

Gria3 Cas9-CKO Strategy

Designer:

Daohua Xu

Reviewer:

Huimin Su

Design Date:

2019-12-18

Project Overview

Project Name

Gria3

Project type

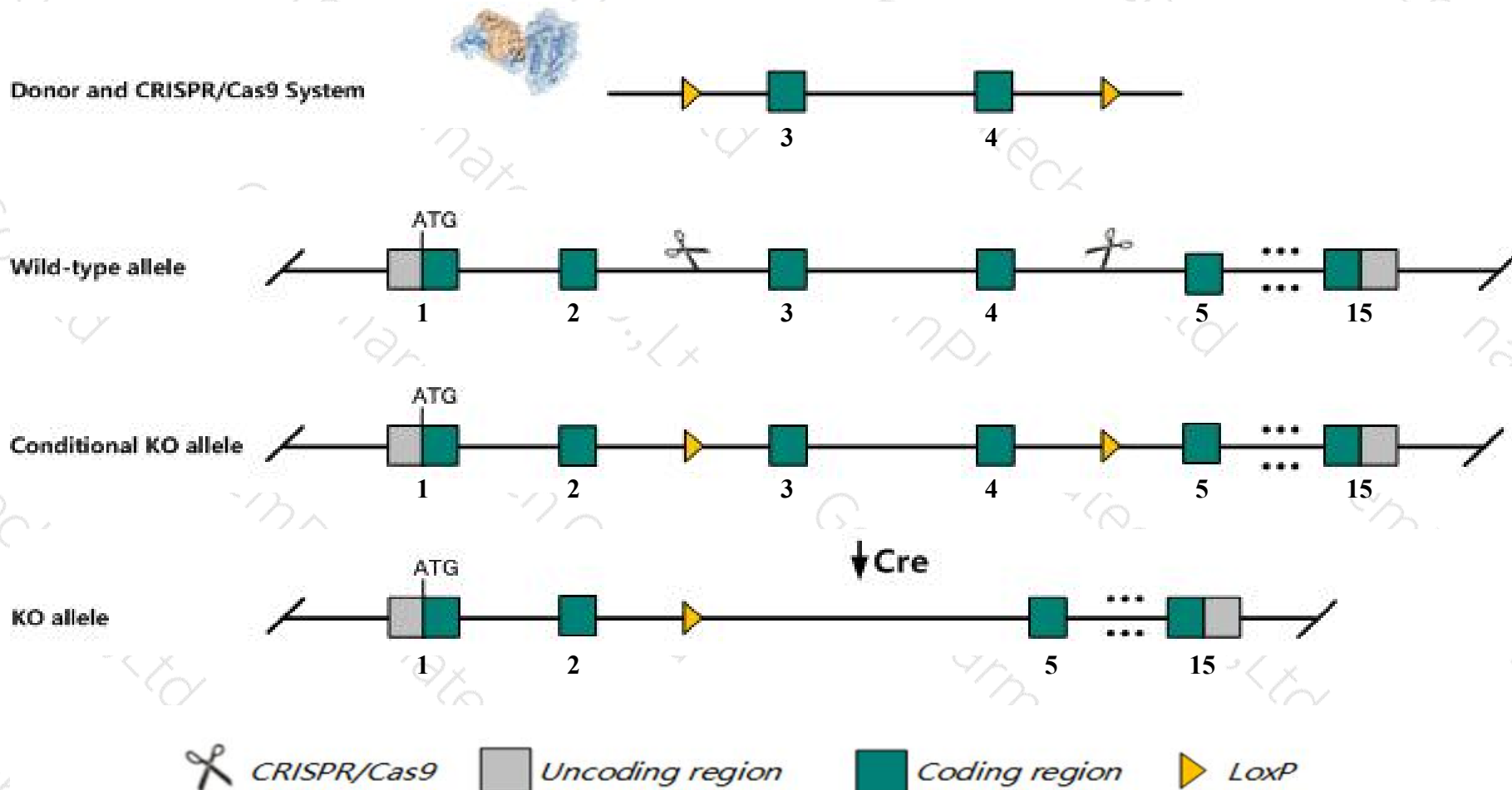
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Gria3* gene. The schematic diagram is as follows:



- The *Gria3* gene has 9 transcripts. According to the structure of *Gria3* gene, exon3-exon4 of *Gria3-201* (ENSMUST00000076349.11) 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 *Gria3* 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, Male mice hemizygous for one allele display reduced fertility and enhanced long term potentiation. Male mice hemizygous for a second allele display decreased thermal nociception, resistance to drug induced seizures and a decreased startle reflex; and homozygous female mice have decreased body weight
- The *Gria3* gene is located on the ChrX. 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)

Gria3 glutamate receptor, ionotropic, AMPA3 (alpha 3) [Mus musculus (house mouse)]

Gene ID: 53623, updated on 31-Jan-2019

Summary



Official Symbol Gria3 provided by [MGI](#)

