

Grin2a Cas9-CKO Strategy

Designer: Jinling Wang

Reviewer: Shilei Zhu

Date: 2019/1/11

Project Overview

Project Name

Grin2a

Project type

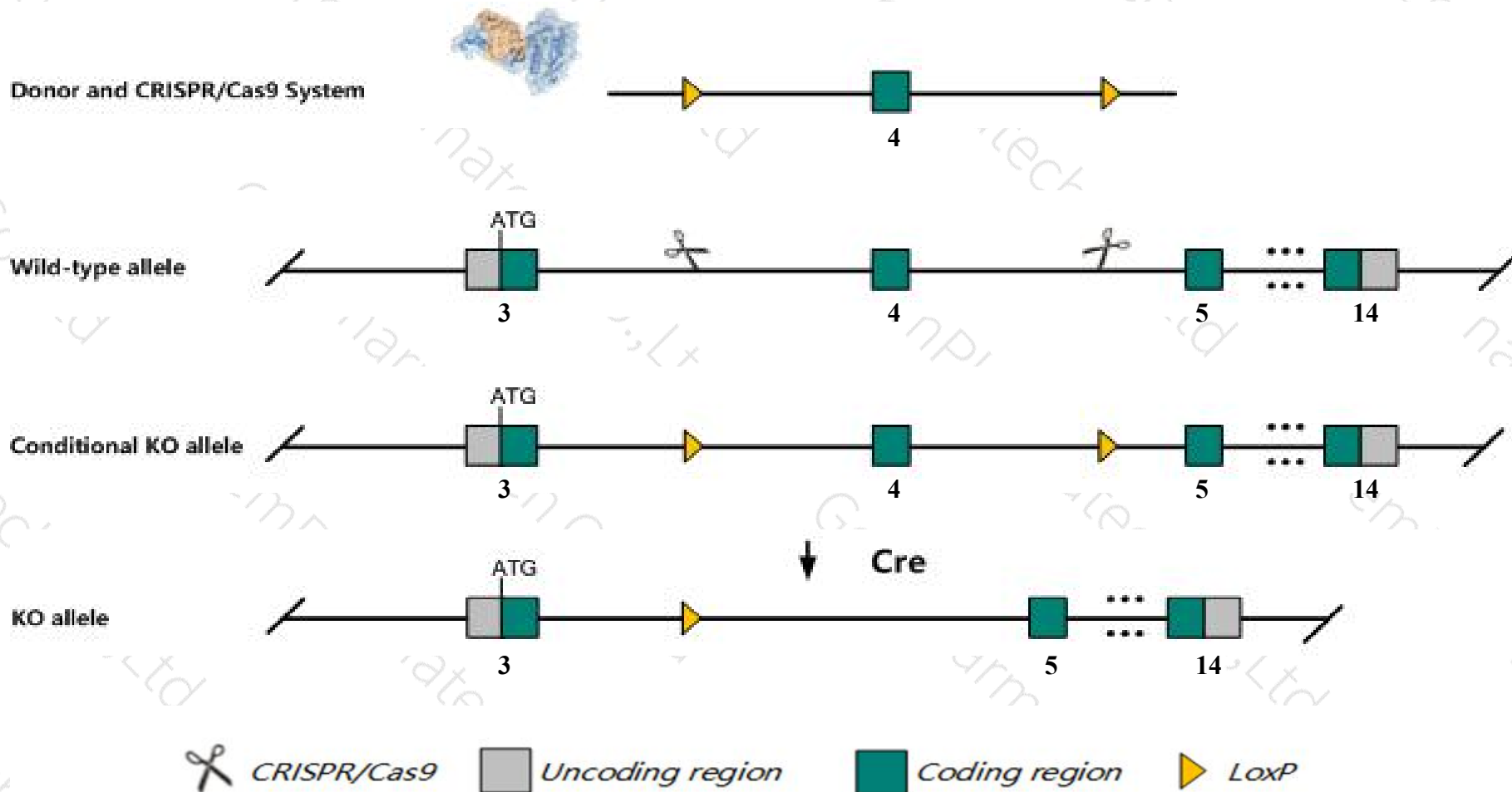
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Grin2a* gene. The schematic diagram is as follows:



- The *Grin2a* gene has 6 transcripts. According to the structure of *Grin2a* gene, exon4 of *Grin2a-206* (ENSMUST00000199708.4) transcript is recommended as the knockout region. The region contains 593bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Grin2a* 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, Homozygotes for targeted null mutations exhibit jumpiness, mildly impaired long-term potentiation and spatial learning, increased locomotor activity and metabolism of dopamine and serotonin, and loss of analgesic tolerance after repeated morphine doses.
- The *Grin2a* gene is located on the Chr16. 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)

Grin2a glutamate receptor, ionotropic, NMDA2A (epsilon 1) [Mus musculus (house mouse)]

Gene ID: 14811, updated on 19-Mar-2019

Summary



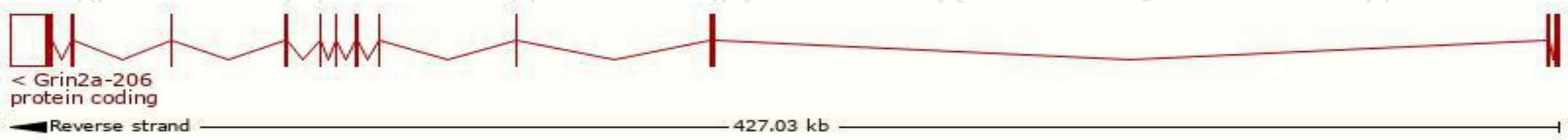
Official Symbol	Grin2a provided by MGI
Official Full Name	glutamate receptor, ionotropic, NMDA2A (epsilon 1) provided by MGI
Primary source	MGI:MGI:95820
See related	Ensembl:ENSMUSG00000059003
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	GluN2A, GluRepsilon1, NMDAR2A, NR2A
Expression	Biased expression in cortex adult (RPKM 2.7), frontal lobe adult (RPKM 1.8) and 3 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

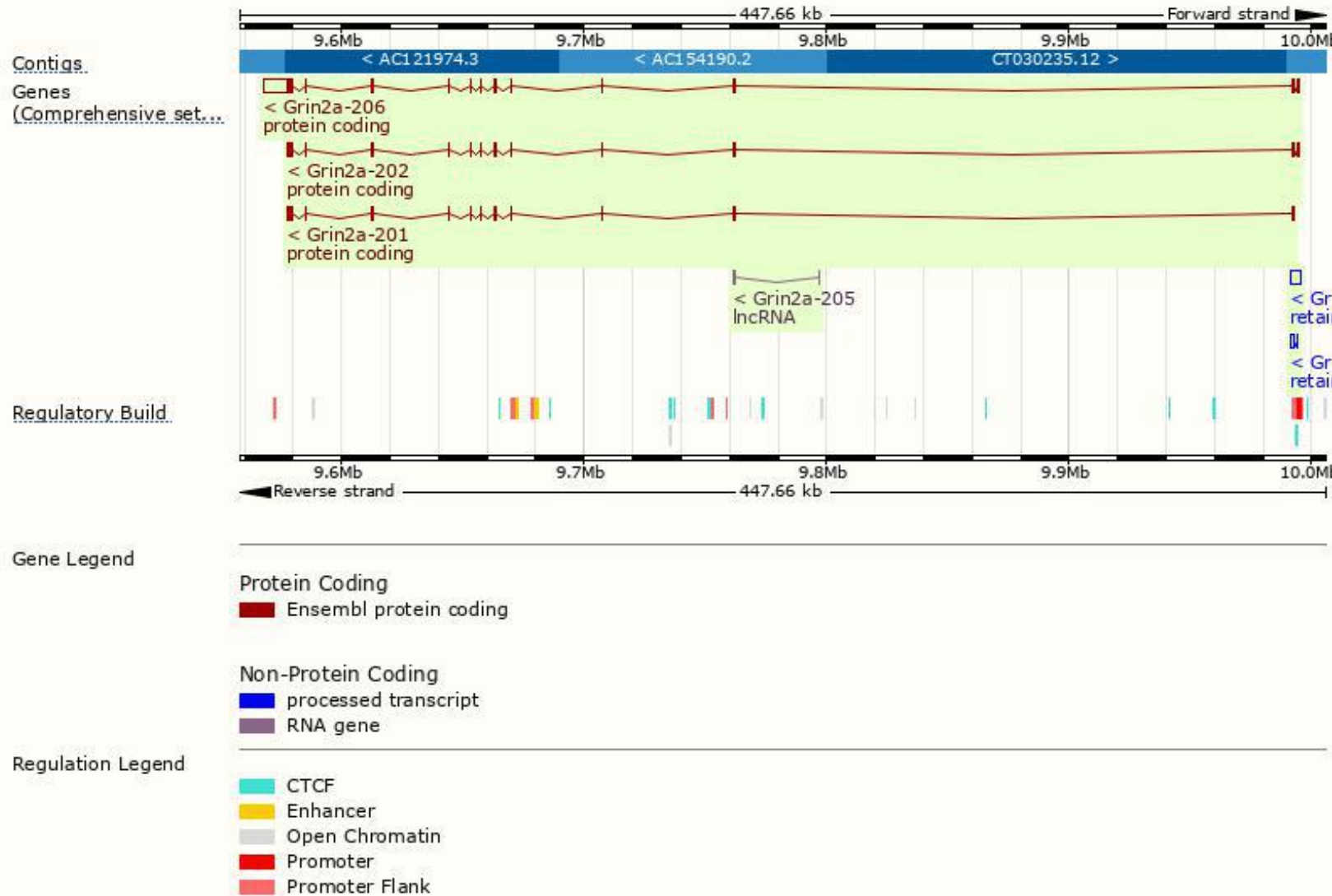
The gene has 6 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Grin2a-206	ENSMUST00000199708.4	14634	1464aa	Protein coding	CCDS27943	P35436	TSL:5 GENCODE basic APPRIS P1
Grin2a-202	ENSMUST00000115835.7	5023	1464aa	Protein coding	CCDS27943	P35436	TSL:5 GENCODE basic APPRIS P1
Grin2a-201	ENSMUST00000032331.7	4395	1464aa	Protein coding	CCDS27943	P35436	TSL:1 GENCODE basic APPRIS P1
Grin2a-205	ENSMUST00000199267.1	602	No protein	Processed transcript	-	-	TSL:5
Grin2a-204	ENSMUST00000197242.1	3906	No protein	Retained intron	-	-	TSL:NA
Grin2a-203	ENSMUST00000156482.2	1109	No protein	Retained intron	-	-	TSL:1

