

# *Akt3* Cas9-KO Strategy

**Designer:**

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**2019-7-25**

# Project Overview

**Project Name**

*Akt3*

**Project type**

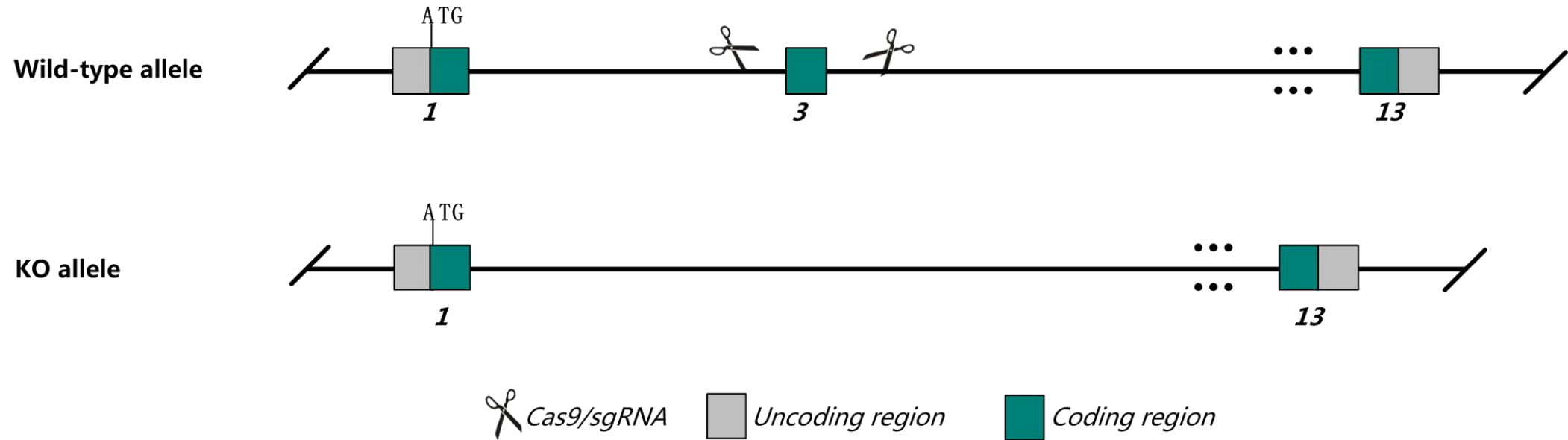
**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Akt3* gene. The schematic diagram is as follows:



- The *Akt3* gene has 4 transcripts. According to the structure of *Akt3* gene, exon3 of *Akt3*-203 (ENSMUST00000111160.8) transcript is recommended as the knockout region. The region contains 112bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Akt3* gene. The brief process is as follows: CRISPR/Cas9 system w

- According to the existing MGI data, Homozygous null mice exhibit a 20% decrease in brain size and have smaller and fewer cells in the brain. Mice heterozygous for an ENU-induced mutation exhibit increased seizures (sporadic and induced) and increased brain weight and size.
- The *Akt3* gene is located on the Chr1. 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)

## Akt3 thymoma viral proto-oncogene 3 [Mus musculus (house mouse)]

Gene ID: 23797, updated on 7-Apr-2019

### Summary



|                           |   |
|---------------------------|---|
| <b>Official Symbol</b>    | Akt3 provided by <a href="#">MGI</a>  |
| <b>Official Full Name</b> | thymoma viral proto-oncogene 3 provided by <a href="#">MGI</a>  |
| <b>Primary source</b>     | <a href="#">MGI:MGI:1345147</a>   |
| <b>See related</b>        | <a href="#">Ensembl:ENSMUSG00000019699</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>      | AI851531, D930002M15Rik, Nmf350   |
| <b>Expression</b>         | Broad expression in CNS E18 (RPKM 12.2), CNS E14 (RPKM 10.5) and 22 other tissues <a href="#">See more</a>  |
| <b>Orthologs</b>          | <a href="#">human</a> <a href="#">all</a>   |

