

# *Rb1cc1* Cas9-KO Strategy

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# Project Overview



**Project Name**

***Rb1cc1***

**Project type**

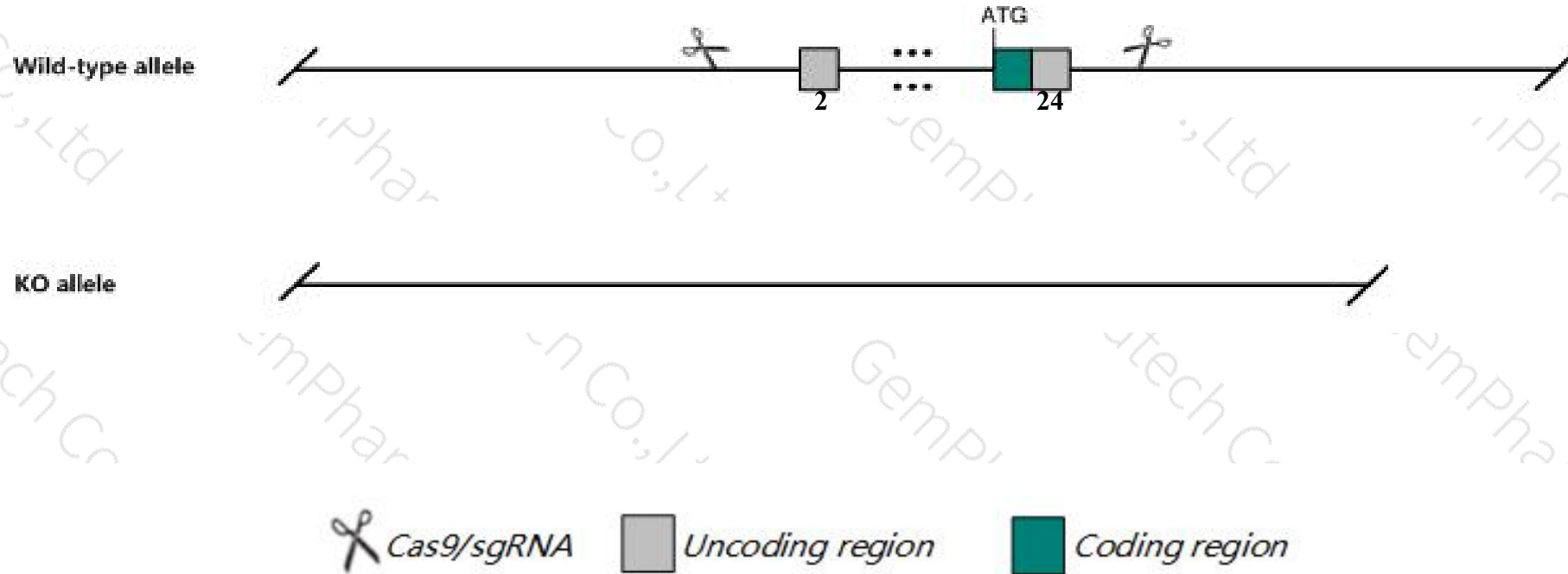
**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Rblcc1* gene. The schematic diagram is as follows:



- The *Rblcc1* gene has 16 transcripts. According to the structure of *Rblcc1* gene, exon2-exon24 of *Rblcc1-201* (ENSMUST00000027040.12) transcript is recommended as the knockout region. The region contains most of the coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Rblcc1* gene. The brief process is as follows: sgRNA was transcribed in vitro. Cas9 and sgRNA 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, Homozygous mutation of this gene results in embryonic lethality at mid/late gestation associated with heart failure and liver degeneration.
- The *Rblccl* 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 the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.



# Gene information (NCBI)

## Rb1cc1 RB1-inducible coiled-coil 1 [Mus musculus (house mouse)]

Gene ID: 12421, updated on 19-Mar-2019

### Summary



|                           |   |
|---------------------------|---|
| <b>Official Symbol</b>    | Rb1cc1 provided by <a href="#">MGI</a>  |
| <b>Official Full Name</b> | RB1-inducible coiled-coil 1 provided by <a href="#">MGI</a>   |
| <b>Primary source</b>     | <a href="#">MGI:MGI:1341850</a>   |
| <b>See related</b>        | <a href="#">Ensembl:ENSMUSG00000025907</a>  |
| <b>Gene type</b>          | protein coding  |
| <b>RefSeq status</b>      | VALIDATED   |
| <b>Organism</b>           | <a href="#">Mus musculus</a>  |
| <b>Lineage</b>            | Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus |
| <b>Also known as</b>      | 2900055E04Rik, 5930404L04Rik, Cc1, FIP200, LaXp180  |
| <b>Expression</b>         | Ubiquitous expression in testis adult (RPKM 10.4), cerebellum adult (RPKM 5.1) and 27 other tissues <a href="#">See more</a>  |
| <b>Orthologs</b>          | <a href="#">human</a> <a href="#">all</a>   |

