

# ***Magt1*** Cas9-CKO Strategy

**Designer: Jiayuan Yao**

**Reviewer: Longyun Hu**

**Design Date: 2021-1-8**

# Project Overview

**Project Name**

*Magt1*

**Project type**

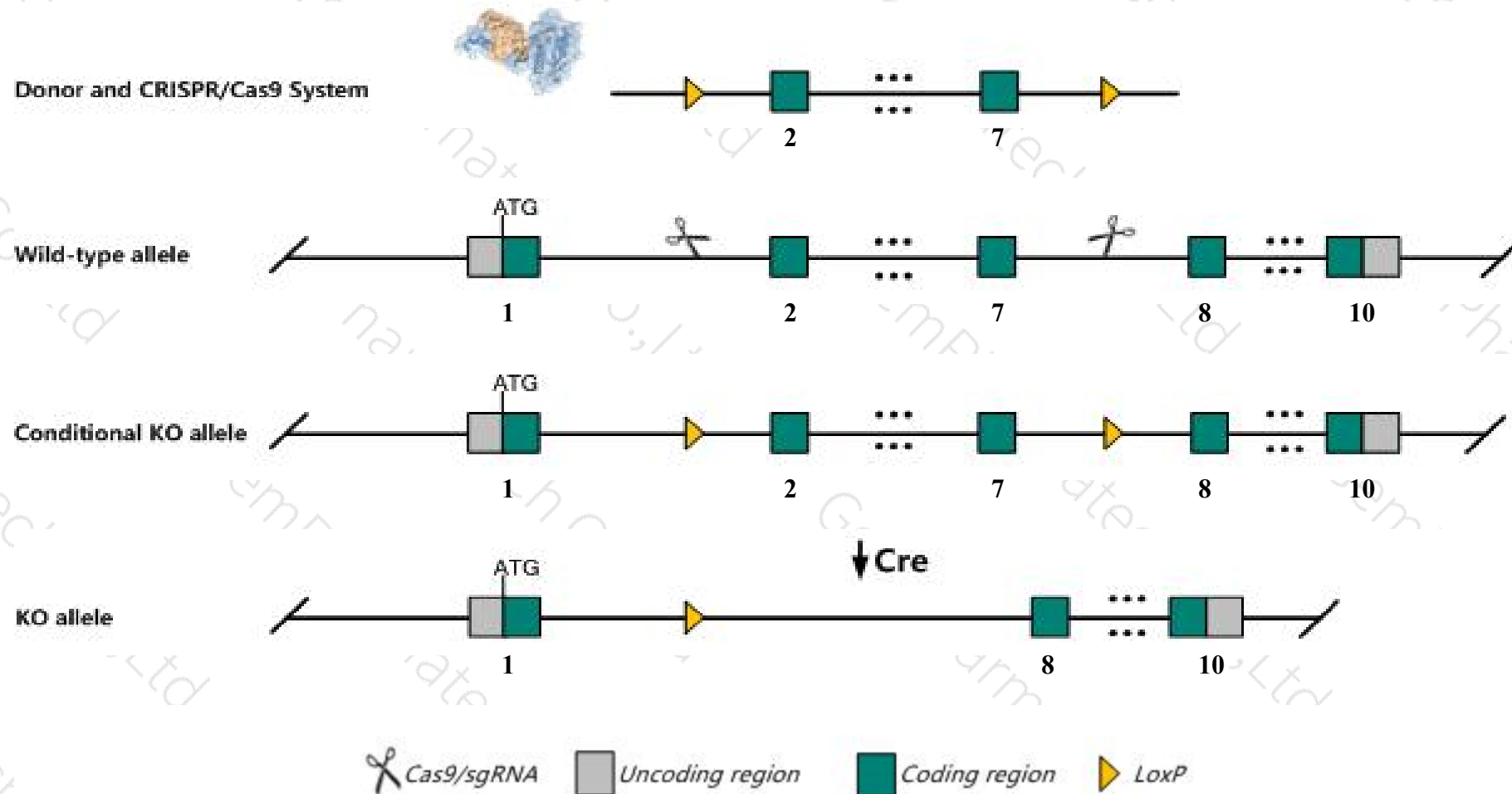
**Cas9-CKO**

**Strain background**

**C57BL/6JGpt**

# Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Magt1* gene. The schematic diagram is as follows:



# Technical routes

- The *Magt1* gene has 5 transcripts. According to the structure of *Magt1* gene, exon2-exon7 of *Magt1*-205(ENSMUST00000238718.1) transcript is recommended as the knockout region. The region contains 724bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Magt1* gene. The brief process is as follows: sgRNA was transcribed in vitro, donor vector was constructed. Cas9, sgRNA 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 was 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.