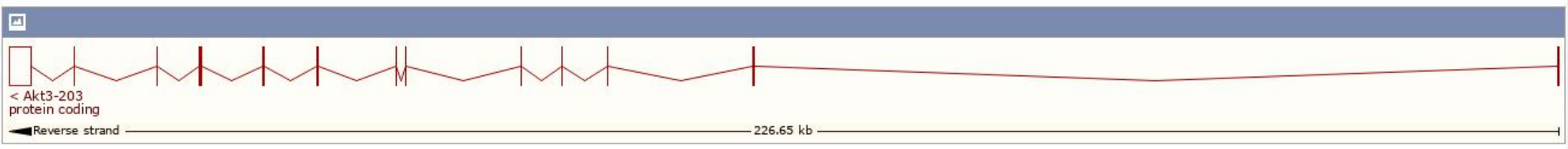


# Transcript information (Ensembl)

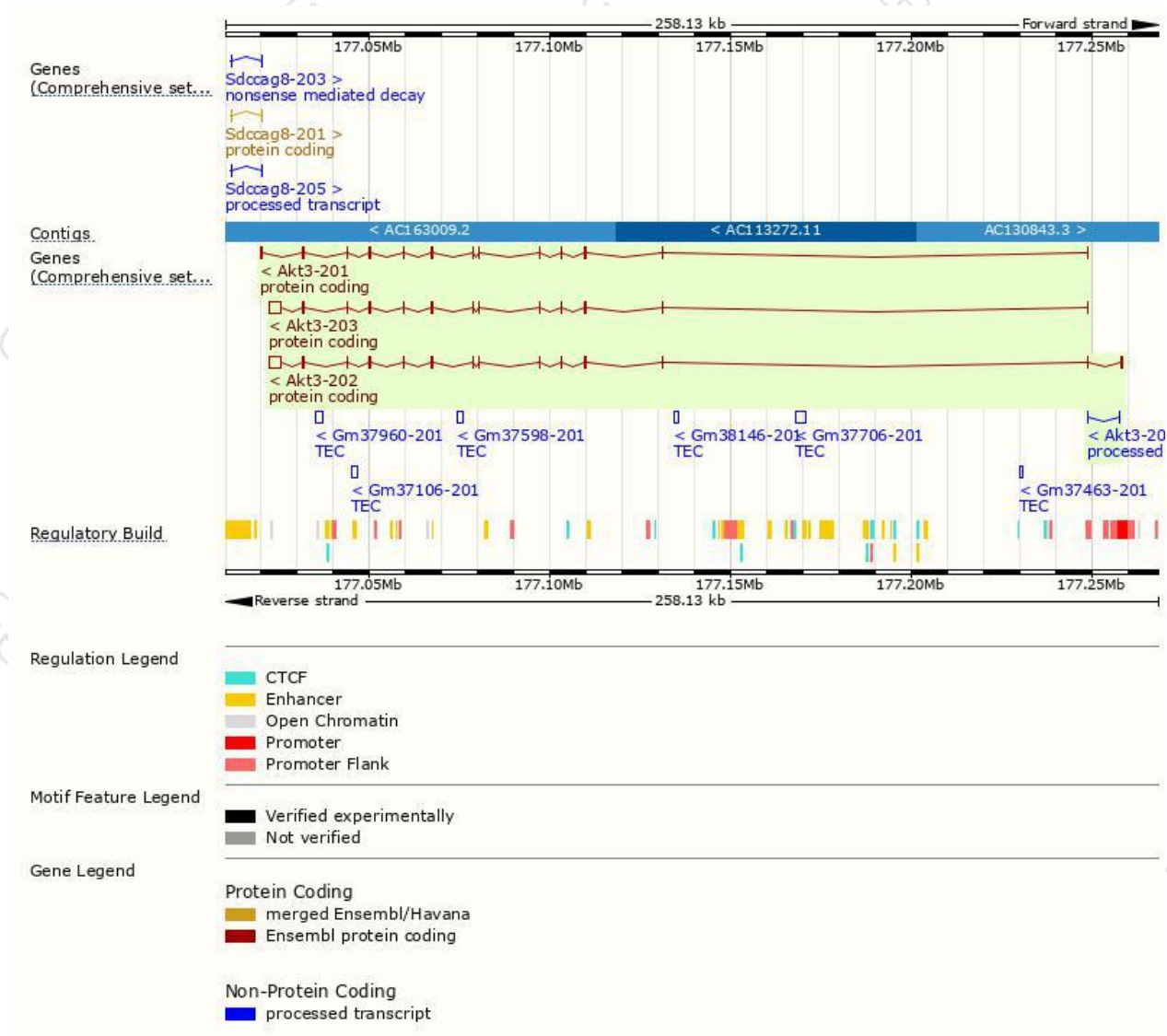
The gene has 4 transcripts,all transcripts are shown below:

| Name     | Transcript ID                         | bp   | Protein               | Biotype              | CCDS                      | UniProt                | Flags                         |
|----------|---------------------------------------|------|-----------------------|----------------------|---------------------------|------------------------|-------------------------------|
| Akt3-202 | <a href="#">ENSMUST00000111159.1</a>  | 4906 | <a href="#">479aa</a> | Protein coding       | <a href="#">CCDS35799</a> | <a href="#">Q9WUA6</a> | TSL:5 GENCODE basic APPRIS P1 |
| Akt3-203 | <a href="#">ENSMUST00000111160.8</a>  | 4735 | <a href="#">479aa</a> | Protein coding       | <a href="#">CCDS35799</a> | <a href="#">Q9WUA6</a> | TSL:1 GENCODE basic APPRIS P1 |
| Akt3-201 | <a href="#">ENSMUST00000019843.14</a> | 1511 | <a href="#">470aa</a> | Protein coding       | -                         | <a href="#">Q9WUA6</a> | TSL:5 GENCODE basic           |
| Akt3-204 | <a href="#">ENSMUST00000211158.1</a>  | 249  | No protein            | Processed transcript | -                         | -                      | TSL:5                         |

The strategy is based on the design of *Akt3-203* transcript,The transcription is shown below

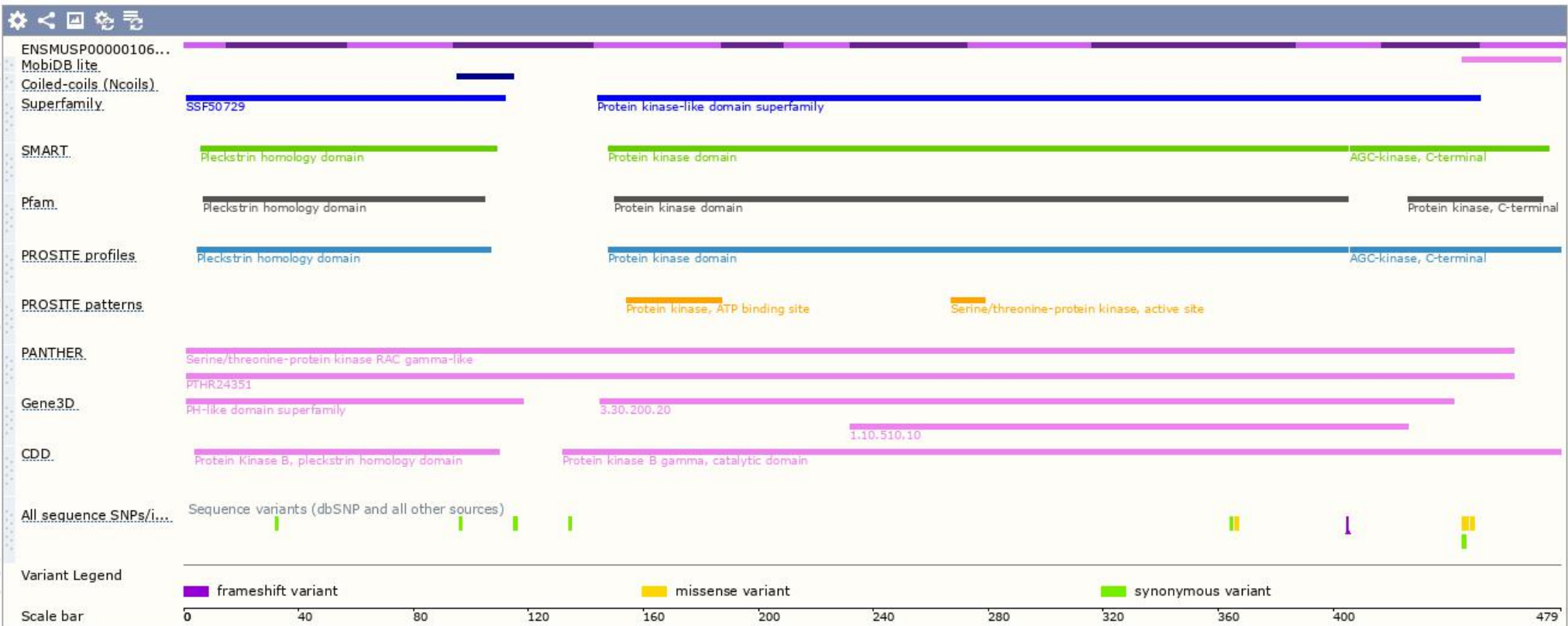


# Genomic location distribution

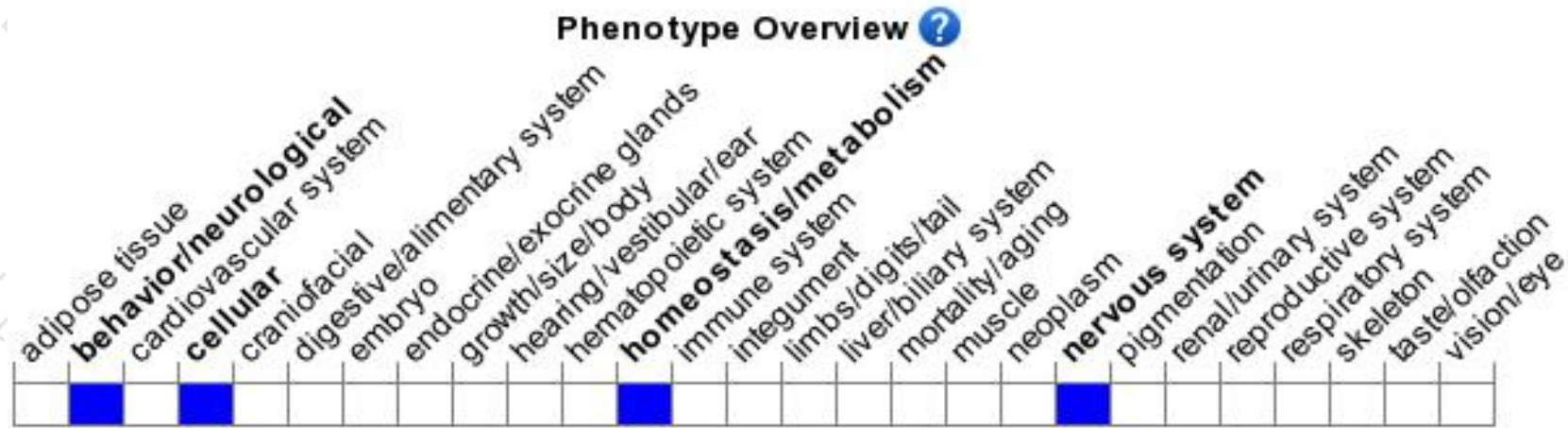




# Protein domain



# 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 null mice exhibit a 20% decrease in brain size and have smaller and fewer cells in the brain. Mice heterozygous for an ENU-induced mutation exhibit increased seizures (sporadic and induced) and increased brain weight and size.

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

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