Oprl1 Cas9-KO Strategy

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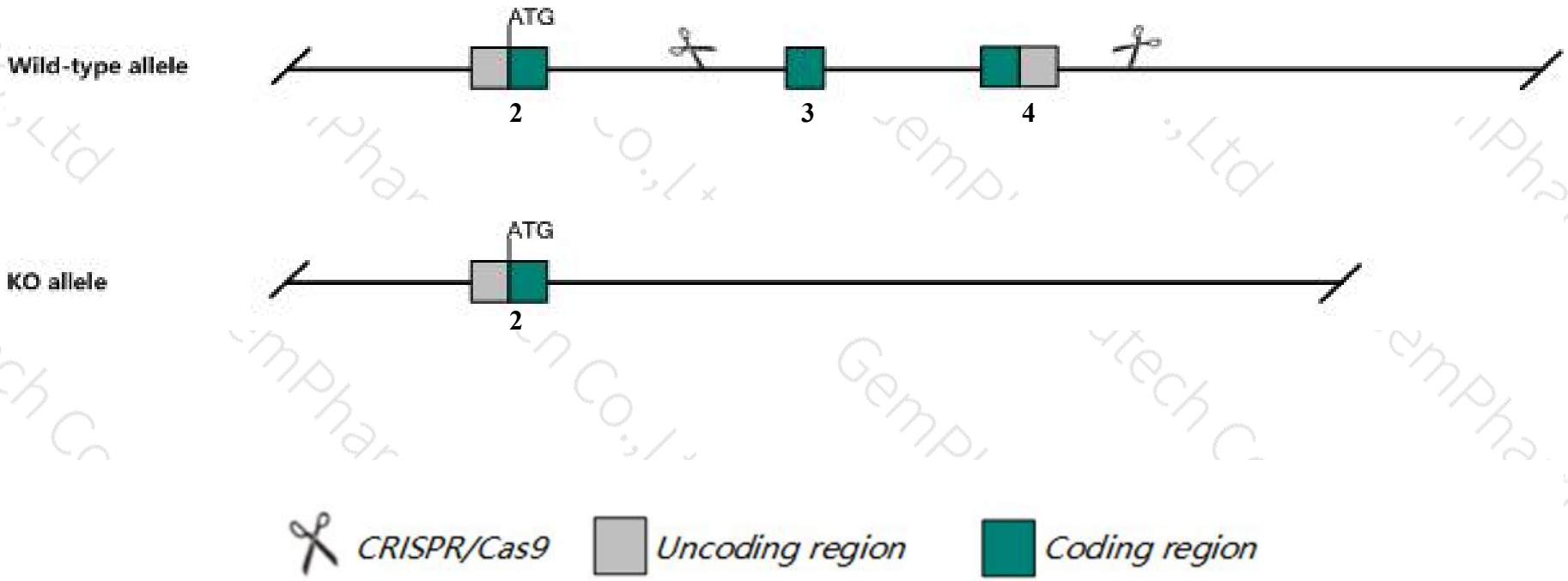
Project Overview

Project Name	***Oprl1***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Oprl1* gene. The schematic diagram is as follows:



Technical routes

➢ The *Oprl1* gene has 11 transcripts. According to the structure of *Oprl1* gene, exon3-exon4 of *Oprl1-201* (ENSMUST00000071585.9) transcript is recommended as the knockout region. The region contains most of coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Oprl1* gene. The brief process is as follows: gRNA was transcribed in vitro.Cas9 and gRNA 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,mice homozygous for a null allele exhibit altered touch/nociception, facilitation of long-term potentiation and memory, increased dopamine release upon administration of opioid peptide agonist, impaired behavioral response to morphine, and increased susceptibility to noise-induced hearing loss.

