

Chrna1 Cas9-CKO Strategy

Designer:

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Design Date:

2019-7-24

Project Overview

Project Name

Chrna1

Project type

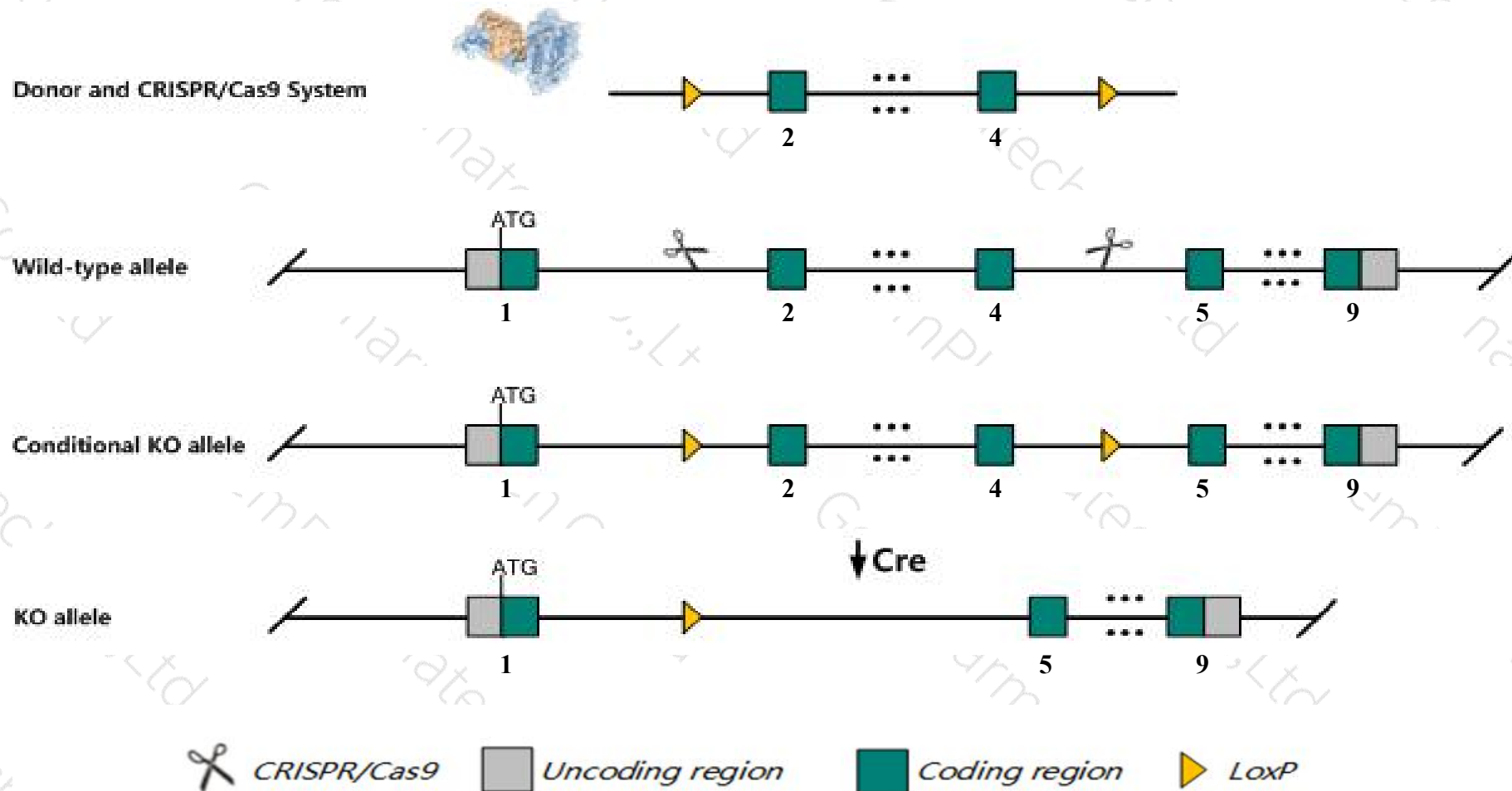
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Chrna1* gene. The schematic diagram is as follows:



Technical routes

- The *Chrna1* gene has 1 transcript. According to the structure of *Chrna1* gene, exon2-exon4 of *Chrna1*-201 (ENSMUST00000028515.3) transcript is recommended as the knockout region. The region contains 301bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Chrna1* 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 knock-out allele exhibit neonatal lethality, kyphosis, carpotosis, absent miniature and nerve-evoked endplant potential, increased motor neuron number, and abnormal neuromuscular synapse.
- The *Chrna1* 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)

Chrna1 cholinergic receptor, nicotinic, alpha polypeptide 1 (muscle) [Mus musculus (house mouse)]

Gene ID: 11435, updated on 26-Mar-2019

Summary



Official Symbol Chrna1 provided by [MGI](#)

Official Full Name cholinergic receptor, nicotinic, alpha polypeptide 1 (muscle) provided by [MGI](#)

Primary source [MGI:MGI:87885](#)

See related [Ensembl:ENSMUSG000000027107](#)

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 AI385656, AI608266, Achr-1, Acra

Summary This gene encodes an alpha subunit of the muscle-derived nicotinic acetylcholine receptor, a pentameric neurotransmitter receptor and member of the ligand-gated ion channel superfamily. The alpha subunit plays a role in substrate binding and channel gating. [provided by RefSeq, Nov 2012]

Expression Biased expression in limb E14.5 (RPKM 3.2), testis adult (RPKM 1.0) and 4 other tissues [See more](#)

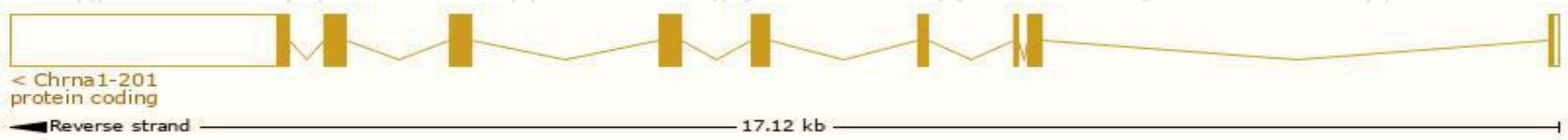
Orthologs [human](#) [all](#)

Transcript information (Ensembl)

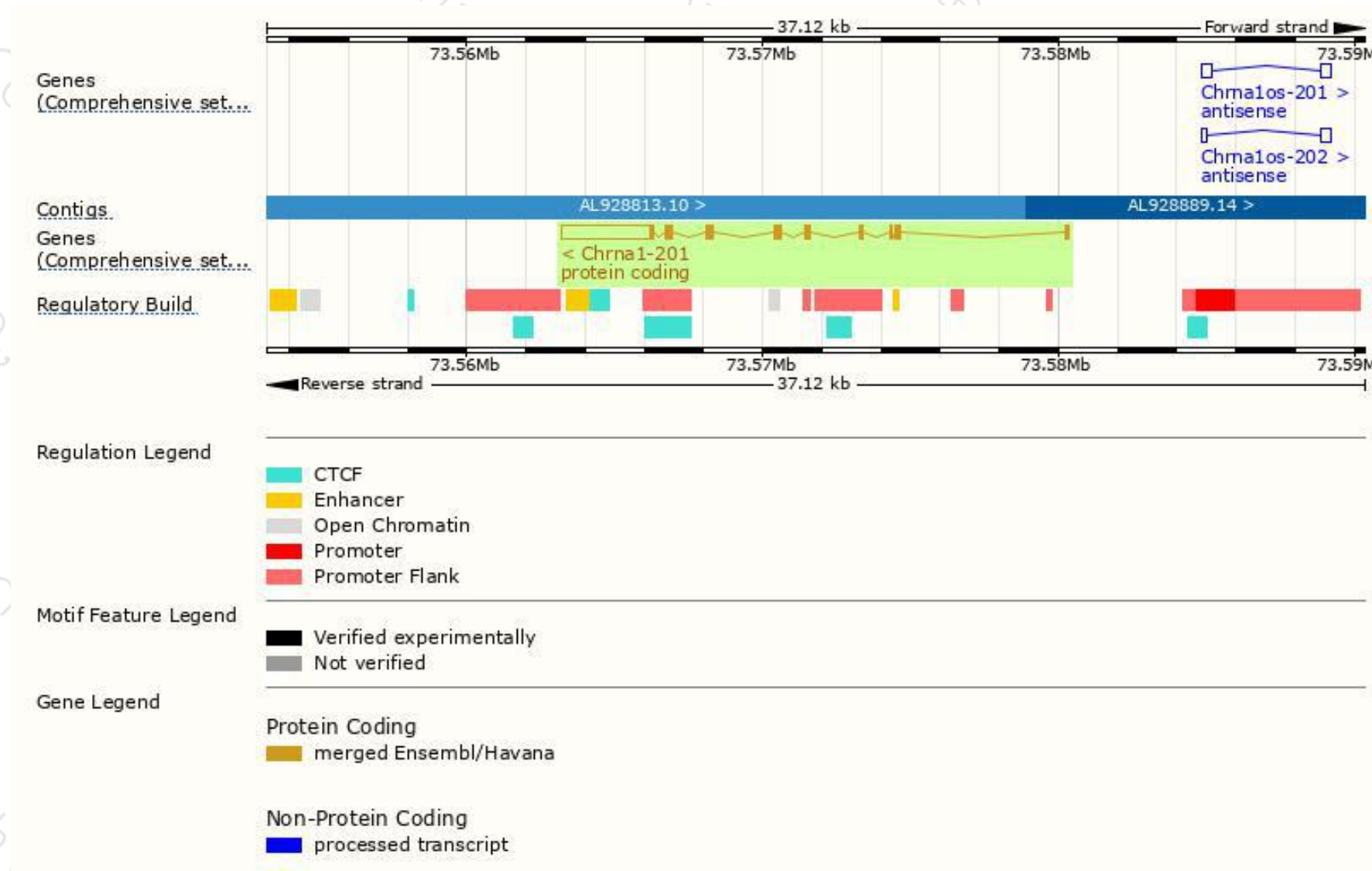
The gene has 1 transcript, and the transcript is shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Chrna1-201	ENSMUST00000028515.3	4386	457aa	Protein coding	CCDS16132	P04756 Q05A24	TSL:1 GENCODE basic APPRIS P1

