

Orai2 Cas9-KO Strategy

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Reviewer:

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Design Date:

2020-2-25

Project Overview

Project Name

Orai2

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Orai2* gene. The schematic diagram is as follows:

- The *Orai2* gene has 4 transcripts. According to the structure of *Orai2* gene, exon2 of *Orai2-201* (ENSMUST00000041048.5) transcript is recommended as the knockout region. The region contains start codon ATG. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Orai2* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, homozygous KO mice show increased SOCE (store-operated Ca^{2+} entry) through CRAC (Ca^{2+} release-activated Ca^{2+}) channels in T cells and higher CRAC currents.
- The *Orai2* gene is located on the Chr5. 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)



Orai2 ORAI calcium release-activated calcium modulator 2 [*Mus musculus* (house mouse)]

Gene ID: 269717, updated on 17-Sep-2019

Summary

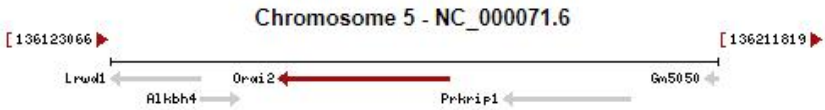
- Official Symbol [Orai2](#) provided by [MGI](#)
- Official Full Name [ORAI calcium release-activated calcium modulator 2](#) provided by [MGI](#)
- Primary source [MGI:MGI:2443195](#)
- See related [Ensembl:ENSMUSG00000039747](#)
- Gene type protein coding
- RefSeq status VALIDATED
- Organism [Mus musculus](#)
- Lineage Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
- Also known as [Tmem142b](#); [A730041O15Rik](#)
- Expression Broad expression in thymus adult (RPKM 40.1), spleen adult (RPKM 26.5) and 20 other tissues [See more](#)
- Orthologs [human](#) [all](#)

Genomic context

Location: 5; 5 G2 See [Orai2](#) in [Genome Data Viewer](#)

Exon count: 5

Annotation release	Status	Assembly	Chr	Location
108	current	GRCm38.p6 (GCF_000001635.26)	5	NC_000071.6 (136147456..136172564, complement)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	5	NC_000071.5 (136623329..136646526, complement)

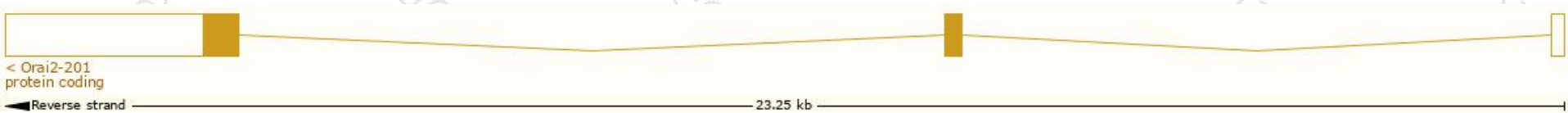


Transcript information (Ensembl)

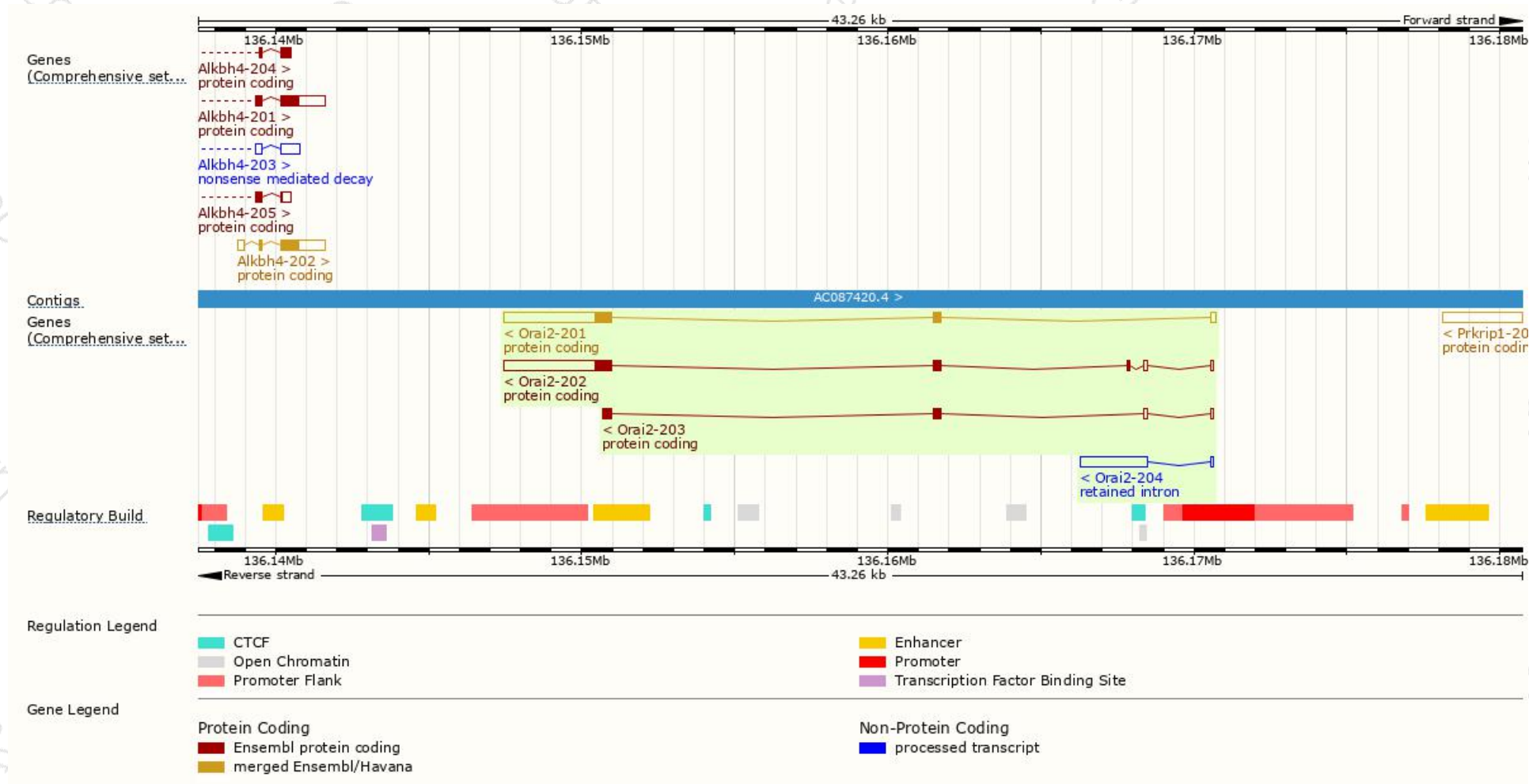
The gene has 4 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Orai2-201	ENSMUST00000041048.5	3908	250aa	 Protein coding	CCDS39326	Q14BR6 Q8BH10	TSL:1 GENCODE basic APPRIS P1
Orai2-202	ENSMUST00000196454.4	3990	264aa	 Protein coding	-	A5CVE1	TSL:5 GENCODE basic
Orai2-203	ENSMUST00000197052.1	693	158aa	 Protein coding	-	A0A0G2JFL5	CDS 3' incomplete TSL:3
Orai2-204	ENSMUST00000198268.1	2265	No protein	 Retained intron	-	-	TSL:1