- The *Oprl1* gene is located on the Chr2. 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）

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Oprl1 opioid receptor-like 1 [*Mus musculus* (house mouse)]

Gene ID: 18389, updated on 13-Aug-2019

Summary

Official Symbol	Oprl1 provided by MGI
Official Full Name	opioid receptor-like 1 provided by MGI
Primary source	MGI:MGI:97440
See related	Ensembl:ENSMUSG00000027584
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	NOP; KOR3; ORGC; ORL1; Oprl; XOR1; morc; KOR-3; LC132; MOR-C
Summary	The protein encoded by this gene is a member of the 7 transmembrane-spanning G protein-coupled receptor family, and functions as a receptor for the endogenous, opioid-related neuropeptide, nociceptin/orphanin FQ. This receptor-ligand system modulates a variety of biological functions and neurobehavior, including stress responses and anxiety behavior, learning and memory, locomotor activity, and inflammatory and immune responses. Alternatively spliced transcript variants have been described for this gene. A recent study provided evidence for translational readthrough in this gene, and expression of an additional C-terminally extended isoform via the use of an alternative in-frame translation termination codon. [provided by RefSeq, Dec 2017]
Expression	Biased expression in whole brain E14.5 (RPKM 16.2), CNS E18 (RPKM 14.7) and 6 other tissues See more
Orthologs	human all