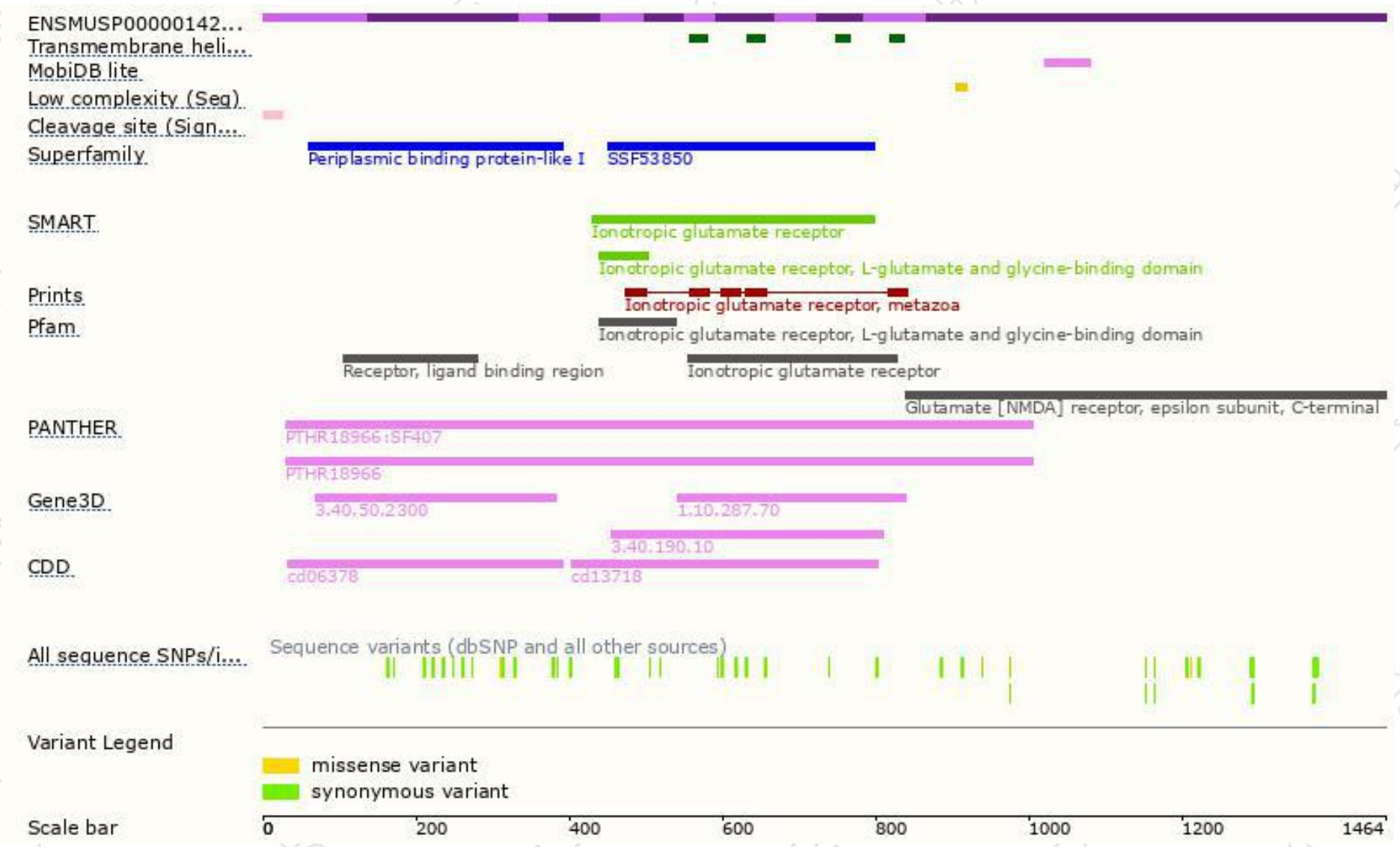
The strategy is based on the design of *Grin2a-206* transcript,The transcription is shown below