# Transcript information (Ensembl)

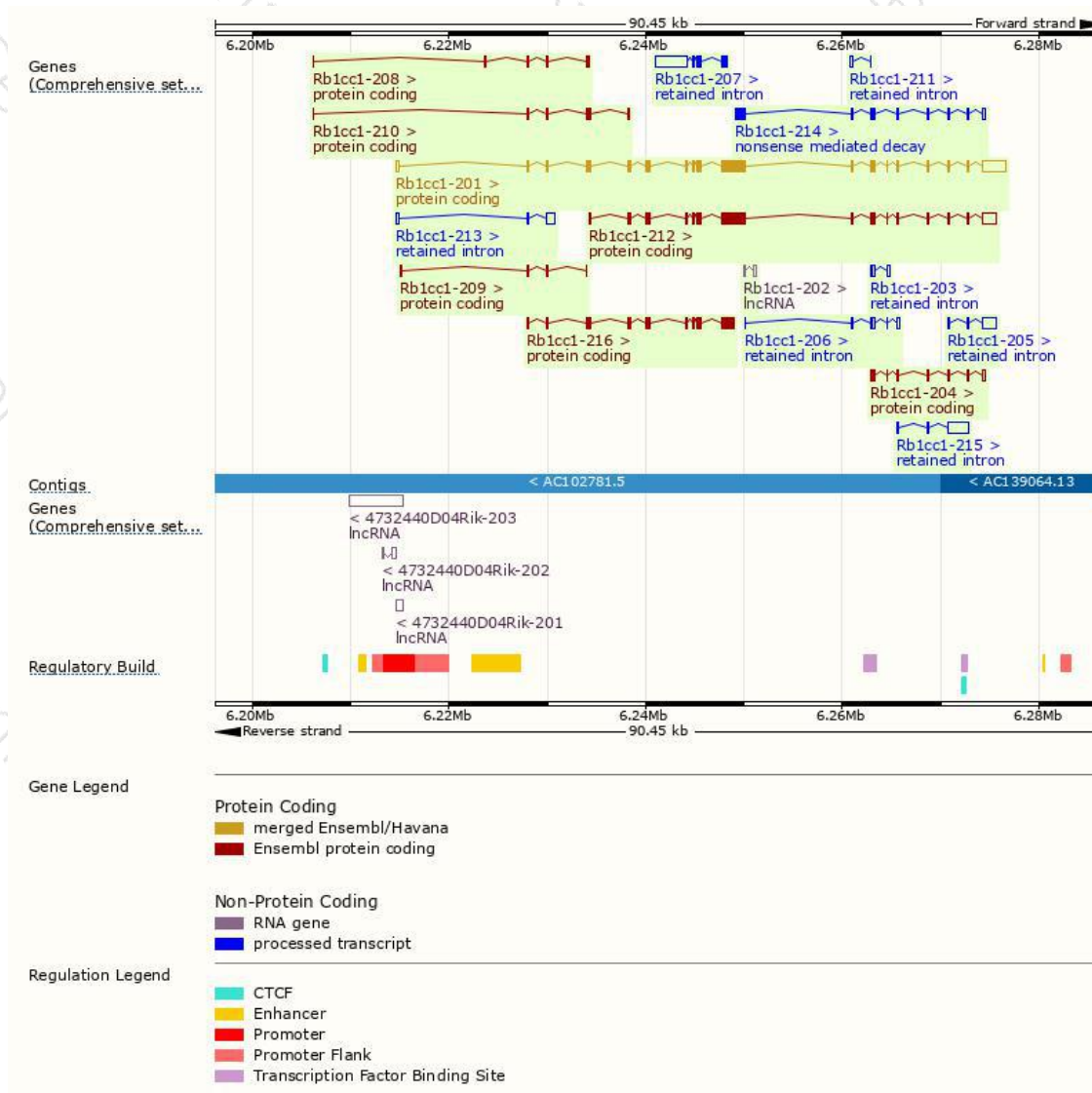
The gene has 16 transcripts, all transcripts are shown below:

| Name       | Transcript ID                        | bp   | Protein                | Biotype                 | CCDS                      | UniProt                | Flags                         |
|------------|--------------------------------------|------|------------------------|-------------------------|---------------------------|------------------------|-------------------------------|
| Rb1cc1-201 | <a href="#">ENSMUST0000027040.12</a> | 7607 | <a href="#">1588aa</a> | Protein coding          | <a href="#">CCDS35507</a> | <a href="#">Q9ESK9</a> | TSL:1 GENCODE basic APPRIS P1 |
| Rb1cc1-212 | <a href="#">ENSMUST00000161327.7</a> | 5707 | <a href="#">1468aa</a> | Protein coding          | -                         | <a href="#">F7CC56</a> | CDS 5' incomplete TSL:1       |
| Rb1cc1-216 | <a href="#">ENSMUST00000162795.7</a> | 2712 | <a href="#">873aa</a>  | Protein coding          | -                         | <a href="#">E9PX56</a> | CDS 3' incomplete TSL:5       |
| Rb1cc1-204 | <a href="#">ENSMUST00000159530.1</a> | 898  | <a href="#">227aa</a>  | Protein coding          | -                         | <a href="#">F6TLJ4</a> | CDS 5' incomplete TSL:1       |
| Rb1cc1-210 | <a href="#">ENSMUST00000160871.7</a> | 690  | <a href="#">164aa</a>  | Protein coding          | -                         | <a href="#">E0CYY6</a> | CDS 3' incomplete TSL:2       |
| Rb1cc1-208 | <a href="#">ENSMUST00000159906.7</a> | 656  | <a href="#">93aa</a>   | Protein coding          | -                         | <a href="#">E0CZG6</a> | CDS 3' incomplete TSL:2       |
| Rb1cc1-209 | <a href="#">ENSMUST00000160062.7</a> | 520  | <a href="#">40aa</a>   | Protein coding          | -                         | <a href="#">E0CYU7</a> | CDS 3' incomplete TSL:3       |
| Rb1cc1-214 | <a href="#">ENSMUST00000162257.7</a> | 2204 | <a href="#">536aa</a>  | Nonsense mediated decay | -                         | <a href="#">F7CCJ3</a> | CDS 5' incomplete TSL:5       |
| Rb1cc1-207 | <a href="#">ENSMUST00000159802.1</a> | 4136 | No protein             | Retained intron         | -                         | -                      | TSL:1                         |
| Rb1cc1-215 | <a href="#">ENSMUST00000162418.1</a> | 2150 | No protein             | Retained intron         | -                         | -                      | TSL:1                         |
| Rb1cc1-205 | <a href="#">ENSMUST00000159656.1</a> | 1599 | No protein             | Retained intron         | -                         | -                      | TSL:1                         |
| Rb1cc1-213 | <a href="#">ENSMUST00000162210.7</a> | 1151 | No protein             | Retained intron         | -                         | -                      | TSL:1                         |
| Rb1cc1-206 | <a href="#">ENSMUST00000159661.7</a> | 875  | No protein             | Retained intron         | -                         | -                      | TSL:5                         |
| Rb1cc1-203 | <a href="#">ENSMUST00000159349.1</a> | 633  | No protein             | Retained intron         | -                         | -                      | TSL:2                         |
| Rb1cc1-211 | <a href="#">ENSMUST00000161183.1</a> | 332  | No protein             | Retained intron         | -                         | -                      | TSL:5                         |
| Rb1cc1-202 | <a href="#">ENSMUST00000159206.1</a> | 519  | No protein             | lncRNA                  | -                         | -                      | TSL:3                         |

The strategy is based on the design of *Rb1cc1-201* transcript, The transcription is shown below

