

# *Sema5b* Cas9-KO Strategy

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**Reviewer:**

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# Project Overview

**Project Name**

***Sema5b***

**Project type**

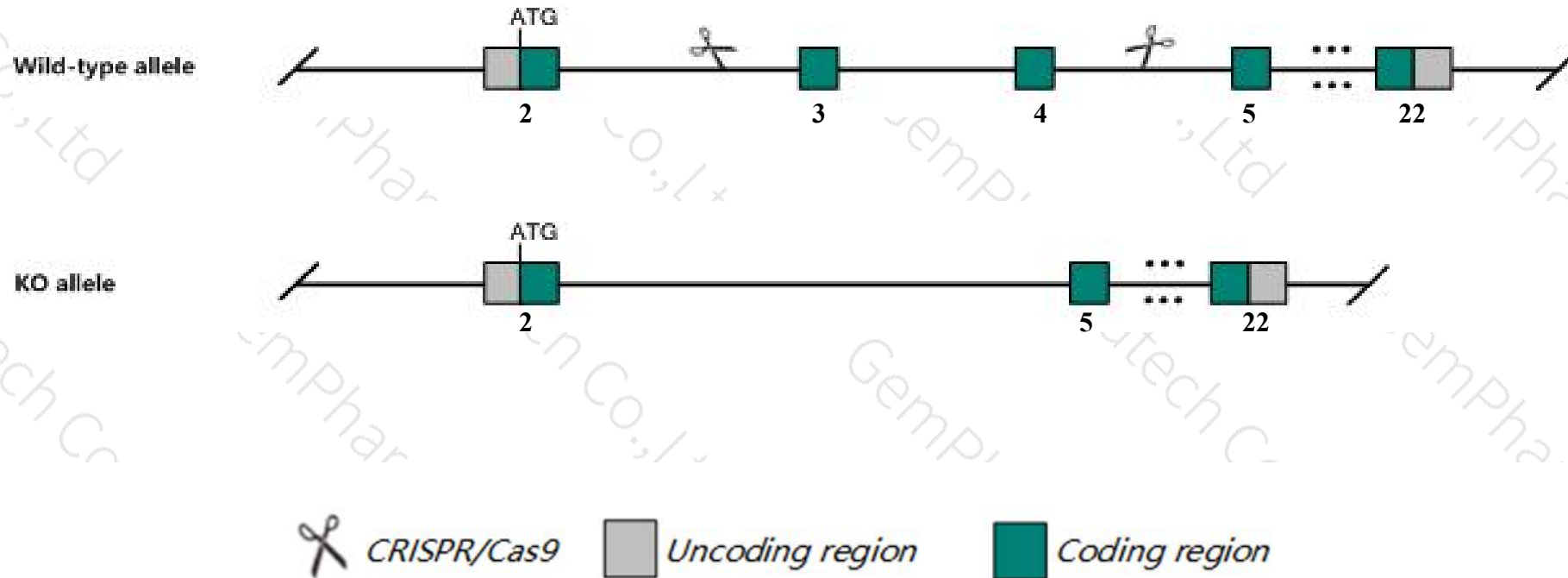
**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Sema5b* gene. The schematic diagram is as follows:



- The *Sema5b* gene has 8 transcripts. According to the structure of *Sema5b* gene, exon3-exon4 of *Sema5b-201* (ENSMUST00000050625.14) transcript is recommended as the knockout region. The region contains 146bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Sema5b* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Mice homozygous for a null mutation display defects in neurite arborization of multiple retinal cell types.
- The *Sema5b* 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 the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

# Gene information (NCBI)

**Sema5b sema domain, seven thrombospondin repeats (type 1 and type 1-like), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 5B [Mus musculus (house mouse)]**

