basic APPRIS P1
Grk1-202	ENSMUST00000209909.1	7431	564aa	Protein coding	-	G3X905	TSL:5 GENCODE basic APPRIS P1
Grk1-203	ENSMUST00000211027.1	4384	No protein	Retained intron	-	-	TSL:5

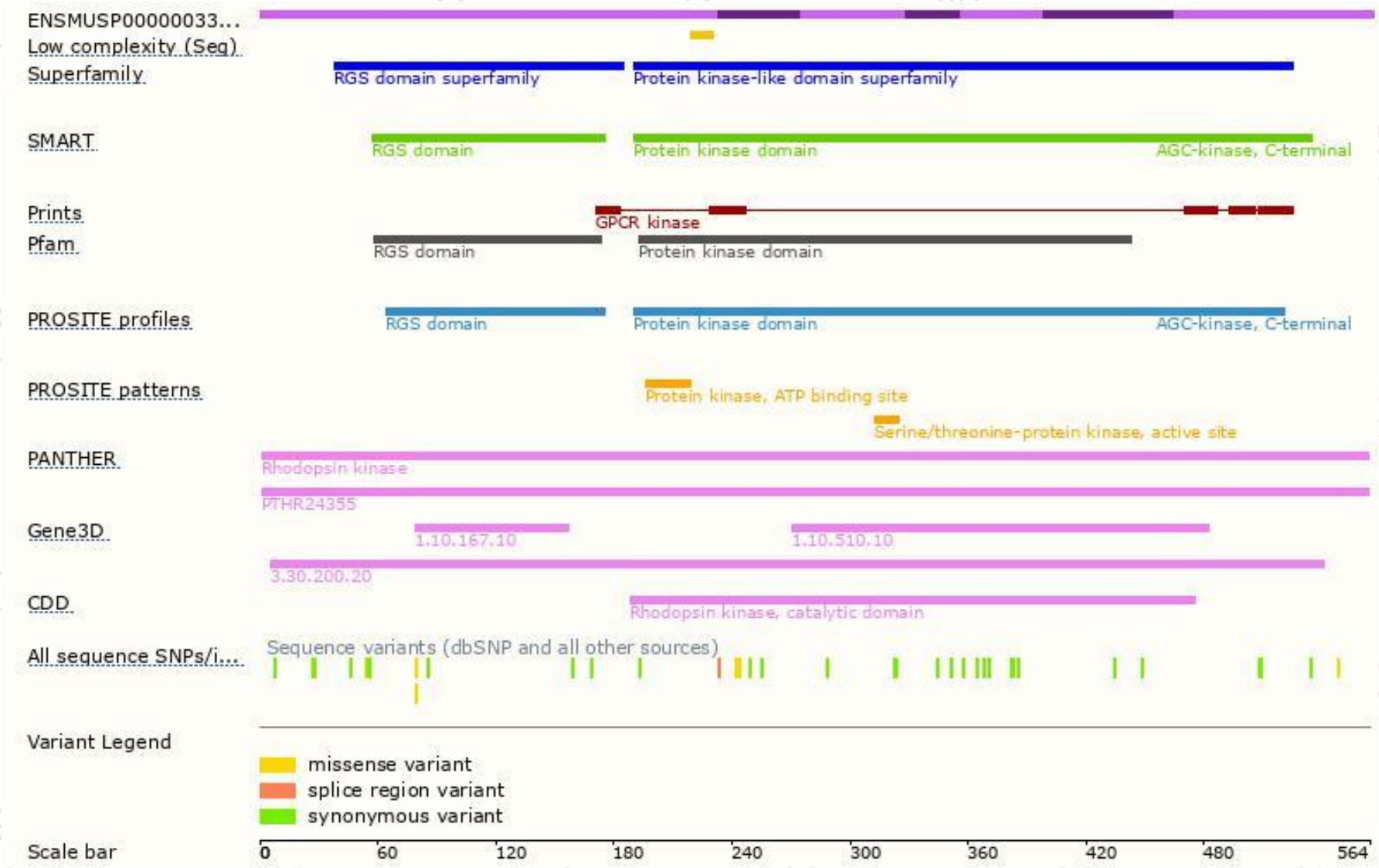
The strategy is based on the design of *Grk1-201* transcript,The transcription is shown below



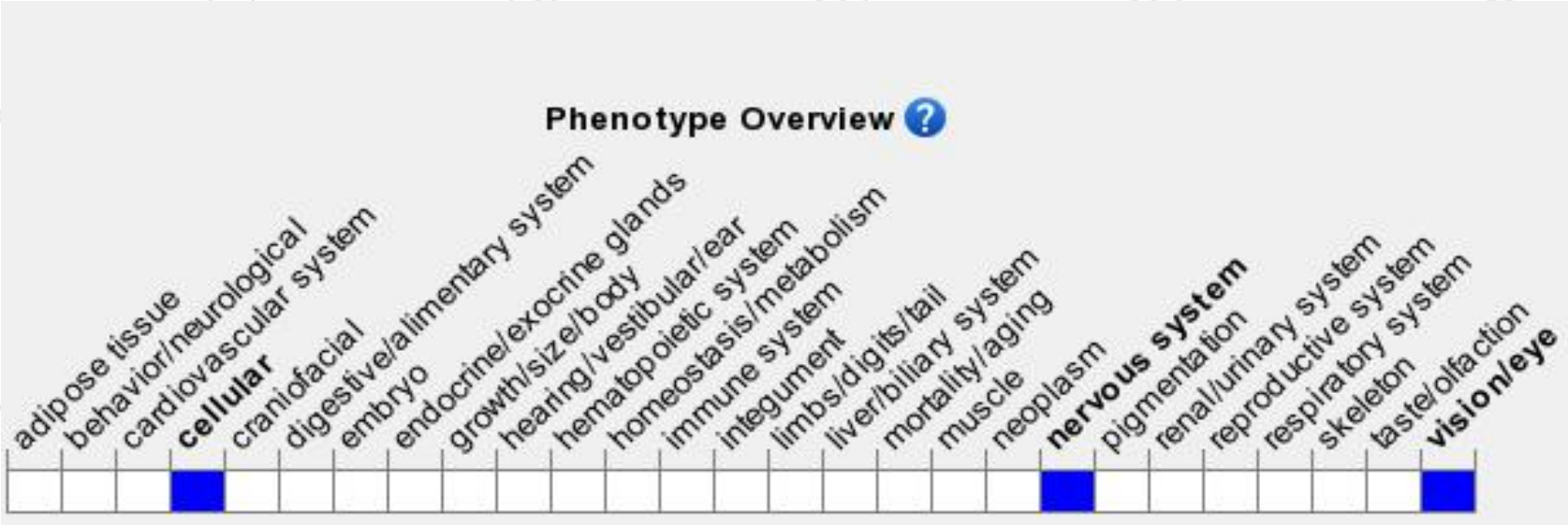
Genomic location distribution



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/).

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

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