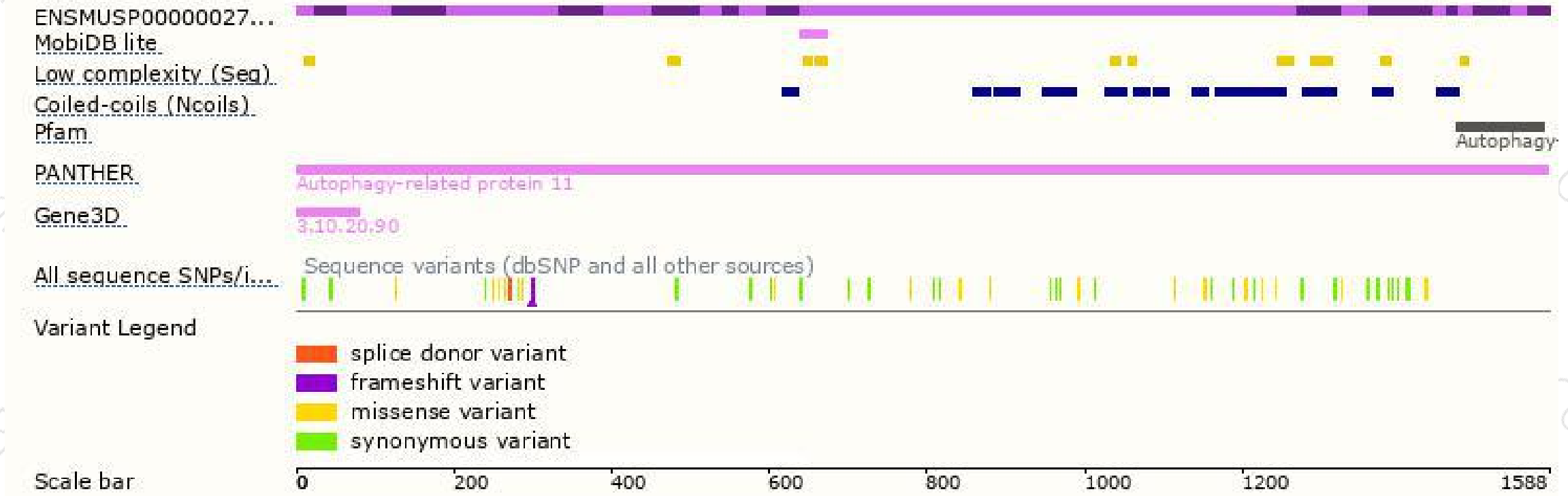


# Genomic location distribution

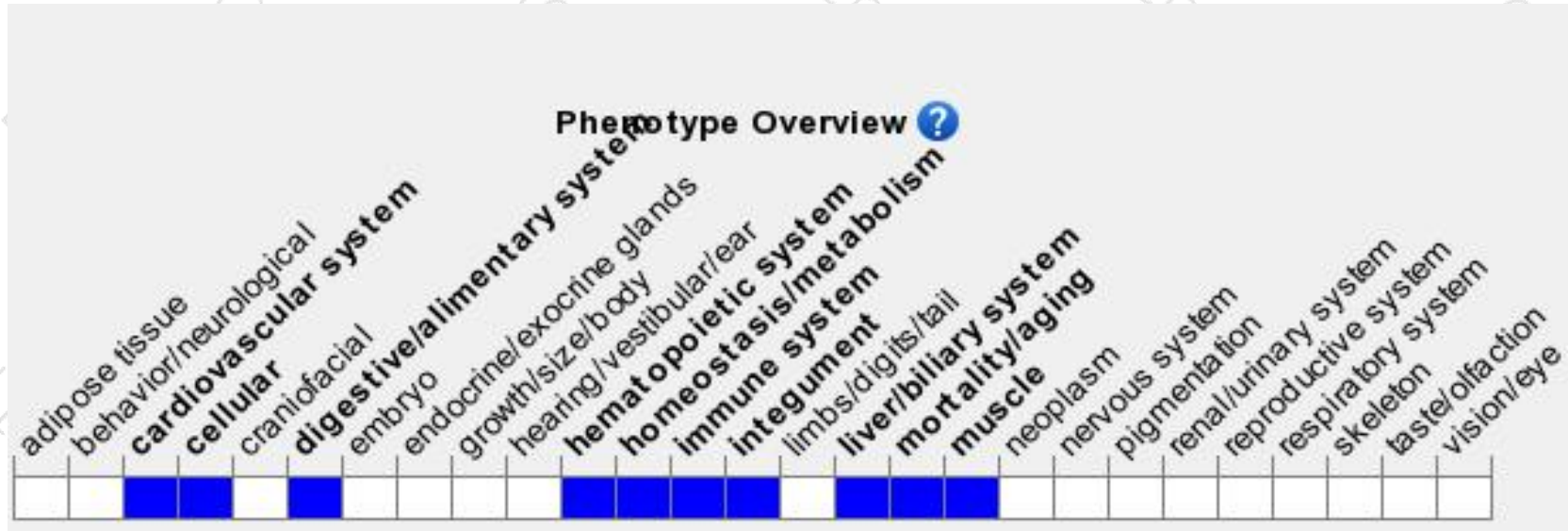




# Protein domain



# 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 mutation of this gene results in embryonic lethality at mid/late gestation associated with heart failure and liver degeneration.

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

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