Gene ID: 20357, updated on 31-Jan-2019

## Summary



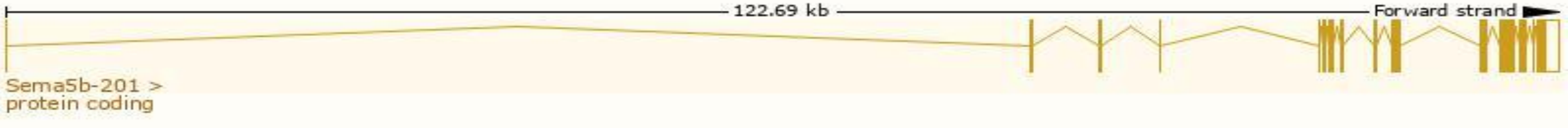
|                           |                                                                                                                                                                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Official Symbol</b>    | Sema5b provided by <a href="#">MGI</a>                                                                                                                                      |
| <b>Official Full Name</b> | sema domain, seven thrombospondin repeats (type 1 and type 1-like), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 5B provided by <a href="#">MGI</a> |
| <b>Primary source</b>     | <a href="#">MGI:MGI:107555</a>                                                                                                                                              |
| <b>See related</b>        | <a href="#">Ensembl:ENSMUSG00000052133</a>                                                                                                                                  |
| <b>Gene type</b>          | protein coding                                                                                                                                                              |
| <b>RefSeq status</b>      | VALIDATED                                                                                                                                                                   |
| <b>Organism</b>           | <a href="#">Mus musculus</a>                                                                                                                                                |
| <b>Lineage</b>            | Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus   |
| <b>Also known as</b>      | AI893641, SemG, Semag, mKIAA1445                                                                                                                                            |
| <b>Expression</b>         | Biased expression in adrenal adult (RPKM 16.2), CNS E11.5 (RPKM 13.7) and 11 other tissues <a href="#">See more</a>                                                         |
| <b>Orthologs</b>          | <a href="#">human</a> <a href="#">all</a>                                                                                                                                   |

# Transcript information (Ensembl)

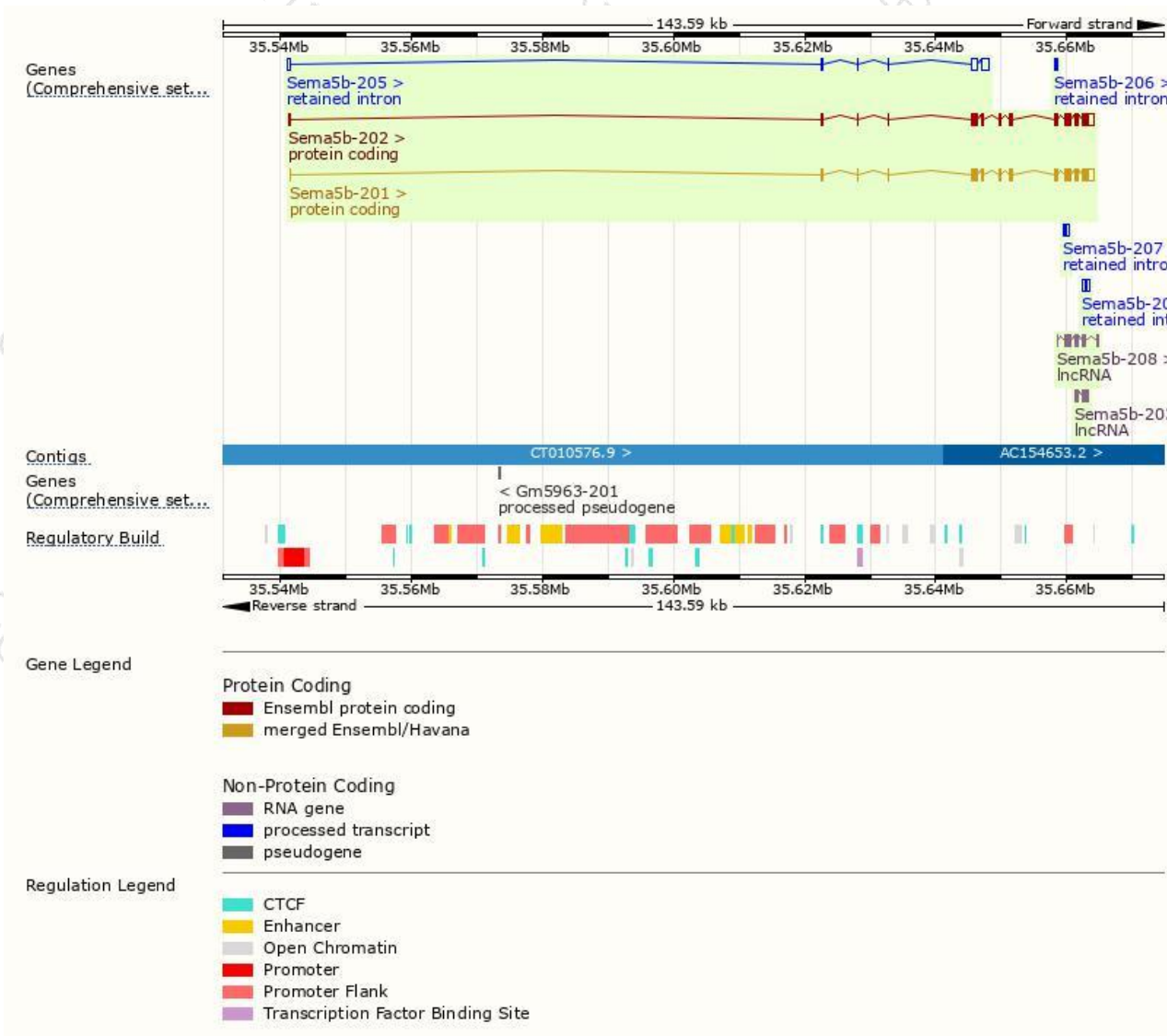
The gene has 8 transcripts,all transcripts are shown below:

| Name       | Transcript ID                         | bp   | Protein                | Biotype         | CCDS                      | UniProt                | Flags                           |
|------------|---------------------------------------|------|------------------------|-----------------|---------------------------|------------------------|---------------------------------|
| Sema5b-201 | <a href="#">ENSMUST00000050625.14</a> | 4350 | <a href="#">1093aa</a> | Protein coding  | <a href="#">CCDS28140</a> | <a href="#">Q60519</a> | TSL:1 GENCODE basic APPRIS P2   |
| Sema5b-202 | <a href="#">ENSMUST00000120756.7</a>  | 4646 | <a href="#">1122aa</a> | Protein coding  | -                         | <a href="#">Q60519</a> | TSL:1 GENCODE basic APPRIS ALT2 |
| Sema5b-205 | <a href="#">ENSMUST00000133554.1</a>  | 2928 | No protein             | Retained intron | -                         | -                      | TSL:1                           |
| Sema5b-204 | <a href="#">ENSMUST00000128966.1</a>  | 766  | No protein             | Retained intron | -                         | -                      | TSL:2                           |
| Sema5b-207 | <a href="#">ENSMUST00000149097.1</a>  | 717  | No protein             | Retained intron | -                         | -                      | TSL:3                           |
| Sema5b-206 | <a href="#">ENSMUST00000139805.1</a>  | 268  | No protein             | Retained intron | -                         | -                      | TSL:3                           |
| Sema5b-208 | <a href="#">ENSMUST00000149855.7</a>  | 1563 | No protein             | lncRNA          | -                         | -                      | TSL:5                           |
| Sema5b-203 | <a href="#">ENSMUST00000128347.1</a>  | 694  | No protein             | lncRNA          | -                         | -                      | TSL:2                           |