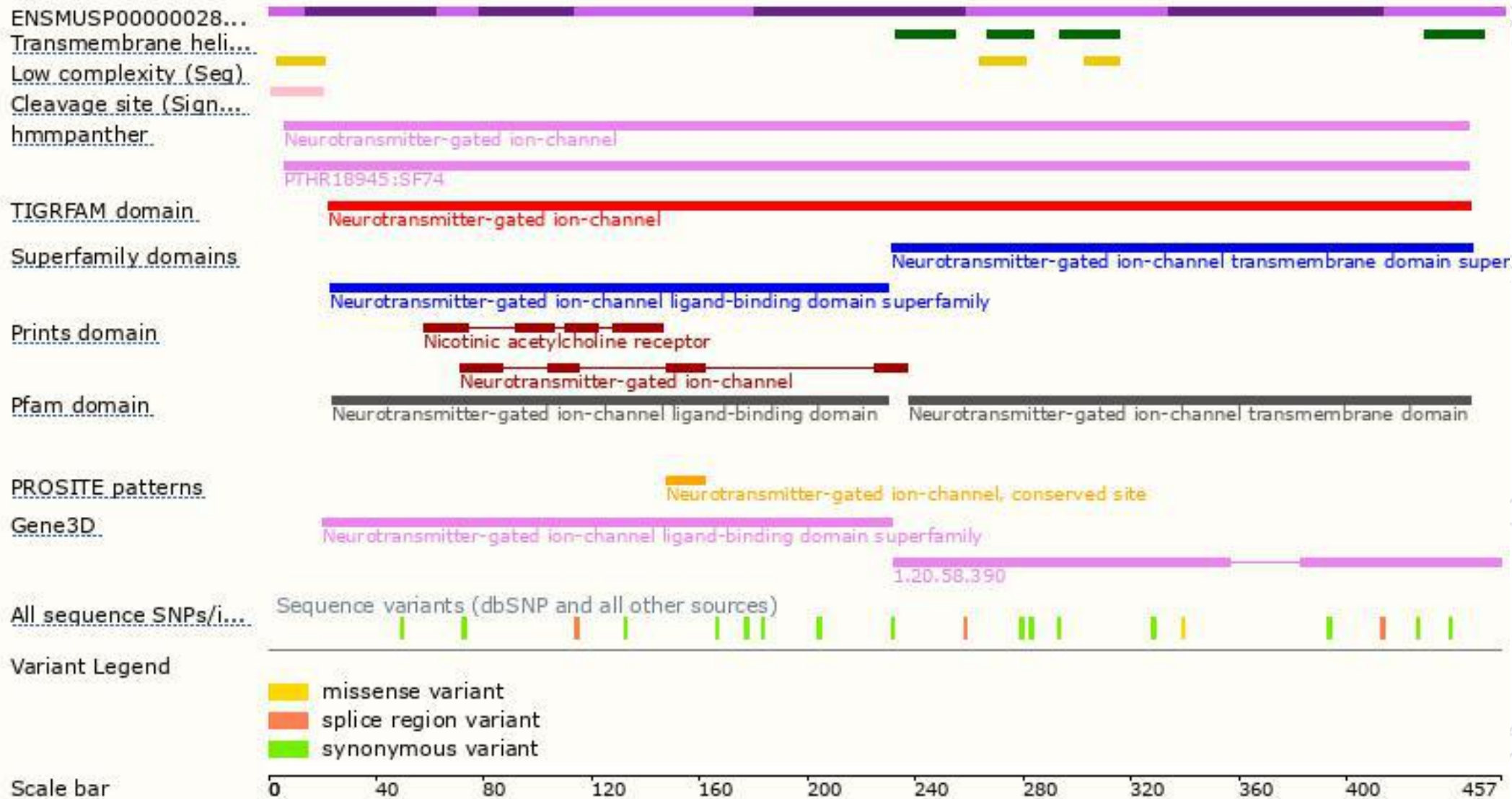
The strategy is based on the design of *Chrna1-201* transcript, The transcription is shown below



