

Nrxn2 Cas9-KO Strategy

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Project Overview

Project Name

Nrxn2

Project type

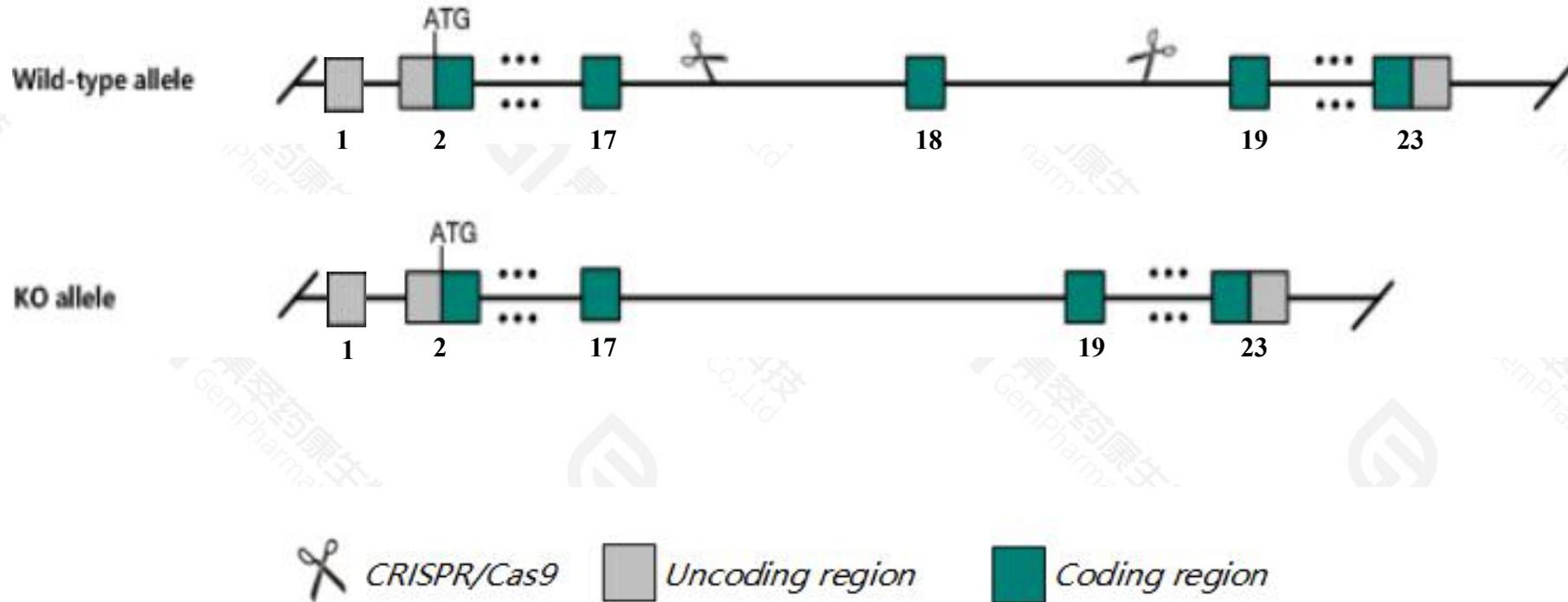
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Nrxn2* gene. The schematic diagram is as follows:



- The *Nrxn2* gene has 18 transcripts. According to the structure of *Nrxn2* gene, exon18 of *Nrxn2*-205(ENSMUST00000113462.8) transcript is recommended as the knockout region. The region contains 182bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Nrxn2* 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, mice homozygous for a knock-out allele are generally non-viable; surviving homozygotes show a 30-40% decrease in body weight and their inhibitory postsynaptic currents (IPSCs) are decreased in cortical slice cultures.
- The effect on *Nrxn2-209* transcript is unknown.
- The *Nrxn2* gene is located on the Chr19. 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)

Nrxn2 neurexin II [Mus musculus (house mouse)]