- According to the existing MGI data, male mice hemizygous for one gene trap allele exhibit decreased T cell number and increased B cell numbers with increased activation.
- The *Magt1* gene is located on the ChrX. 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)

## Magt1 magnesium transporter 1 [Mus musculus (house mouse)]

Gene ID: 67075, updated on 13-Mar-2020

### Summary



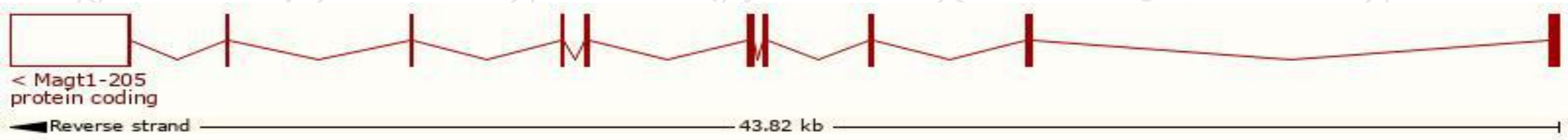
<b>Official Symbol</b>	Magt1 provided by <a href="#">MGI</a>
<b>Official Full Name</b>	magnesium transporter 1 provided by <a href="#">MGI</a>
<b>Primary source</b>	<a href="#">MGI:MGI:1914325</a>
<b>See related</b>	<a href="#">Ensembl:ENSMUSG000000031232</a>
<b>Gene type</b>	protein coding
<b>RefSeq 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>	2410001C15Rik, 2610529C04Rik, 2810482I07Rik, IAG2, IAP
<b>Expression</b>	Ubiquitous expression in placenta adult (RPKM 16.4), limb E14.5 (RPKM 8.4) and 27 other tissues <a href="#">See more</a>
<b>Orthologs</b>	<a href="#">human</a> <a href="#">all</a>