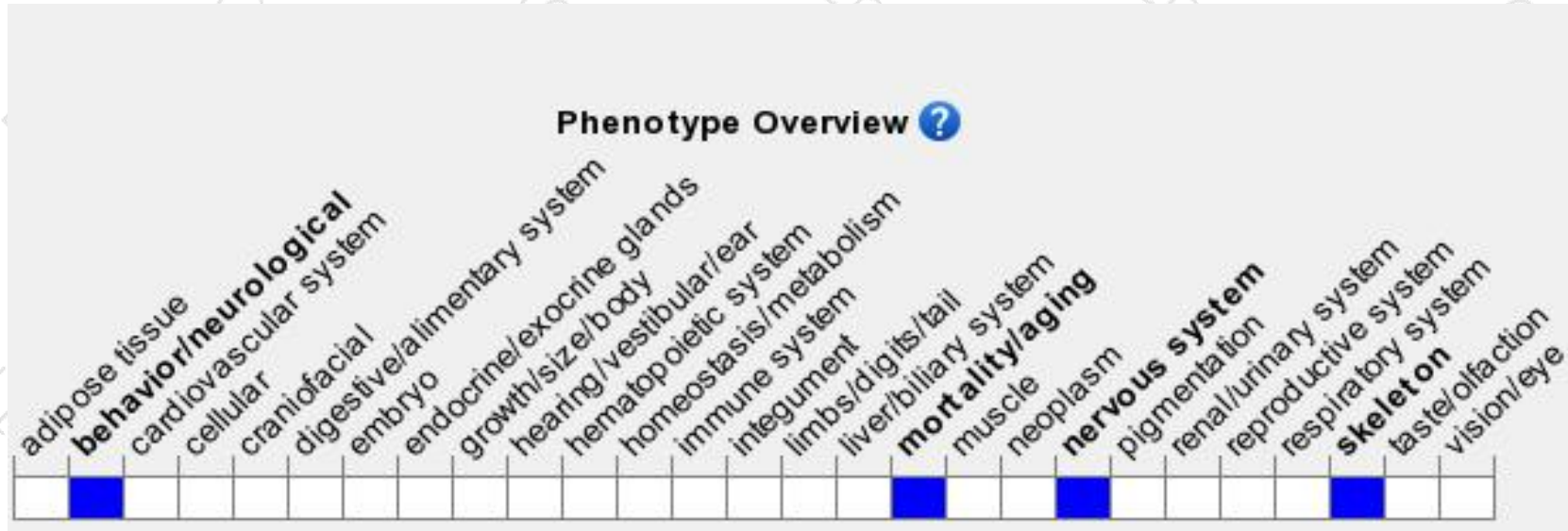
Genomic location distribution



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, Mice homozygous for a knock-out allele exhibit neonatal lethality, kyphosis, carpotosis, absent miniature and nerve-evoked endplant potential, increased motor neuron number, and abnormal neuromuscular synapse.

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

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