Rims1 Cas9-CKO Strategy

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Project Overview

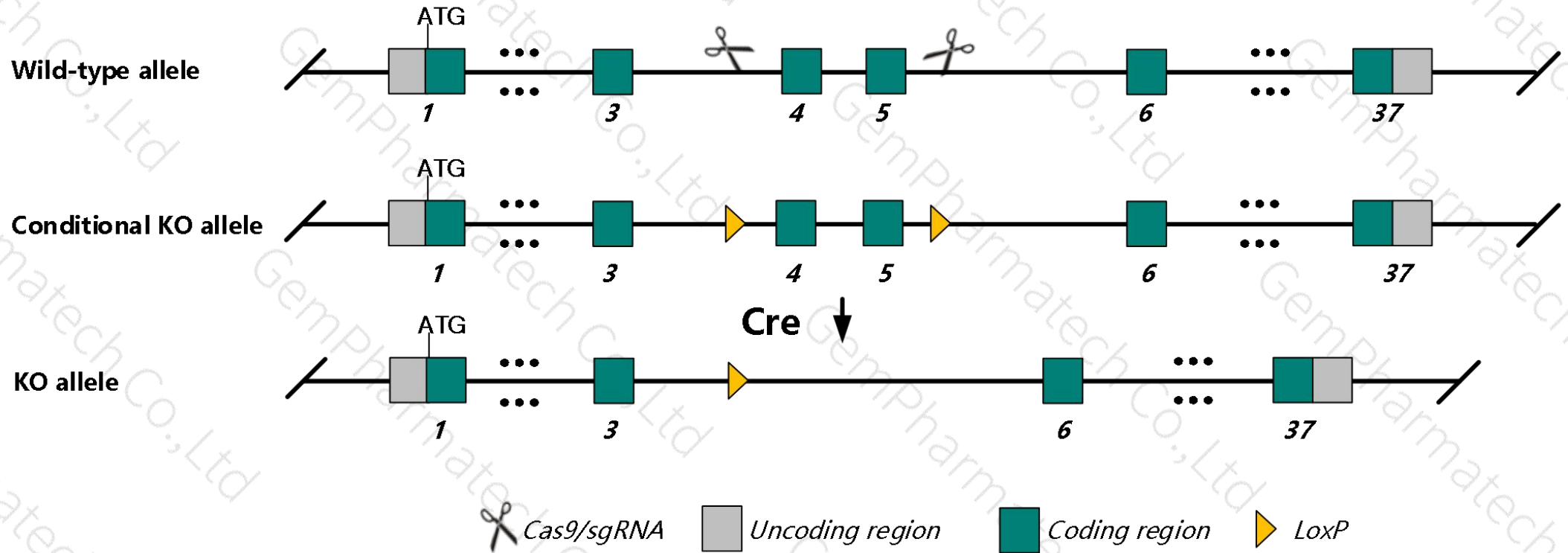| Project Name	*Rims1*
Project type	Cas9-CKO
Strain background	C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Rims1* gene. The schematic diagram is as follows:

Technical routes

➢ The *Rims1* gene has 11 transcripts. According to the structure of *Rims1* gene, exon4-exon5 of *Rims1-205* (ENSMUST00000097811.9) transcript is recommended as the knockout region. The region contains ENS 226bp of coding reigon. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Rims1* 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.

Notice

➢ According to the existing MGI data,Mice homozygous for disruptions in this gene display defects in maternal care and abnormalities in synaptic transmission in the central nervous system.

➢ *Rims1-207*, *Rims1-208* and *Rims1-210* transcripts are incomplete, so the effect on them are unknown.

