Syn1-IRES-EGFP Mouse Model Strategy

Designer: Lingyan Wu

Reviewer: Yun Li

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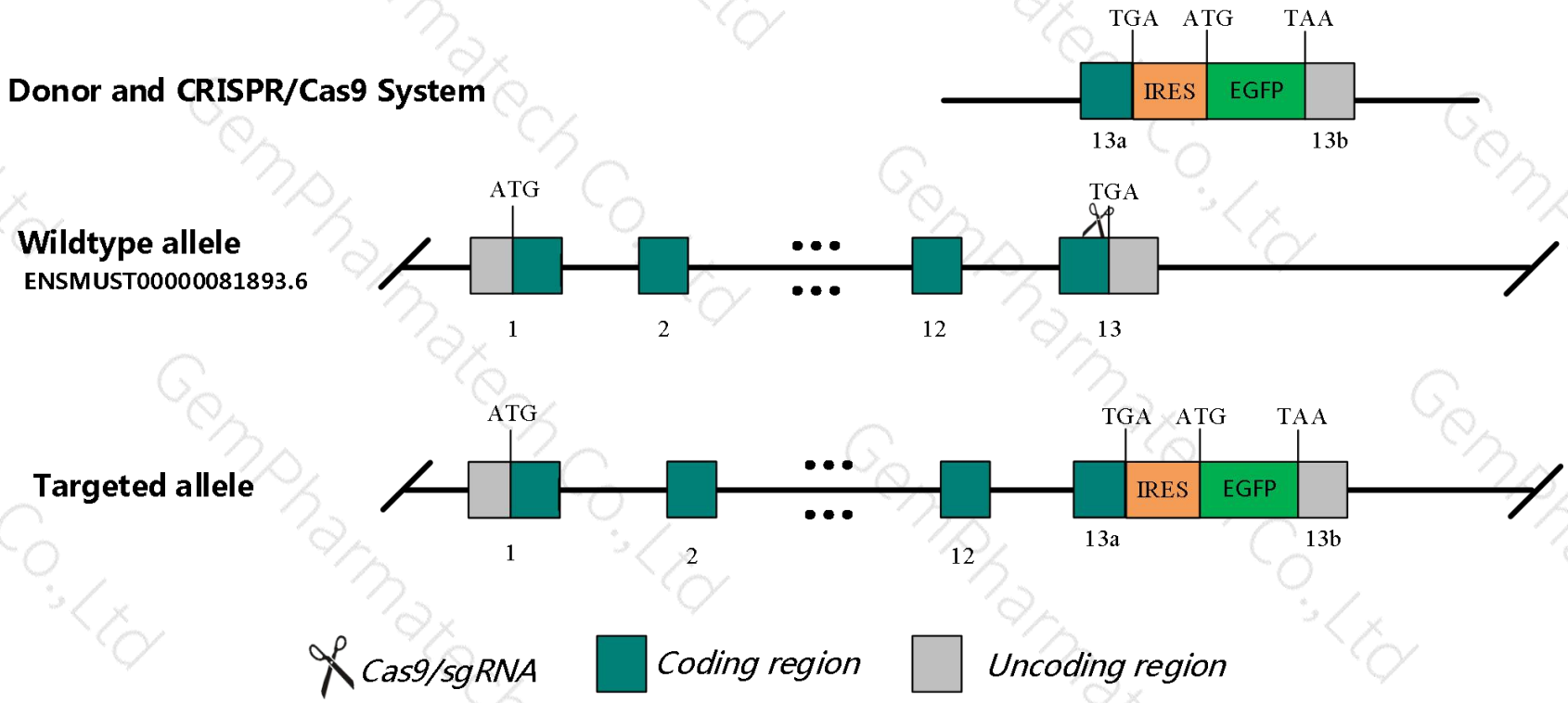
Project Overview

Project Name	***Syn1*-IRES-EGFP**
Project type	**Cas9-KI**
Strain background	**C57BL/6JGpt**

Strategy

This model will use CRISPR/Cas9 technology to edit the *Syn1* gene. The schematic diagram is as follows:



Technical Description

➢ The *Syn1* gene has 2 transcripts.

➢ According to the structure of *Syn1* gene, the element IRES-EGFP will be inserted at the translation stop codon of of *Syn1-201*(ENSMUST00000081893.6) , the length of inserted fragment is about 1.3kb.

➢ In this project we use CRISPR/Cas9 technology to modify *Syn1* 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.