Official Full Name glutamate receptor, ionotropic, AMPA3 (alpha 3) provided by [MGI](#)

Primary source [MGI:MGI:95810](#)

See related [Ensembl:ENSMUSG00000001986](#)

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 2900064I19Rik, GluA3, GluR-C, GluR-K3, Glur-3, Glur3, Gluralpha3

Summary This gene encodes a multi-pass transmembrane protein that forms a homotetramer or heterotetramer in neuronal cells. The encoded protein is a ligand-gated ion channel that responds to the neurotransmitter L-glutamate to promote synaptic transmission. Deficiency of this gene leads to behavioral phenotypes. The transcript is subject to RNA editing at codon 769 (AGA->GGA; R->G). Alternative splicing results in multiple transcript variants. [provided by RefSeq, Aug 2013]

Expression Biased expression in frontal lobe adult (RPKM 31.4), cortex adult (RPKM 28.9) and 7 other tissues [See more](#)

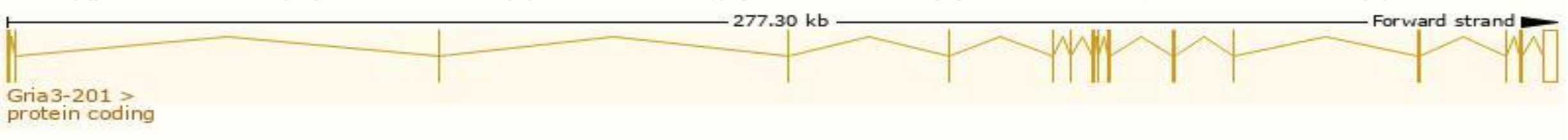
Orthologs [human](#) [all](#)

Transcript information (Ensembl)

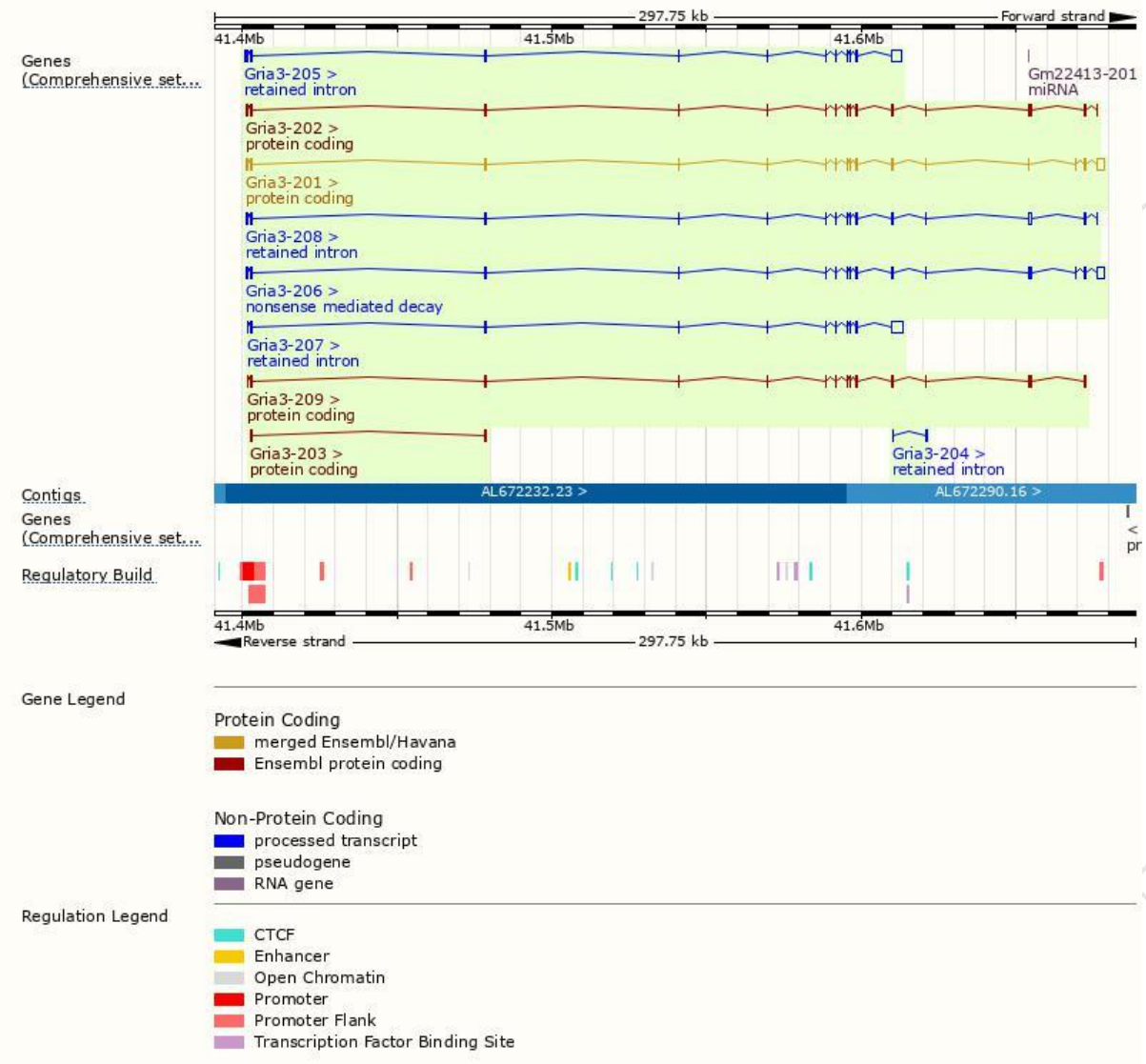
The gene has 9 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Gria3-201	ENSMUST00000076349.11	5192	888aa	Protein coding	CCDS30097	Q9Z2W9	TSL:1 GENCODE basic APPRIS P3
Gria3-202	ENSMUST00000115103.8	3081	888aa	Protein coding	CCDS72370	B0QZW1	TSL:5 GENCODE basic APPRIS ALT2
Gria3-209	ENSMUST00000165288.1	2667	888aa	Protein coding	CCDS72370	B0QZW1	TSL:1 GENCODE basic APPRIS ALT2
Gria3-203	ENSMUST00000124169.1	322	83aa	Protein coding	-	B0QZW2	CDS 3' incomplete TSL:3
Gria3-206	ENSMUST00000139965.7	5172	818aa	Nonsense mediated decay	-	F2Z488	TSL:5
Gria3-207	ENSMUST00000148212.1	5206	No protein	Retained intron	-	-	TSL:2
Gria3-205	ENSMUST00000128197.7	5108	No protein	Retained intron	-	-	TSL:2
Gria3-208	ENSMUST00000156721.7	3645	No protein	Retained intron	-	-	TSL:2
Gria3-204	ENSMUST00000126843.1	560	No protein	Retained intron	-	-	TSL:2

