

# ***Dnm1*** Cas9-KO Strategy

**Designer: Lixin Lv**

**Reviewer: Lingyan Wu**

**Design Date: 2021-8-3**

# Project Overview

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**Project Name**

***Dnm1***

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**Project type**

**Cas9-KO**

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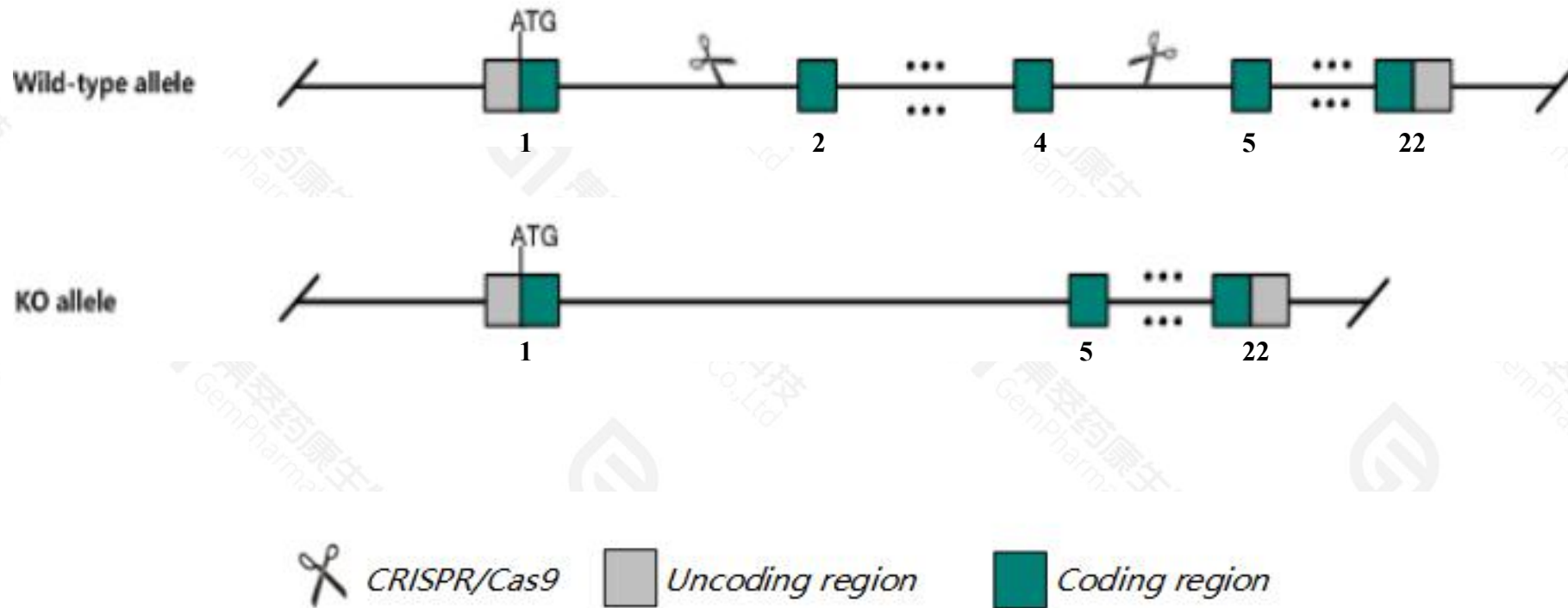
**Strain background**

**C57BL/6JGpt**

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# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Dnm1* gene. The schematic diagram is as follows:



- The *Dnm1* gene has 17 transcripts. According to the structure of *Dnm1* gene, exon2-exon4 of *Dnm1*-201(ENSMUST00000078352.12) transcript is recommended as the knockout region. The region contains 428bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Dnm1* gene. The brief process is as follows: CRISPR/Cas9 system 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.

- According to the existing MGI data, homozygous mice display reduced postnatal viability. Null mutation of this gene results in abnormal synaptic vesicle morphology, and recycling during neuronal activity. Other alleles are associated with seizures.
- The *Dnm1* 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 the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

# Gene information (NCBI)

## Dnm1 dynamin 1 [Mus musculus (house mouse)]

Gene ID: 13429, updated on 23-Feb-2021

### Summary



**Official Symbol** Dnm1 provided by [MGI](#)

**Official Full Name** dynamin 1 provided by [MGI](#)

**Primary source** [MGI:MGI:107384](#)

**See related** [Ensembl:ENSMUSG00000026825](#)

**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** AI838169, Dnm, Ftf, Ftfl, mKIAA4093

**Summary** This gene encodes a member of the dynamin subfamily of GTP-binding proteins. The encoded protein is a GTPase which is required for membrane recycling, including vesicle endocytosis in neurons. It may also be involved in cellular fission via association with microtubules and actin filaments. Mutations in this gene have been shown to cause seizures. Alternative splicing results in multiple transcript variants. [provided by RefSeq, Sep 2014]