# Transcript information (Ensembl)

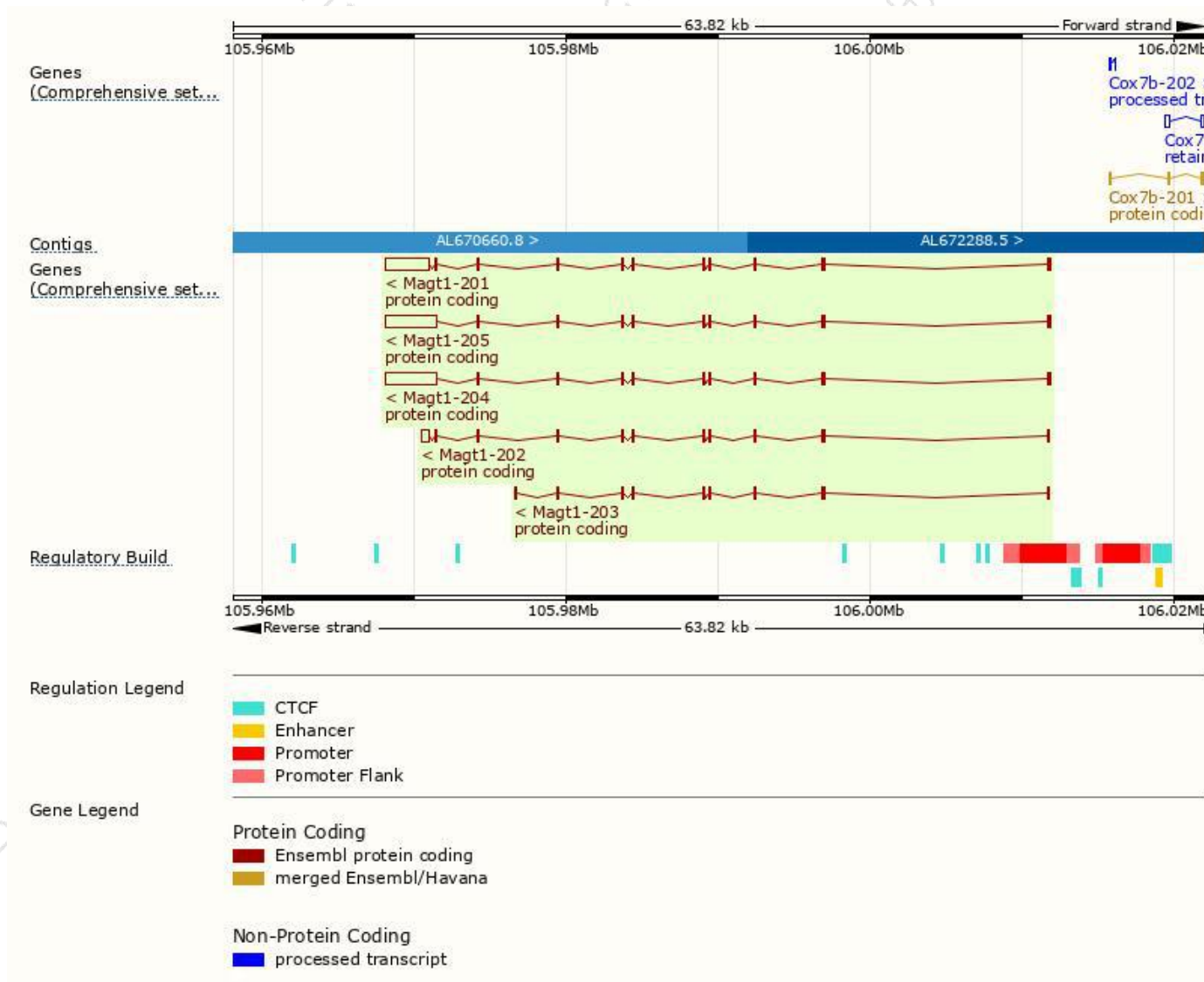
The gene has 5 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Magt1-205	<a href="#">ENSMUST00000238718.1</a>	4524	<a href="#">368aa</a>	Protein coding	<a href="#">CCDS53168</a>	-	GENCODE basic APPRIS P2
Magt1-201	<a href="#">ENSMUST00000033583.13</a>	4115	<a href="#">368aa</a>	Protein coding	<a href="#">CCDS53168</a>	<a href="#">A2ADH1</a>	TSL:1 GENCODE basic APPRIS P2
Magt1-204	<a href="#">ENSMUST00000151689.8</a>	4531	<a href="#">335aa</a>	Protein coding	-	<a href="#">A2ADH1 Q9CQY5</a>	TSL:1 GENCODE basic APPRIS ALT2
Magt1-202	<a href="#">ENSMUST00000113566.9</a>	1608	<a href="#">335aa</a>	Protein coding	-	<a href="#">F6WHL0 Q9CQY5</a>	TSL:1 GENCODE basic APPRIS ALT2
Magt1-203	<a href="#">ENSMUST00000139421.2</a>	1059	<a href="#">306aa</a>	Protein coding	-	<a href="#">F6TBV1</a>	TSL:1 GENCODE basic APPRIS ALT2

The strategy is based on the design of *Magt1-205* transcript,the transcription is shown below:

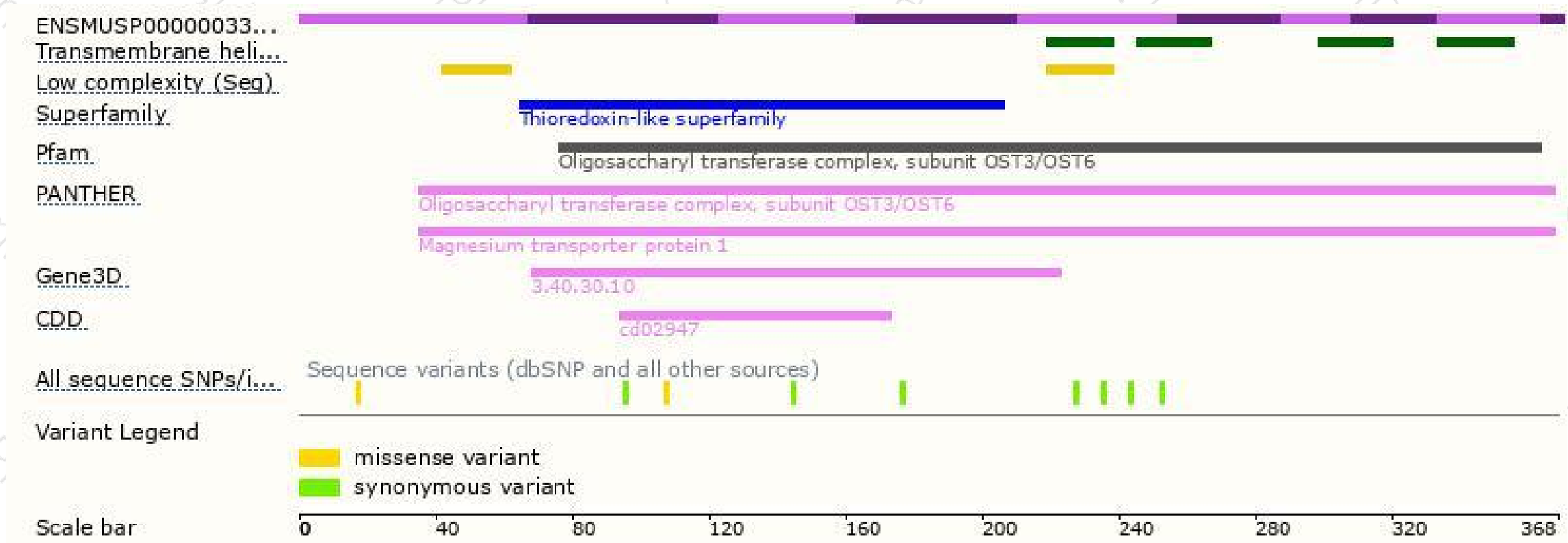


# Genomic location distribution

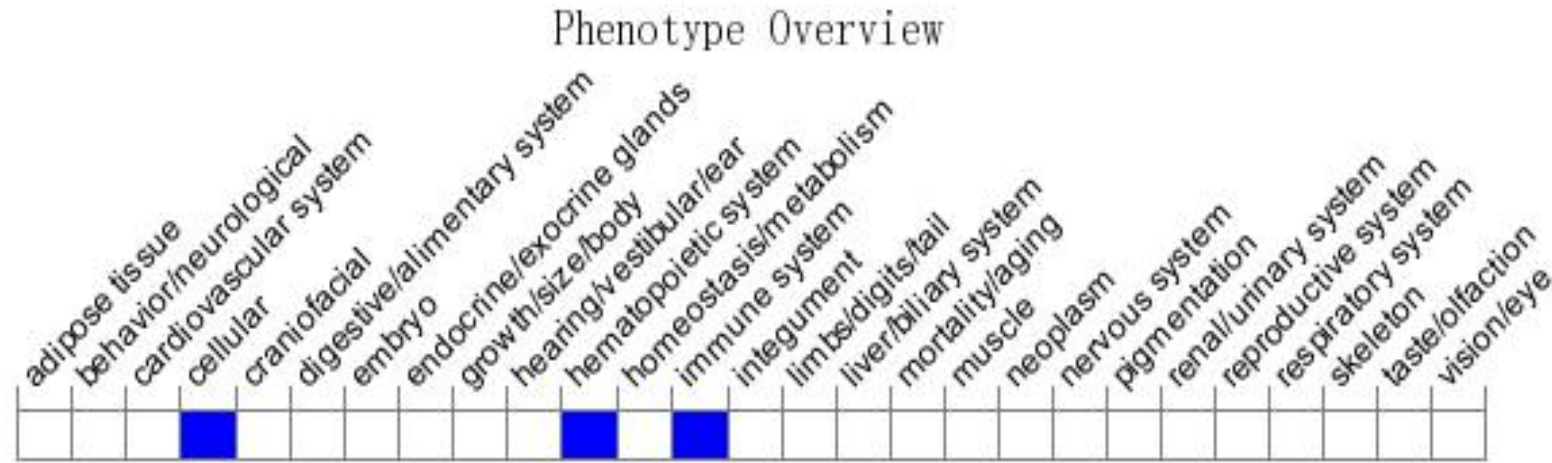




# Protein domain



# 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, male mice hemizygous for one gene trap allele exhibit decreased T cell number and increased B cell numbers with increased activation.

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

Tel: 025-5864 1534