The strategy is based on the design of *Gria3-201* transcript,The transcription is shown below



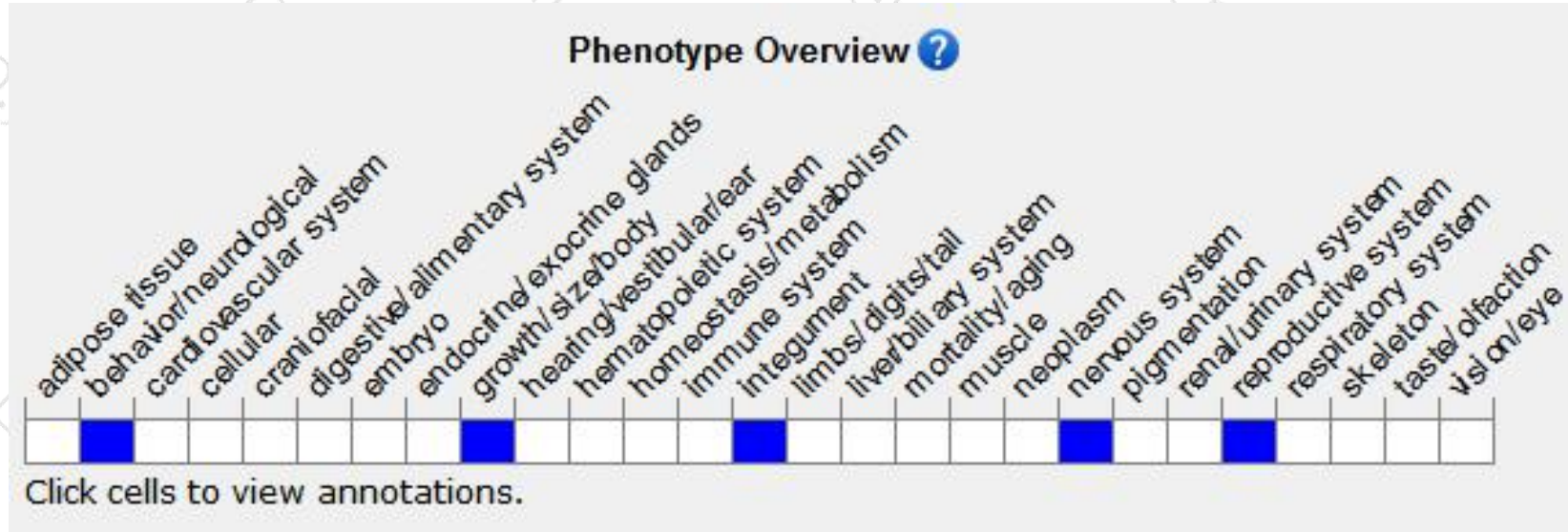
Genomic location distribution



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, Male mice hemizygous for one allele display reduced fertility and enhanced long term potentiation. Male mice hemizygous for a second allele display decreased thermal nociception, resistance to drug induced seizures and a decreased startle reflex; and homozygous female mice have decreased body weight

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

Tel: 400-9660890