**Expression** Biased expression in cerebellum adult (RPKM 188.3), cortex adult (RPKM 160.9) and 14 other tissues [See more](#)

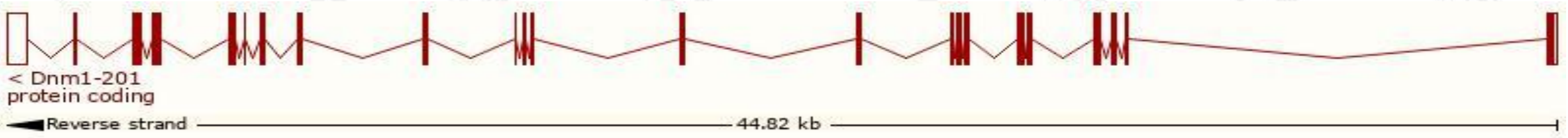
**Orthologs** [human](#) [all](#)

# Transcript information (Ensembl)

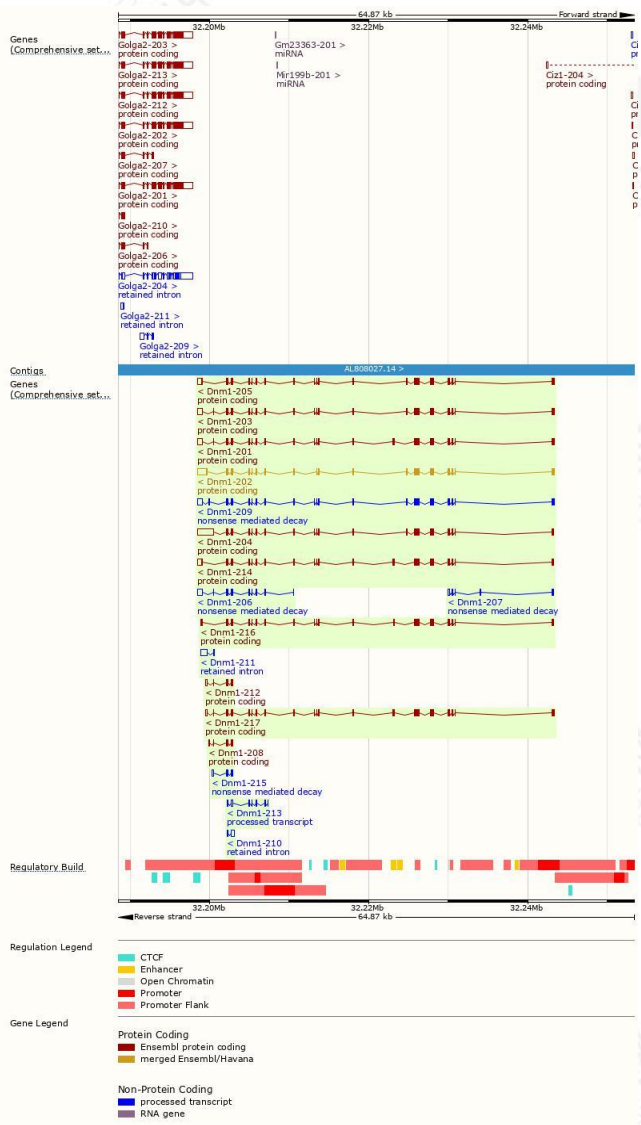
The gene has 17 transcripts,all transcripts are shown below:

| Name     | Transcript ID                         | bp   | Protein               | Biotype                 | CCDS                      | UniProt | Flags                                |
|----------|---------------------------------------|------|-----------------------|-------------------------|---------------------------|---------|--------------------------------------|
| Dnm1-202 | <a href="#">ENSMUST00000091089.12</a> | 3764 | <a href="#">864aa</a> | Protein coding          | <a href="#">CCDS38102</a> |         | TSL:1, GENCODE basic ,               |
| Dnm1-201 | <a href="#">ENSMUST00000078352.12</a> | 3246 | <a href="#">851aa</a> | Protein coding          | <a href="#">CCDS79772</a> |         | TSL:1, GENCODE basic , APPRIS P2 ,   |
| Dnm1-217 | <a href="#">ENSMUST00000202578.4</a>  | 2820 | <a href="#">851aa</a> | Protein coding          | <a href="#">CCDS79772</a> |         | TSL:5, GENCODE basic , APPRIS P2 ,   |
| Dnm1-204 | <a href="#">ENSMUST00000113352.9</a>  | 4605 | <a href="#">851aa</a> | Protein coding          | -                         |         | TSL:2, GENCODE basic , APPRIS ALT1 , |
| Dnm1-203 | <a href="#">ENSMUST00000113350.8</a>  | 3258 | <a href="#">851aa</a> | Protein coding          | -                         |         | TSL:5, GENCODE basic , APPRIS ALT1 , |
| Dnm1-205 | <a href="#">ENSMUST00000113365.8</a>  | 3257 | <a href="#">864aa</a> | Protein coding          | -                         |         | TSL:5, GENCODE basic , APPRIS ALT1 , |
| Dnm1-214 | <a href="#">ENSMUST00000201433.4</a>  | 3146 | <a href="#">864aa</a> | Protein coding          | -                         |         | TSL:5, GENCODE basic , APPRIS ALT1 , |
| Dnm1-216 | <a href="#">ENSMUST00000201494.4</a>  | 2732 | <a href="#">835aa</a> | Protein coding          | -                         |         | TSL:5, GENCODE basic ,               |
| Dnm1-212 | <a href="#">ENSMUST00000155269.8</a>  | 656  | <a href="#">159aa</a> | Protein coding          | -                         |         | CDS 5' incomplete, TSL:5 ,           |
| Dnm1-208 | <a href="#">ENSMUST00000139291.3</a>  | 641  | <a href="#">149aa</a> | Protein coding          | -                         |         | CDS 5' incomplete, TSL:3 ,           |
| Dnm1-209 | <a href="#">ENSMUST00000139624.8</a>  | 3337 | <a href="#">867aa</a> | Nonsense mediated decay | -                         |         | TSL:1 ,                              |
| Dnm1-206 | <a href="#">ENSMUST00000129156.5</a>  | 1520 | <a href="#">283aa</a> | Nonsense mediated decay | -                         |         | CDS 5' incomplete, TSL:5 ,           |
| Dnm1-207 | <a href="#">ENSMUST00000139238.2</a>  | 695  | <a href="#">59aa</a>  | Nonsense mediated decay | -                         |         | TSL:3 ,                              |
| Dnm1-215 | <a href="#">ENSMUST00000201440.2</a>  | 621  | <a href="#">110aa</a> | Nonsense mediated decay | -                         |         | CDS 5' incomplete, TSL:5 ,           |
| Dnm1-213 | <a href="#">ENSMUST00000156866.2</a>  | 810  | No protein            | Processed transcript    | -                         |         | TSL:3 ,                              |
| Dnm1-211 | <a href="#">ENSMUST00000145885.2</a>  | 899  | No protein            | Retained intron         | -                         |         | TSL:3 ,                              |
| Dnm1-210 | <a href="#">ENSMUST00000141633.2</a>  | 495  | No protein            | Retained intron         | -                         |         | TSL:2 ,                              |