Gene ID: 18190, updated on 25-Sep-2020

Summary



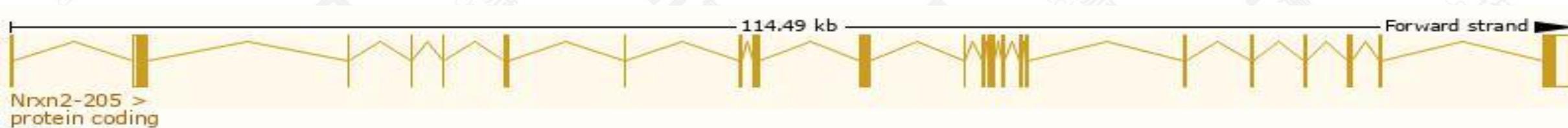
Official Symbol	Nrxn2 provided by MGI
Official Full Name	neurexin II provided by MGI
Primary source	MGI:MGI:1096362
See related	Ensembl:ENSMUSG00000033768
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	6430591O13Rik, mKIAA0921
Expression	Biased expression in cerebellum adult (RPKM 41.2), frontal lobe adult (RPKM 37.4) and 7 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

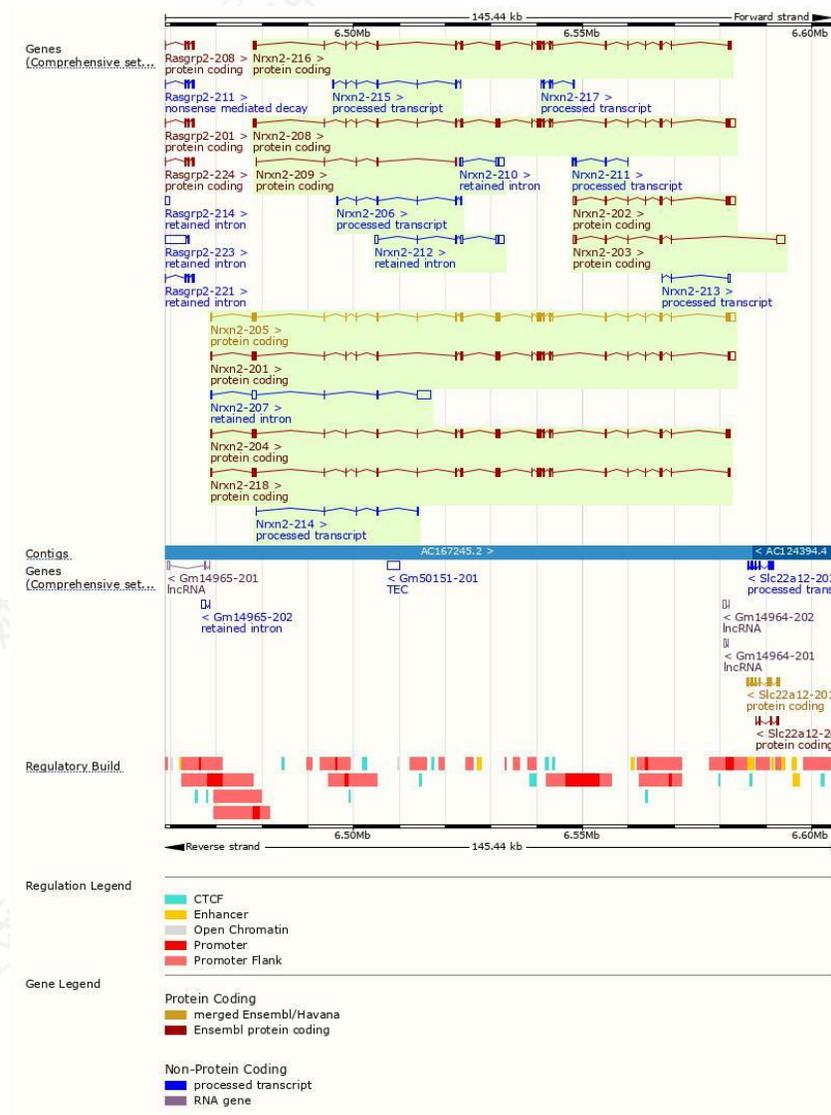
The gene has 18 transcripts, all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Nrxn2-205	ENSMUST00000113462.8	6667	1703aa	Protein coding	CCDS57132		TSL:1, GENCODE basic, APPRIS P4,
Nrxn2-201	ENSMUST0000077182.13	6059	1503aa	Protein coding	CCDS57133		TSL:5, GENCODE basic, APPRIS ALT2,
Nrxn2-216	ENSMUST00000235714.2	5001	1503aa	Protein coding	CCDS57133		GENCODE basic, APPRIS ALT2,
Nrxn2-208	ENSMUST00000137166.8	6314	1710aa	Protein coding	-		TSL:5, GENCODE basic,
Nrxn2-204	ENSMUST00000113461.8	5505	1640aa	Protein coding	-		TSL:5, GENCODE basic,
Nrxn2-218	ENSMUST00000236635.2	5118	1511aa	Protein coding	-		GENCODE basic, APPRIS ALT2,
Nrxn2-202	ENSMUST00000113458.8	3503	660aa	Protein coding	-		TSL:5, GENCODE basic,
Nrxn2-203	ENSMUST00000113459.2	3285	353aa	Protein coding	-		TSL:2, GENCODE basic,
Nrxn2-209	ENSMUST00000137821.8	648	216aa	Protein coding	-		CDS 5' and 3' incomplete, TSL:3,
Nrxn2-206	ENSMUST00000124815.8	818	No protein	Processed transcript	-		TSL:3,
Nrxn2-215	ENSMUST00000157014.8	739	No protein	Processed transcript	-		TSL:3,
Nrxn2-217	ENSMUST00000236610.2	725	No protein	Processed transcript	-		
Nrxn2-214	ENSMUST00000155158.3	604	No protein	Processed transcript	-		TSL:5,
Nrxn2-213	ENSMUST00000154580.2	576	No protein	Processed transcript	-		TSL:3,
Nrxn2-211	ENSMUST00000148391.2	547	No protein	Processed transcript	-		TSL:5,
Nrxn2-207	ENSMUST00000128272.8	4456	No protein	Retained intron	-		TSL:1,
Nrxn2-212	ENSMUST00000150792.8	2748	No protein	Retained intron	-		TSL:5,
Nrxn2-210	ENSMUST00000140435.2	1933	No protein	Retained intron	-		TSL:1,