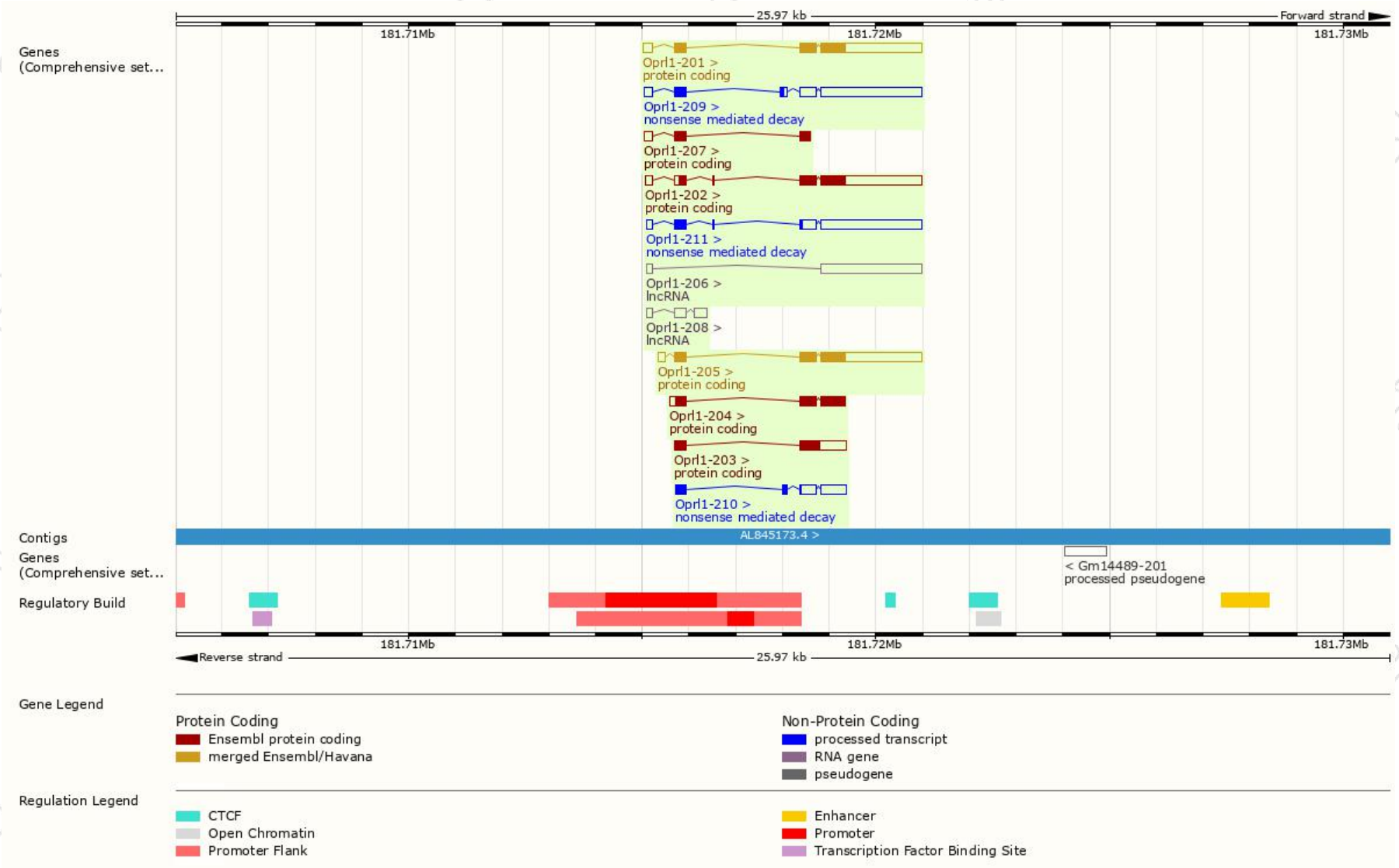
Transcript information（Ensembl）

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

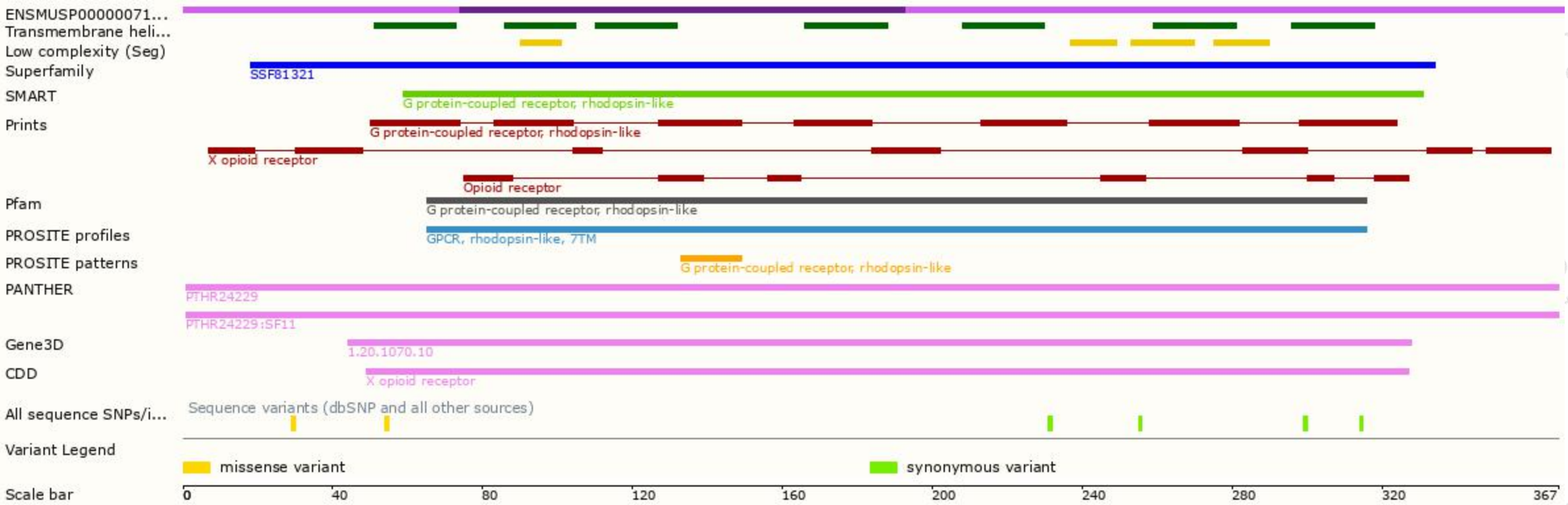
Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Oprl1-201	ENSMUST00000071585.9	2999	367aa	Protein coding	CCDS17222	P35377 Q542U1	TSL:1 GENCODE basic APPRIS P3
Oprl1-202	ENSMUST00000108763.7	2971	353aa	Protein coding	CCDS84606	B0R0C0	TSL:1 GENCODE basic APPRIS ALT2
Oprl1-203	ENSMUST00000108766.1	1241	213aa	Protein coding	-	P35377	TSL:1 GENCODE basic
Oprl1-204	ENSMUST00000108767.1	1248	367aa	Protein coding	CCDS17222	P35377 Q542U1	TSL:1 GENCODE basic APPRIS P3
Oprl1-205	ENSMUST00000108768.7	2914	367aa	Protein coding	CCDS17222	P35377 Q542U1	TSL:1 GENCODE basic APPRIS P3
Oprl1-206	ENSMUST00000126835.1	2297	No protein	lncRNA	-	-	TSL:1
Oprl1-207	ENSMUST00000148334.7	640	141aa	Protein coding	-	B0R0B7	CDS 3' incomplete TSL:3
Oprl1-208	ENSMUST00000151241.1	647	No protein	lncRNA	-	-	TSL:5
Oprl1-209	ENSMUST00000183693.7	3102	95aa	Nonsense mediated decay	-	P35377	TSL:1
Oprl1-210	ENSMUST00000184127.1	1257	111aa	Nonsense mediated decay	-	P35377	TSL:1
Oprl1-211	ENSMUST00000184795.1	2938	94aa	Nonsense mediated decay	-	V9GX47	TSL:1

