

Sema7a Cas9-CKO Strategy

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Reviewer:

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Design Date:

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Project Overview

Project Name

Sema7a

Project type

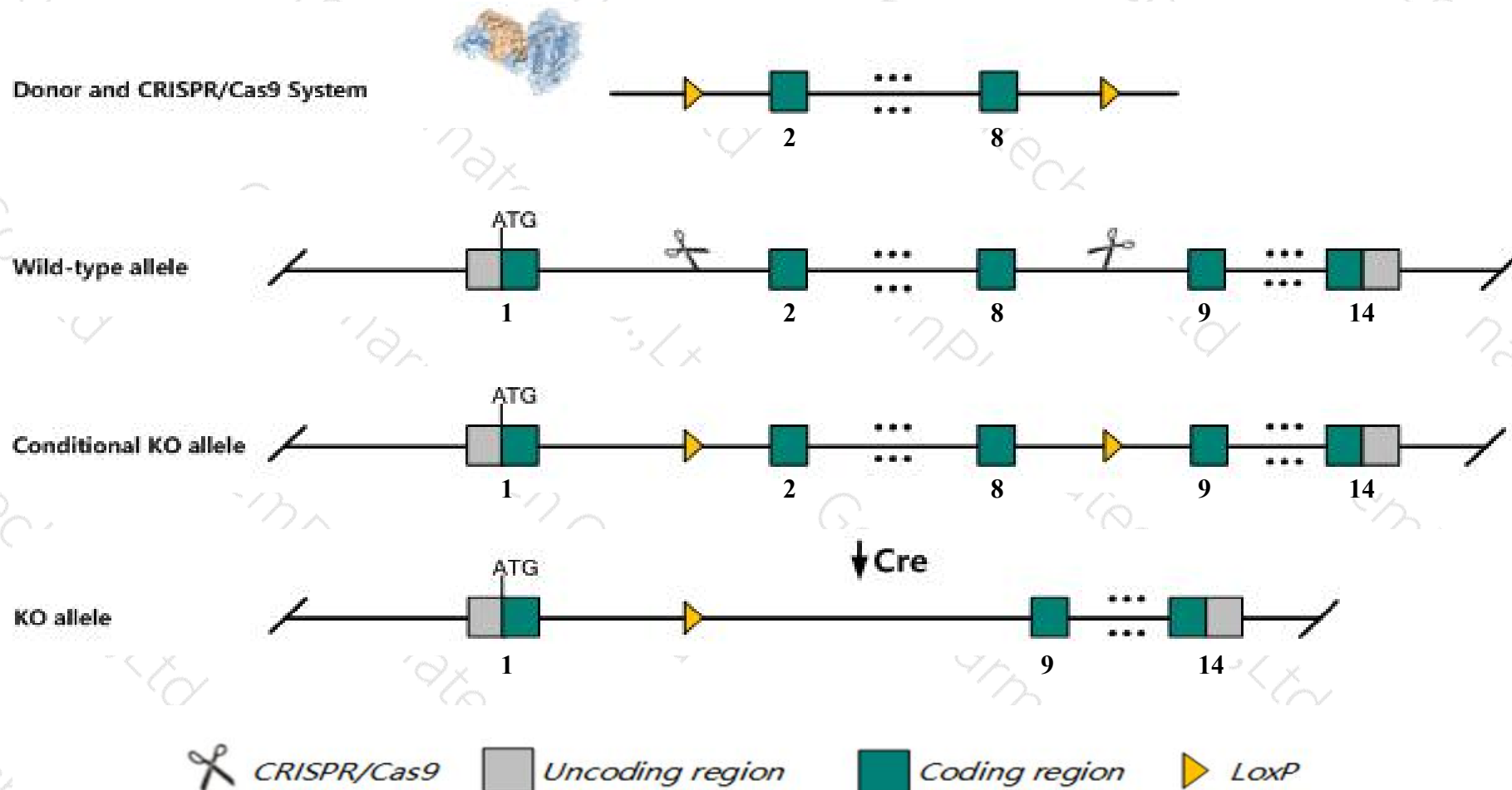
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Sema7a* gene. The schematic diagram is as follows:



Technical routes

- The *Sema7a* gene has 2 transcripts. According to the structure of *Sema7a* gene, exon2-exon8 of *Sema7a*-201 (ENSMUST00000043059.8) transcript is recommended as the knockout region. The region contains 802bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Sema7a* 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, The development of the olfactory tract is impaired in homozygous null mice.
- The *Sema7a* gene is located on the Chr9. 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)

Sema7a sema domain, immunoglobulin domain (Ig), and GPI membrane anchor, (semaphorin) 7A [Mus musculus (house mouse)]

Gene ID: 20361, updated on 31-Jan-2019

Summary



Official Symbol	Sema7a provided by MGI
Official Full Name	sema domain, immunoglobulin domain (Ig), and GPI membrane anchor, (semaphorin) 7A provided by MGI
Primary source	MGI:MGI:1306826
See related	Ensembl:ENSMUSG00000038264
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	2900057C09Rik, CDw108, H-Sema K1, H-Sema-L, M-Sema-L, Semal, sema K1, sema L
Expression	Broad expression in ovary adult (RPKM 69.7), cerebellum adult (RPKM 47.2) and 22 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

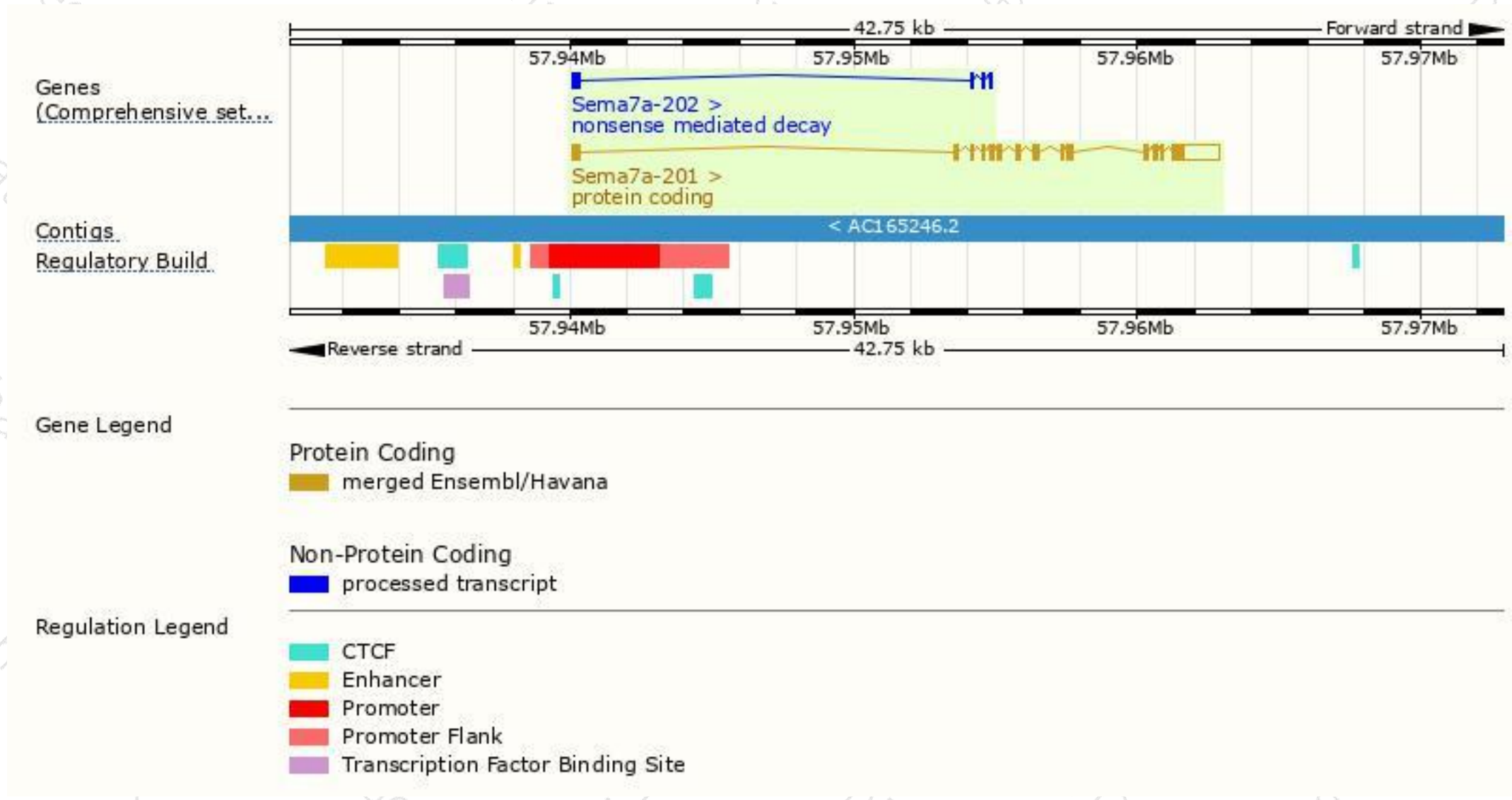
The gene has 2 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Sema7a-201	ENSMUST00000043059.8	3297	664aa	Protein coding	CCDS23235	Q9QUR8	TSL:1 GENCODE basic APPRIS P1
Sema7a-202	ENSMUST00000214314.1	417	86aa	Nonsense mediated decay	-	A0A1L1SQ43	TSL:3