Notice

➢ According to the existing MGI data,homozygous inactivation of this gene causes impaired CNS synapse formation and synaptic vesicle (SV) clustering, and may lead to altered SV recycling and inhibitory postsynaptic currents, convulsive seizures, increased response to electrical stimulation,and enhanced paired-pulse facilitation.

➢ It is necessary to introduce 1-2 synonymous mutation in exon13.

➢ The IERS-linked genes will be tarnscripted together and then be translated two protein separately, but the downstream protein is lower than the upstream protein.

➢ The *Syn1* gene is located on the ChrX. Please take the loci in consideration when breeding this knockin mice with other gene modified (e.g., Tg, iCre) strains, if the other gene is also on ChrX, it may be extremely hard to get double gene positive homozygotes.

➢ The scheme is designed according to the genetic information in the existing database. Inserting a foreign gene between the 3'UTR and the gene coding region may affect the expression of endogenous and foreign genes. Due to the complexity of biological processes, it cannot be predicted completely at the present technology level.

Gene information （NCBI）

集萃药康 GemPharmatech

Syn1 synapsin I [Mus musculus (house mouse)]

Gene ID: 20964, updated on 13-Mar-2020

Summary

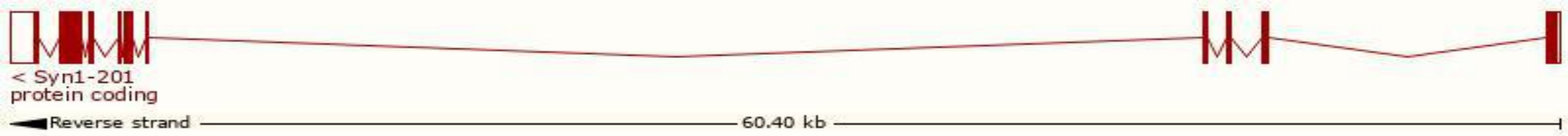
Official Symbol	Syn1 provided by MGI
Official Full Name	synapsin I provided by MGI
Primary source	MGI:MGI:98460
See related	Ensembl:ENSMUSG00000037217
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Syn-1, Syn1-S
Expression	Biased expression in frontal lobe adult (RPKM 77.1), cortex adult (RPKM 74.4) and 11 other tissues See more
Orthologs	human all

Transcript information（Ensembl）

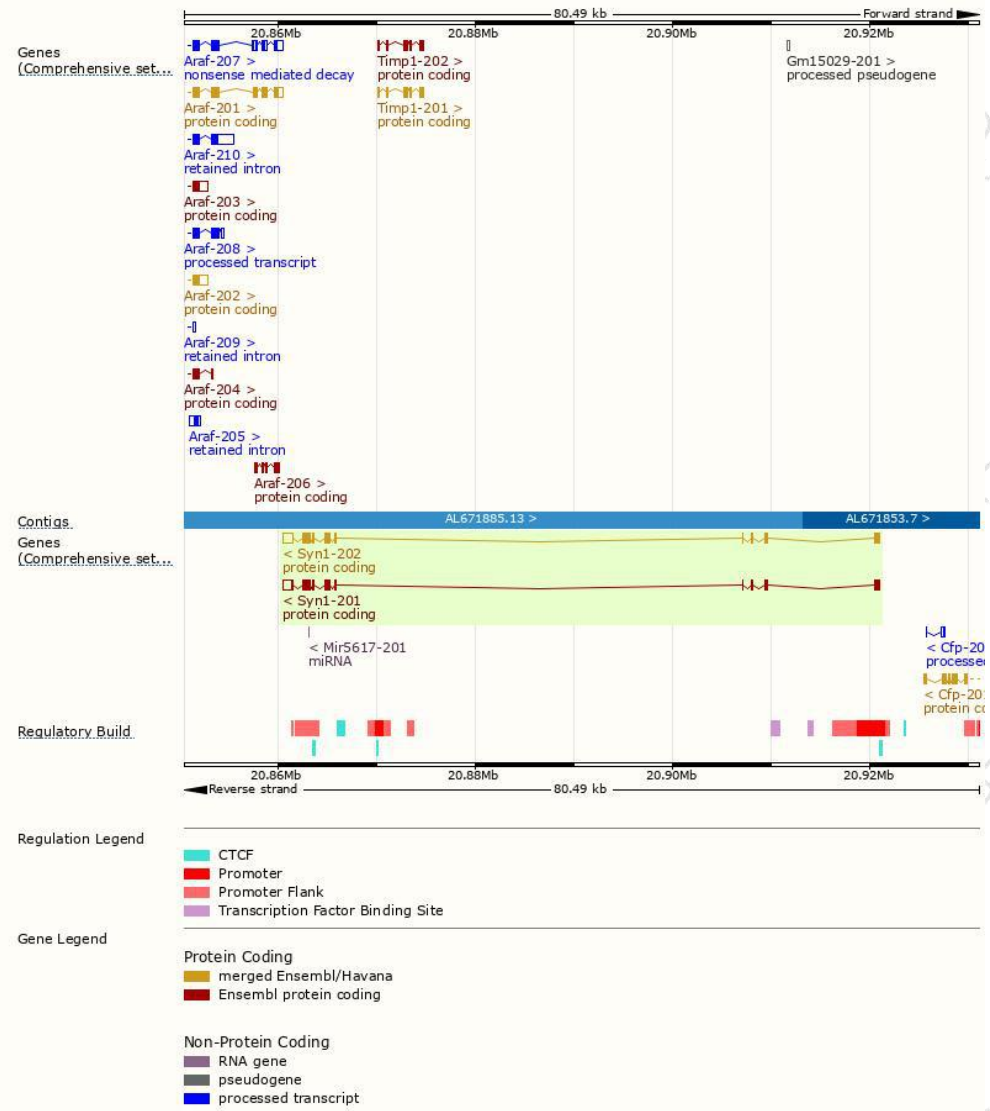
The gene has 2 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Syn1-202	ENSMUST00000115345.7	3261	670aa	Protein coding	CCDS53018	O88935	TSL:1 GENCODE basic APPRIS is a system to annotate alternatively spliced transcripts based on a range of computational methods to identify the most functionally important transcript(s) of a gene. APPRIS ALT1
Syn1-201	ENSMUST00000081893.6	3209	706aa	Protein coding	CCDS53017	O88935	TSL:5 GENCODE basic APPRIS is a system to annotate alternatively spliced transcripts based on a range of computational methods to identify the most functionally important transcript(s) of a gene. APPRIS P4