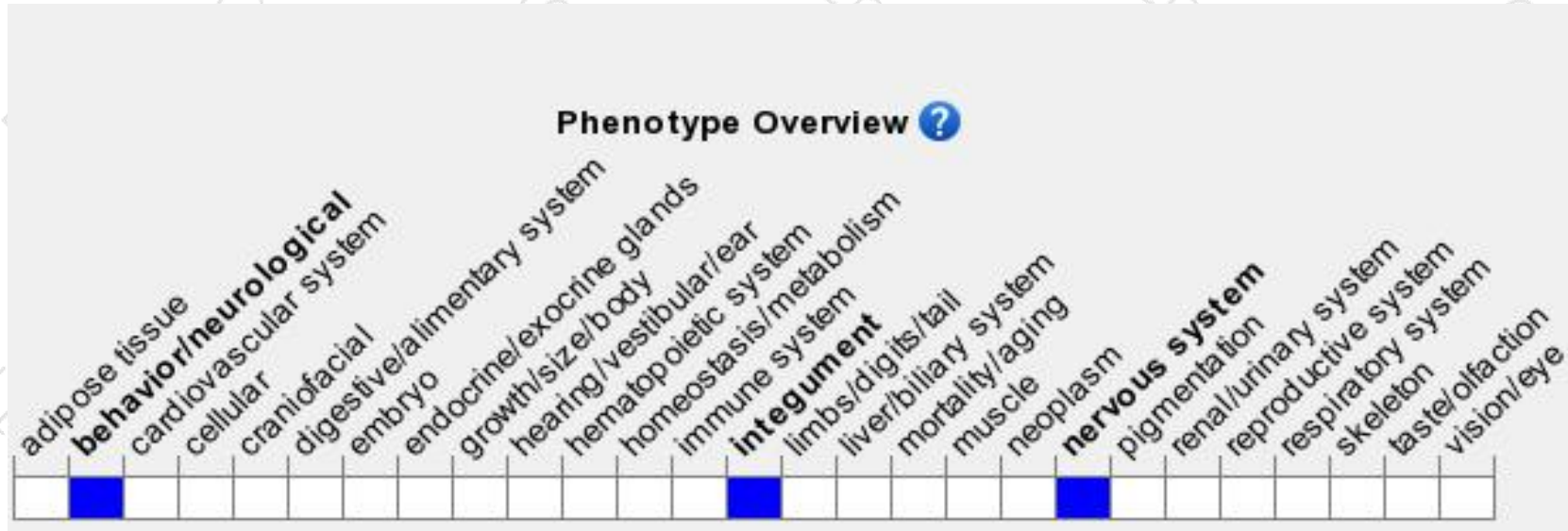
Genomic location distribution



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 targeted null mutations exhibit jumpiness, mildly impaired long-term potentiation and spatial learning, increased locomotor activity and metabolism of dopamine and serotonin, and loss of analgesic tolerance after repeated morphine doses.

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

Tel: 400-9660890