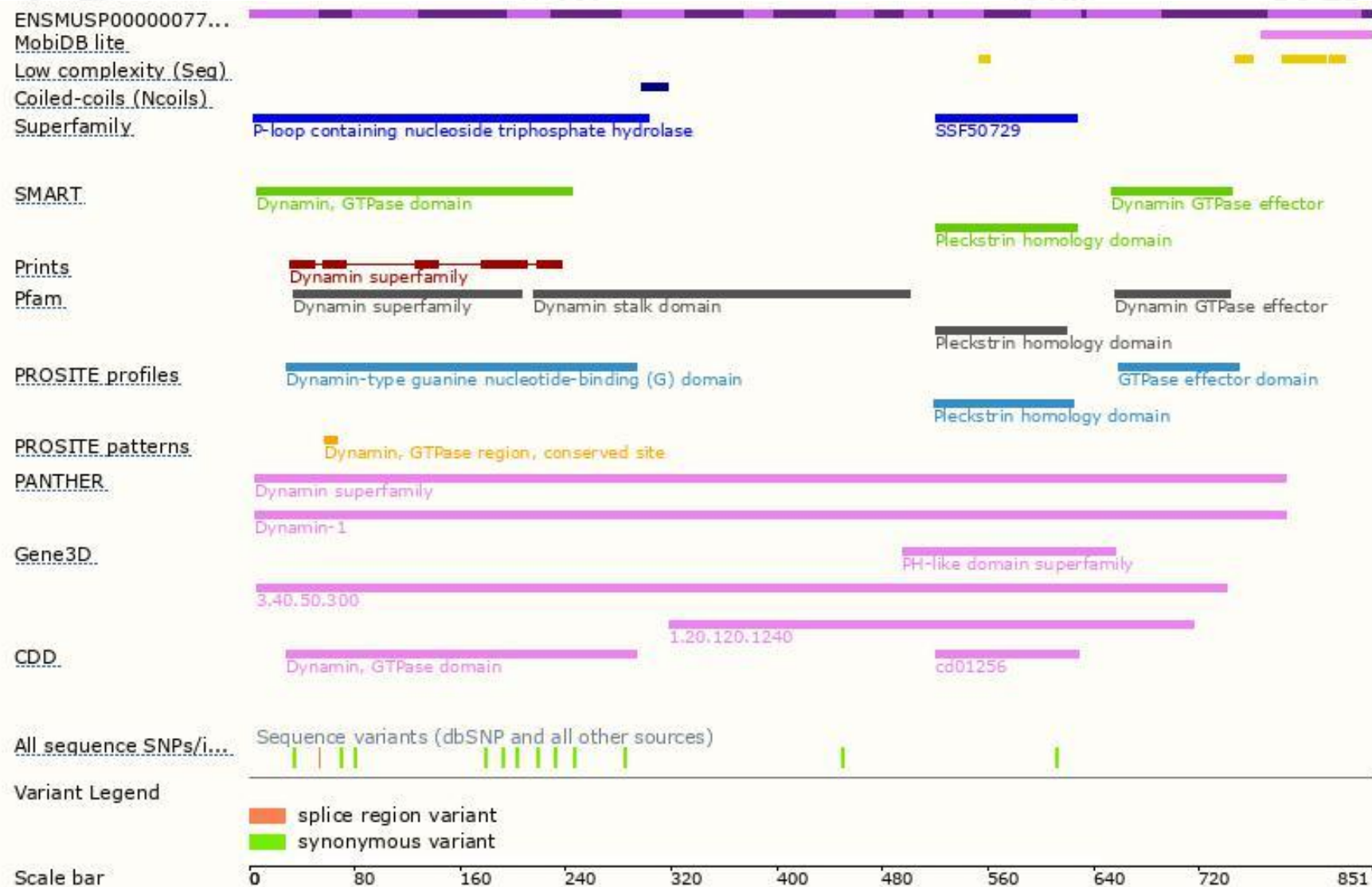
The strategy is based on the design of *Dnm1-201* transcript,the transcription is shown below:



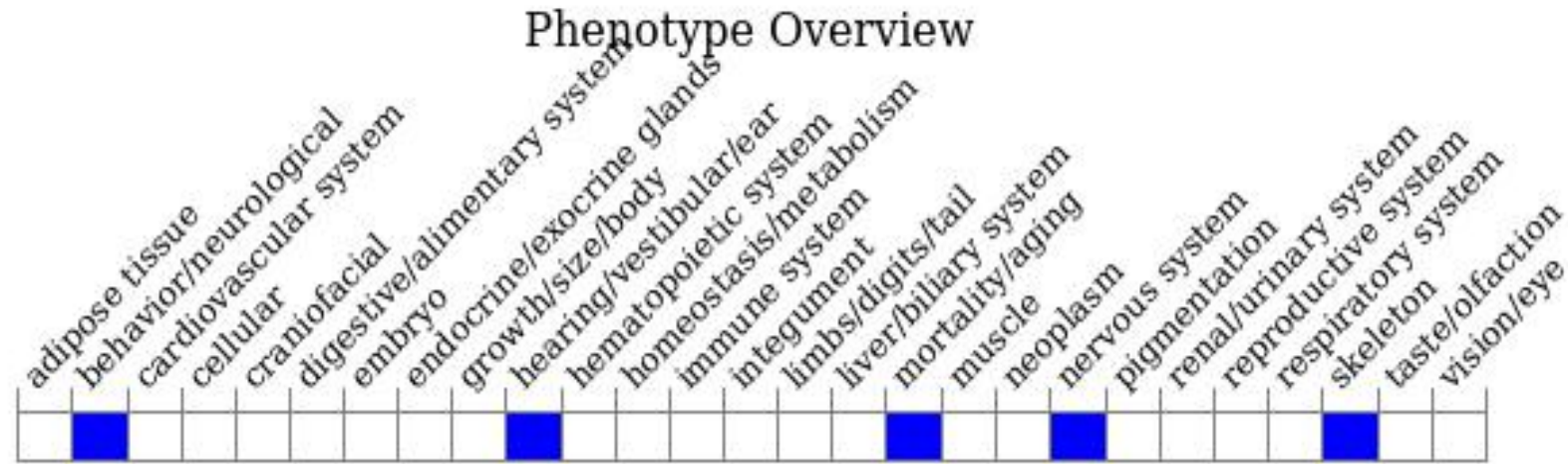
# Genomic location distribution



# 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, homozygous mice display reduced postnatal viability. Null mutation of this gene results in abnormal synaptic vesicle morphology, and recycling during neuronal activity. Other alleles are associated with seizures.

If you have any questions, you are welcome to inquire.  
Tel: 400-9660890