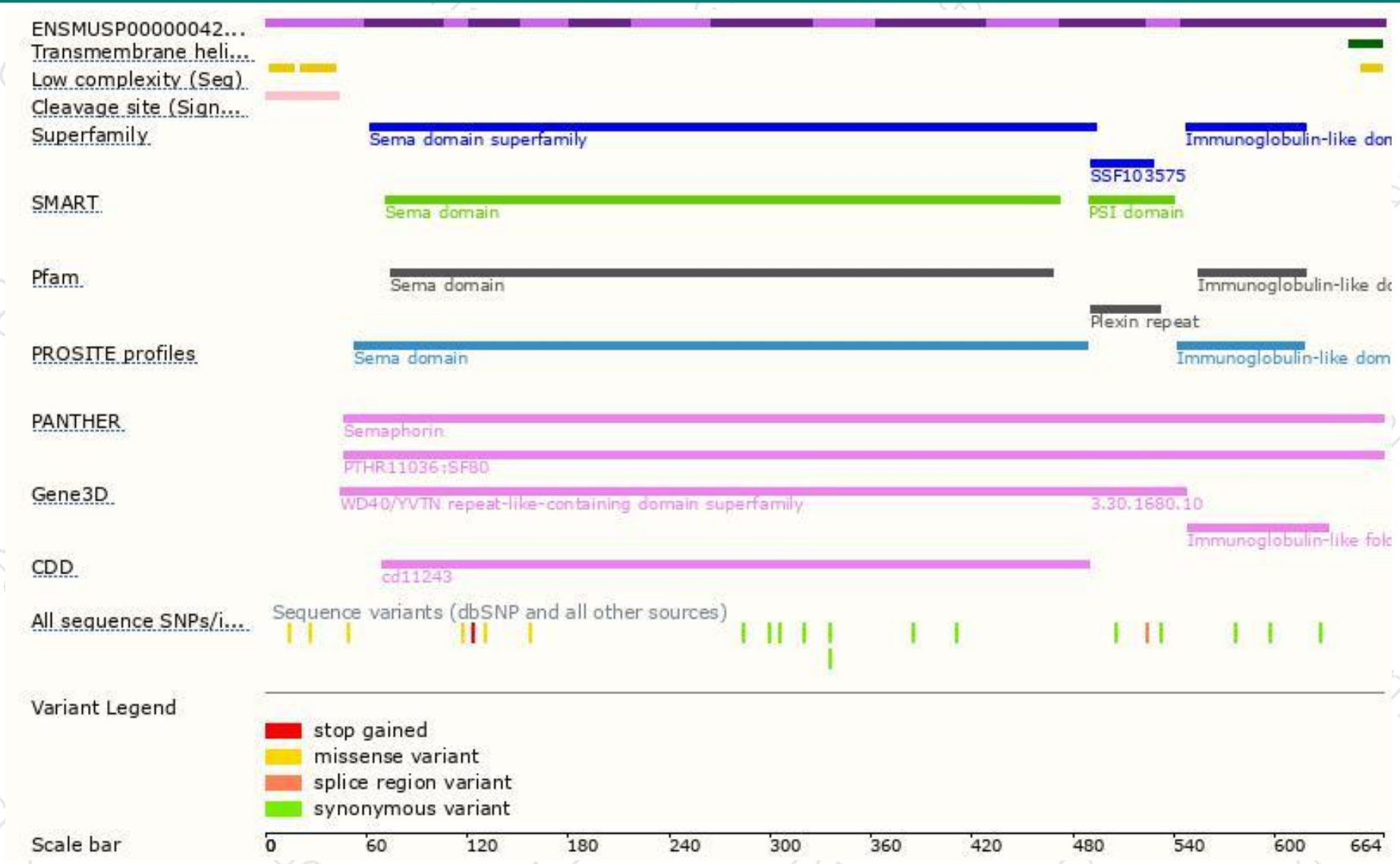
The strategy is based on the design of *Sema7a-201* transcript,The transcription is shown below