The strategy is based on the design of *Oprl1-201* transcript,The transcription is shown below

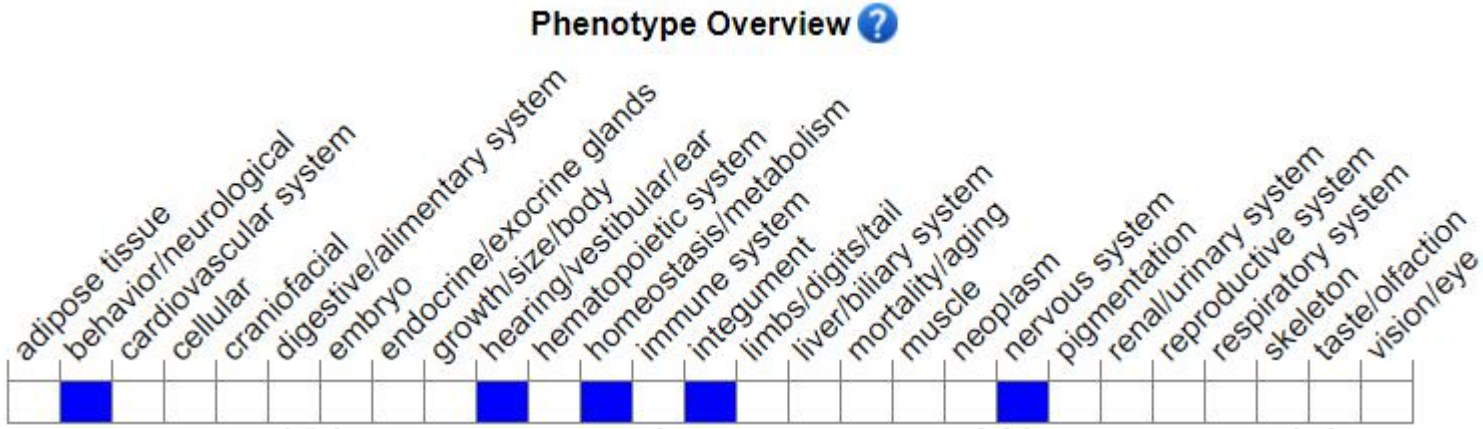
Genomic location distribution



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/).

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

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