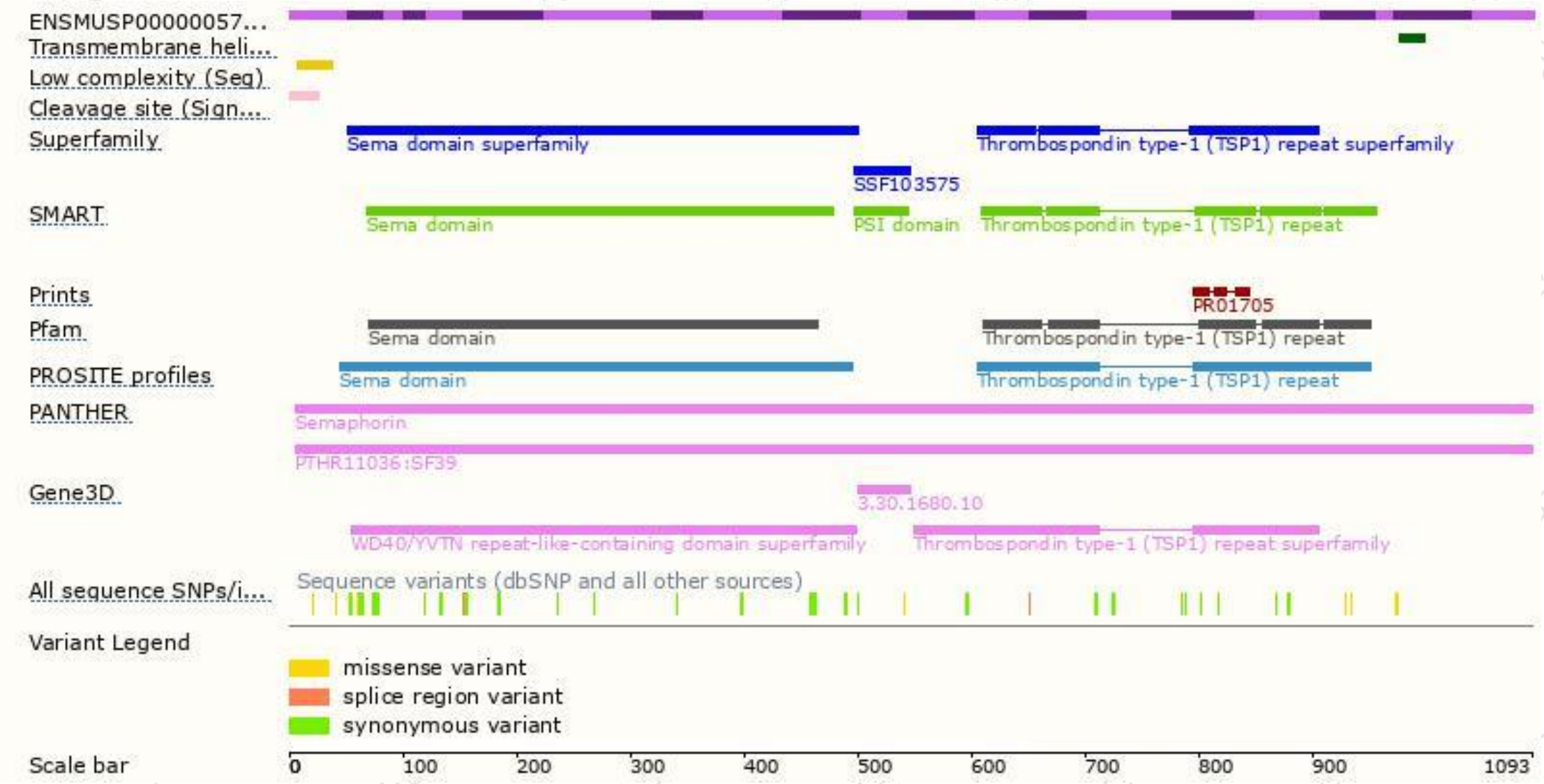
The strategy is based on the design of *Sema5b-201* transcript,The transcription is shown below



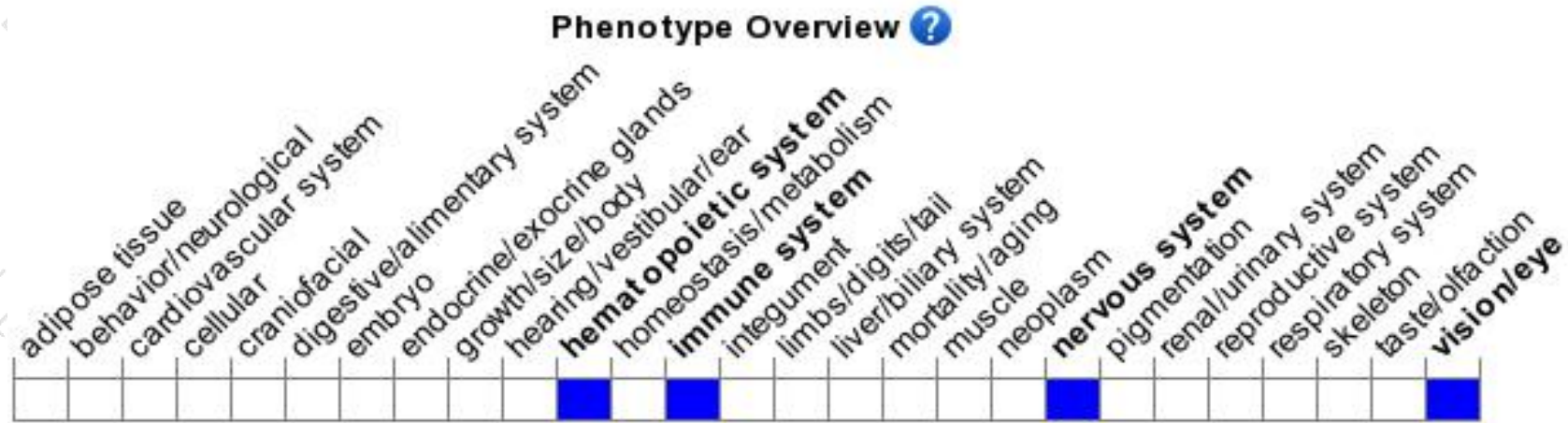
# Genomic location distribution



# 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 null mutation display defects in neurite arborization of multiple retinal cell types.

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

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