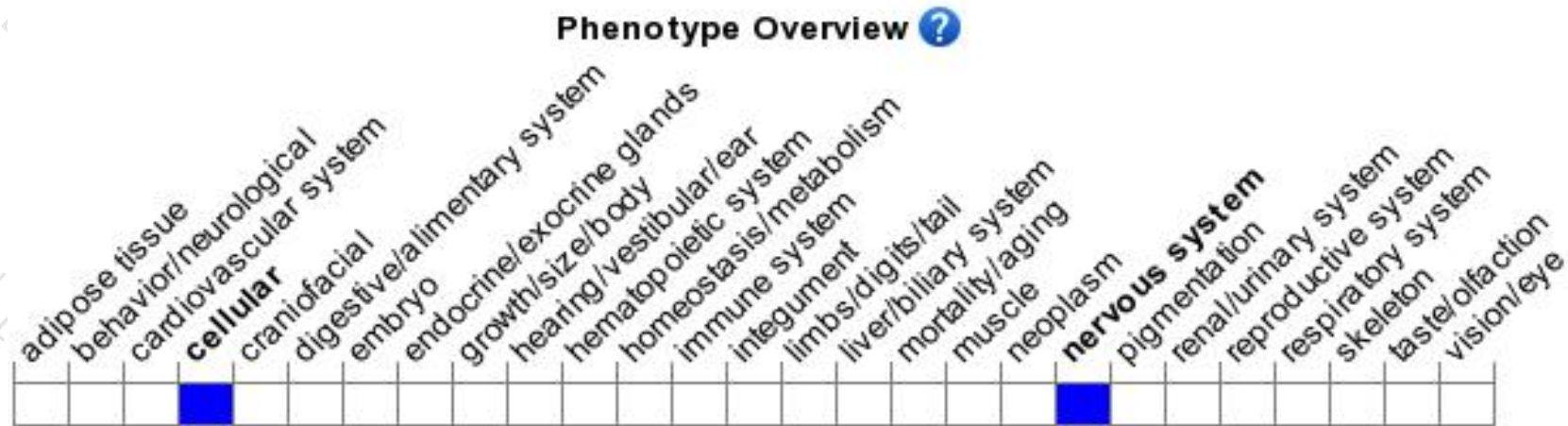
Genomic location distribution



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, The development of the olfactory tract is impaired in homozygous null mice.

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

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