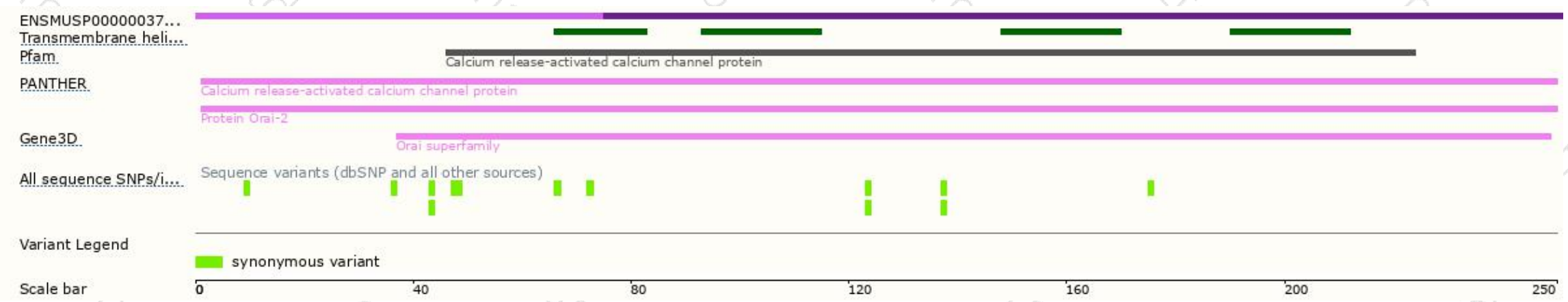
The strategy is based on the design of *Orai2-201* transcript, the transcription is shown below:



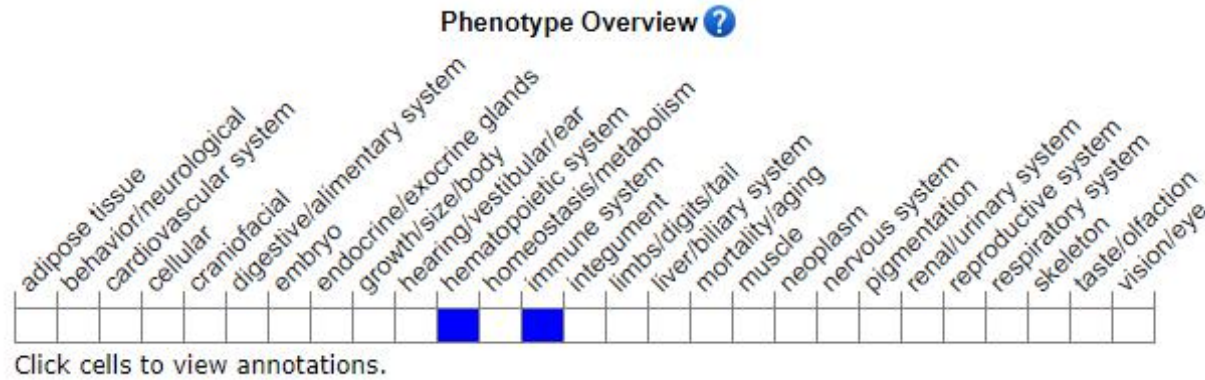
Genomic location distribution



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 KO mice show increased SOCE (store-operated Ca^{2+} entry) through CRAC (Ca^{2+} release-activated Ca^{2+}) channels in T cells and higher CRAC currents.

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

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