➢ The *Rims1* 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information （NCBI）

Rims1　regulating synaptic membrane exocytosis 1 [*Mus musculus* (house mouse)]

Gene ID: 116837, updated on 13-Jan-2020

Summary

|	
Official Symbol	Rims1 provided by MGI
Official Full Name	regulating synaptic membrane exocytosis 1 provided by MGI
Primary source	MGI:MGI:2152971
See related	Ensembl:ENSMUSG00000041670
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	Rim; RIM1; RIM1a; Serg1; Rab3ip1; RIM1alpha; C030033M19Rik
Annotation information	Annotation category: partial on reference assembly
Expression	Biased expression in cortex adult (RPKM 23.6), frontal lobe adult (RPKM 17.0) and 5 other tissues See more
Orthologs	human all

Chromosome 1 - NC_000067.6

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Kcnq5   Rims1 ◀————————————Gm7761 ◀
Gm7658 ◀   Gm5696 ◀   Gm7759 ▶

Transcript information（Ensembl）

The gene has 11 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Rims1-205	ENSMUST00000097811.9	6446	1424aa	Protein coding	-	F6VBR4	TSL:5 GENCODE basic APPRIS P5
Rims1-204	ENSMUST00000097810.9	6362	1396aa	Protein coding	-	F6VBT9	TSL:5 GENCODE basic APPRIS ALT2
Rims1-203	ENSMUST00000097809.9	6179	1335aa	Protein coding	-	F6VBV0	TSL:5 GENCODE basic APPRIS ALT2
Rims1-206	ENSMUST00000115273.8	6107	1311aa	Protein coding	-	F6Y0S3	TSL:5 GENCODE basic APPRIS ALT2
Rims1-201	ENSMUST00000081544.12	5954	1260aa	Protein coding	-	F6TZK4	TSL:5 GENCODE basic APPRIS ALT2
Rims1-202	ENSMUST00000097808.6	2411	803aa	Protein coding	-	E9PWP6	CDS 3' incomplete TSL:5
Rims1-207	ENSMUST00000164877.7	2294	219aa	Protein coding	-	Q7TPL9	TSL:1 GENCODE basic
Rims1-208	ENSMUST00000185942.1	2189	729aa	Protein coding	-	A0A087WSA4	CDS 5' incomplete TSL:1
Rims1-209	ENSMUST00000218140.1	1434	388aa	Protein coding	-	A0A1W2P6S9	TSL:5 GENCODE basic
Rims1-210	ENSMUST00000239255.1	516	129aa	Protein coding	-	-	CDS 3' incomplete
Rims1-211	ENSMUST00000239339.1	863	No protein	Processed transcript	-	-	-

The strategy is based on the design of *Rims1-205* transcript,The transcription is shown below