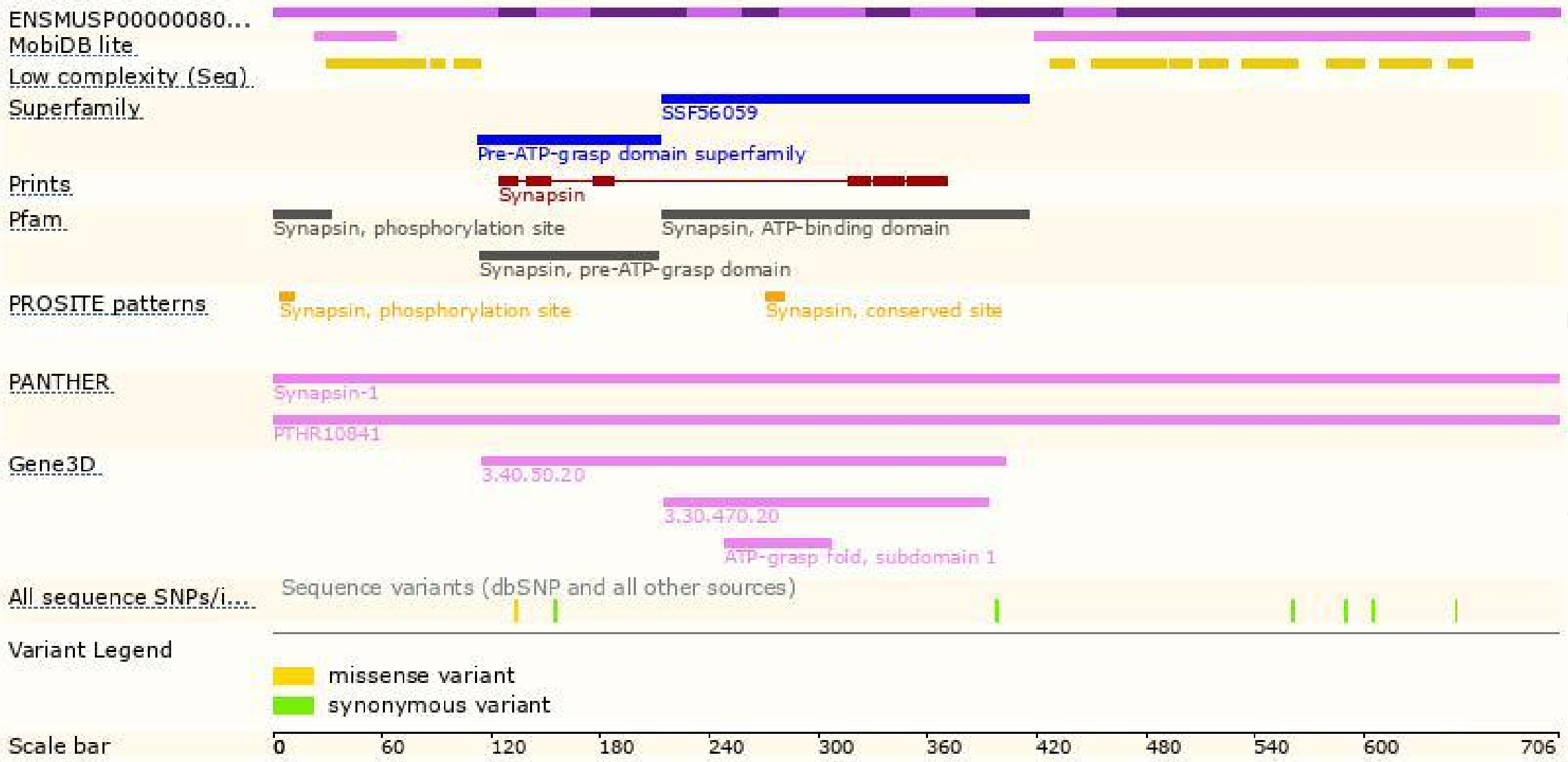
The strategy is based on the design of *Syn1-201* transcript,the transcription is shown below:



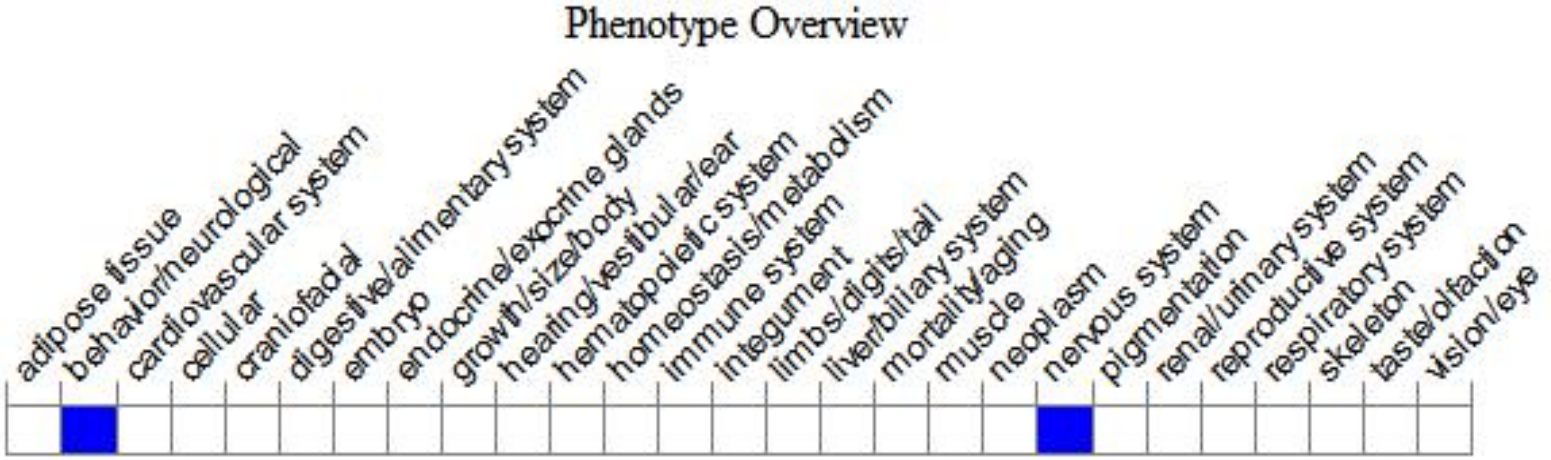
Genomic location distribution



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 inactivation of this gene causes impaired CNS synapse formation and synaptic vesicle (SV) clustering, and may lead to altered SV recycling and inhibitory postsynaptic currents, convulsive seizures, increased response to electrical stimulation,and enhanced paired-pulse facilitation.

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

Tel: 400-9660890

集萃药康生物科技
GemPharmatech Co.,Ltd