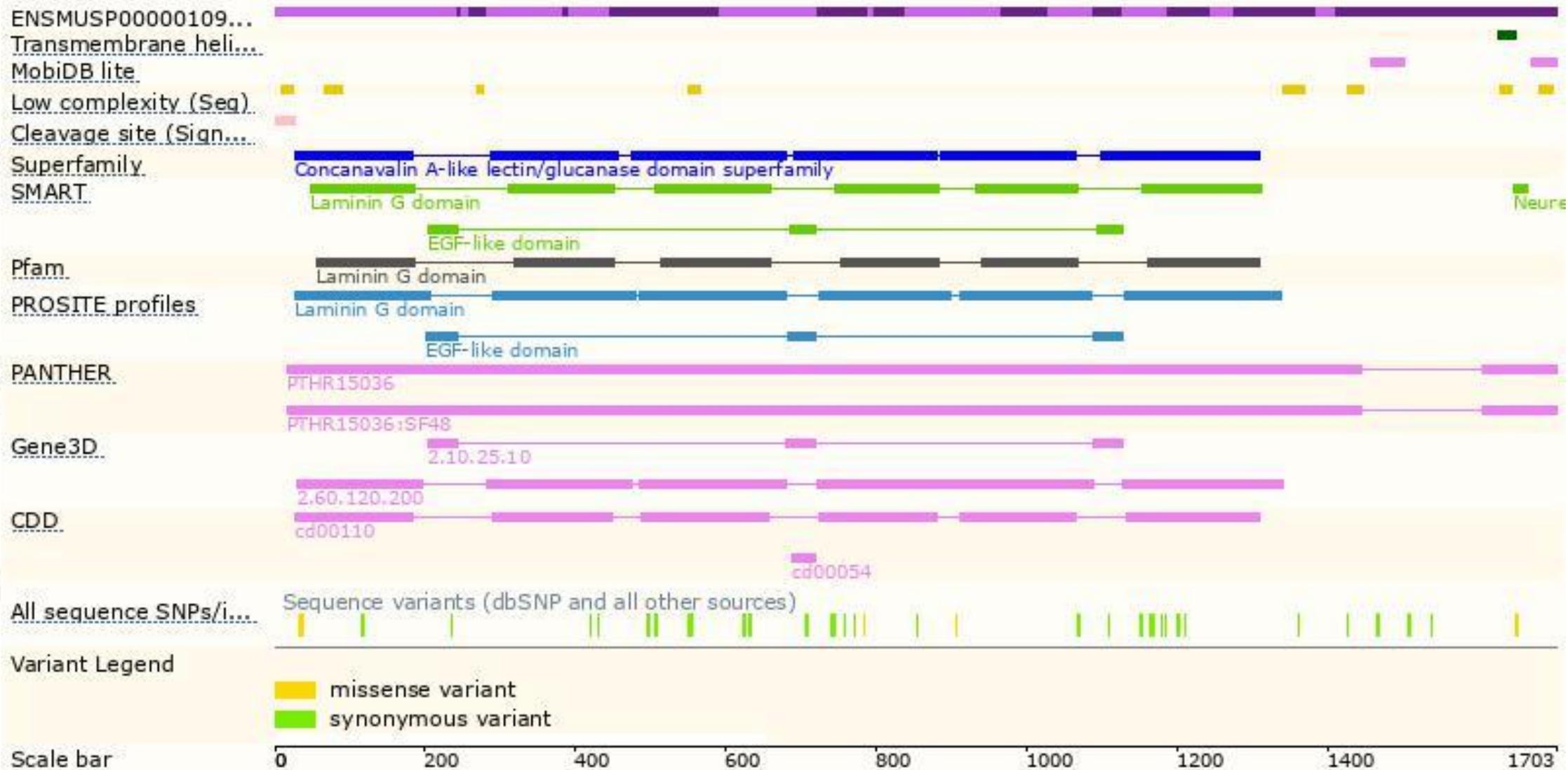
The strategy is based on the design of *Nrxn2-205* transcript, the transcription is shown below:



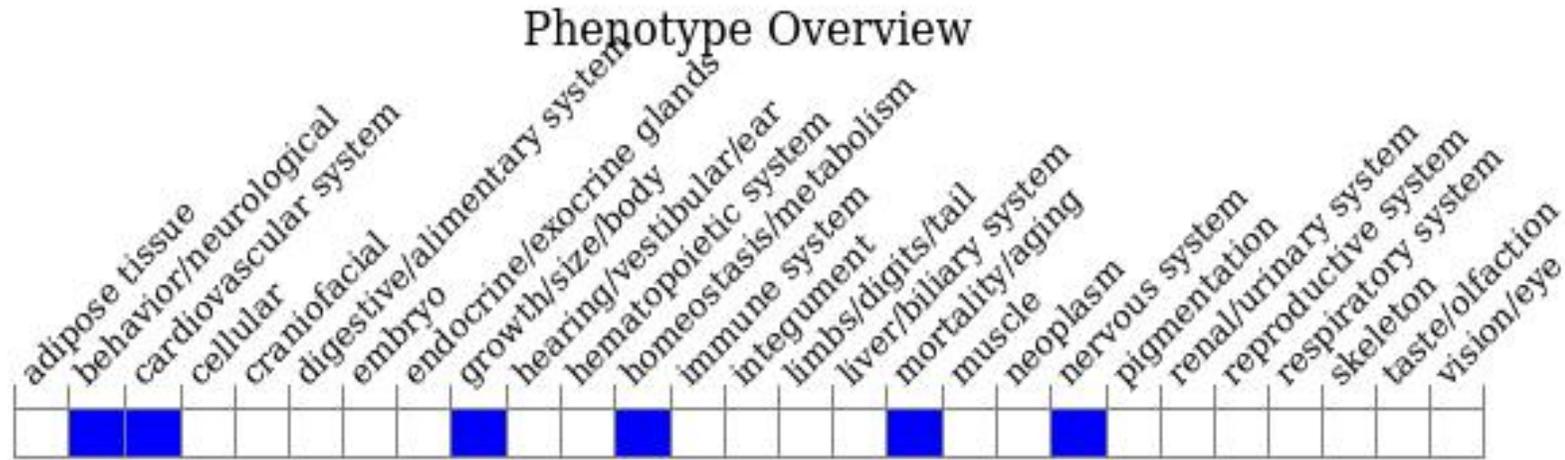
Genomic location distribution



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 knock-out allele are generally non-viable; surviving homozygotes show a 30-40% decrease in body weight and their inhibitory postsynaptic currents (IPSCs) are decreased in cortical slice cultures.

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

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