< Rims1-205
protein coding

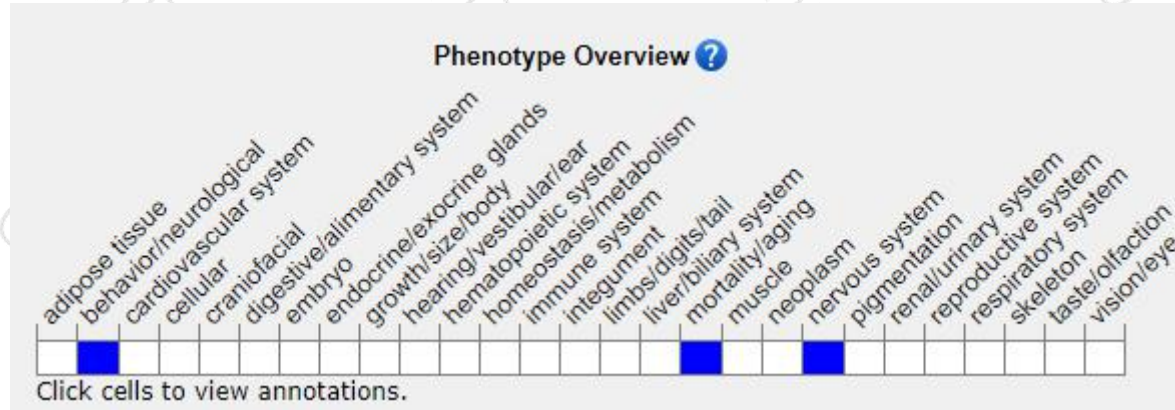Reverse strand ◄——————————— 519.47 kb ———————————►
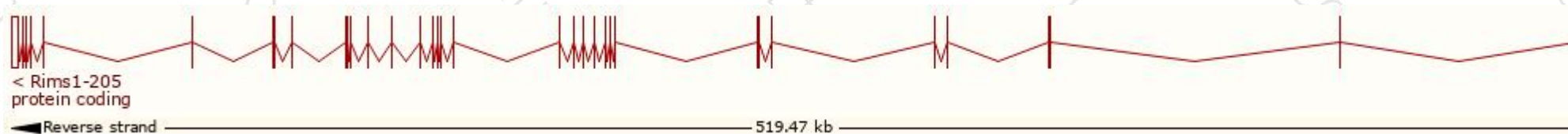
Genomic location distribution
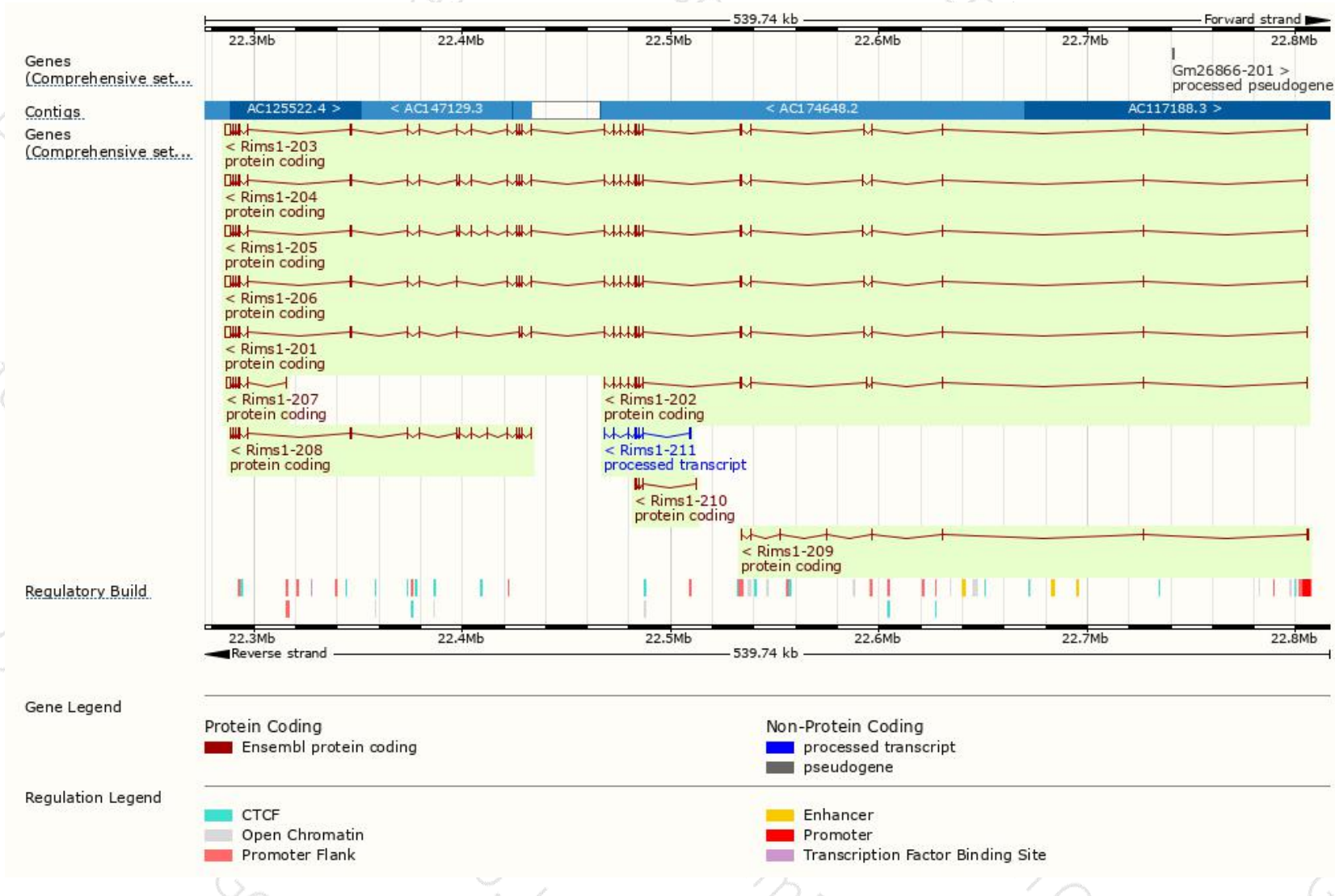
Protein domain
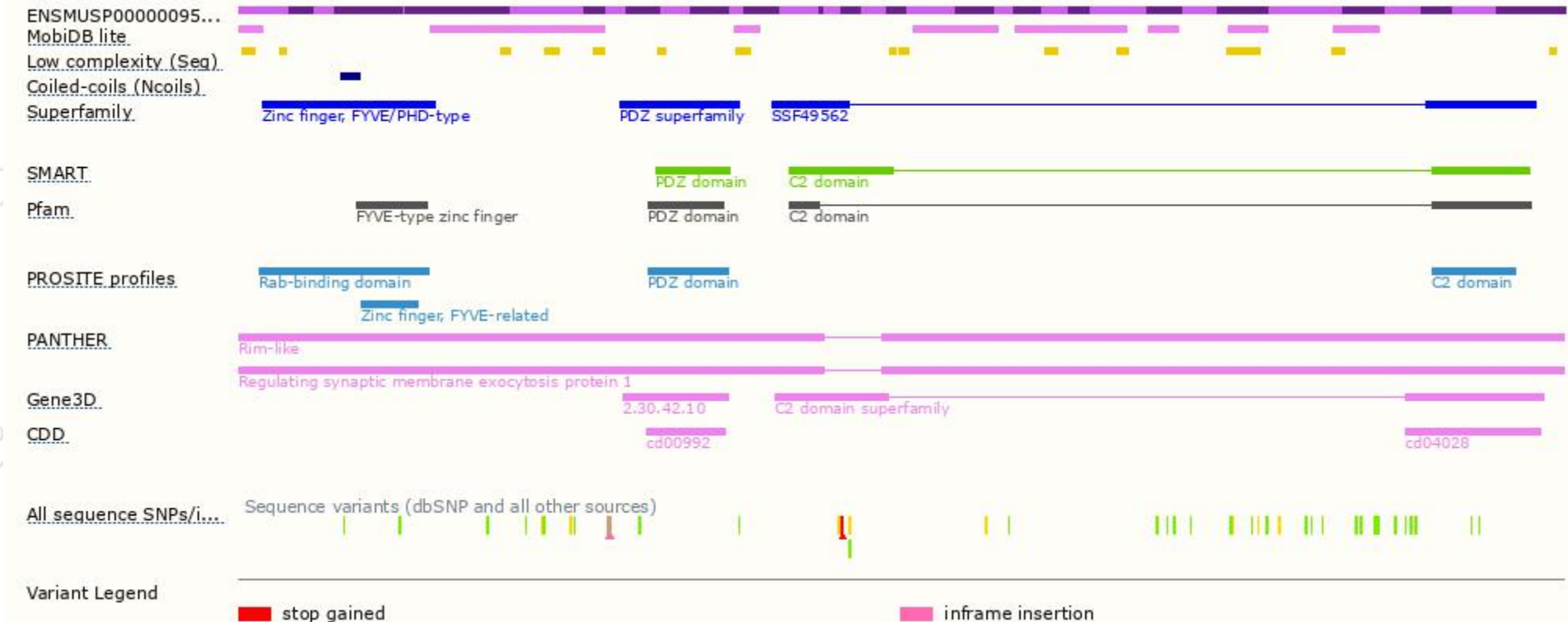
Mouse phenotype description(MGI)

Phenotypes affected by the gene are marked in blue.Data quoted from MGI database(http://www.informatics.jax.org/).

Mice homozygous for disruptions in this gene display defects in maternal care and abnormalities in synaptic transmission in the central nervous system.