

# *Arrb2* Cas9-KO Strategy

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# Project Overview

**Project Name**

*Arrb2*

**Project type**

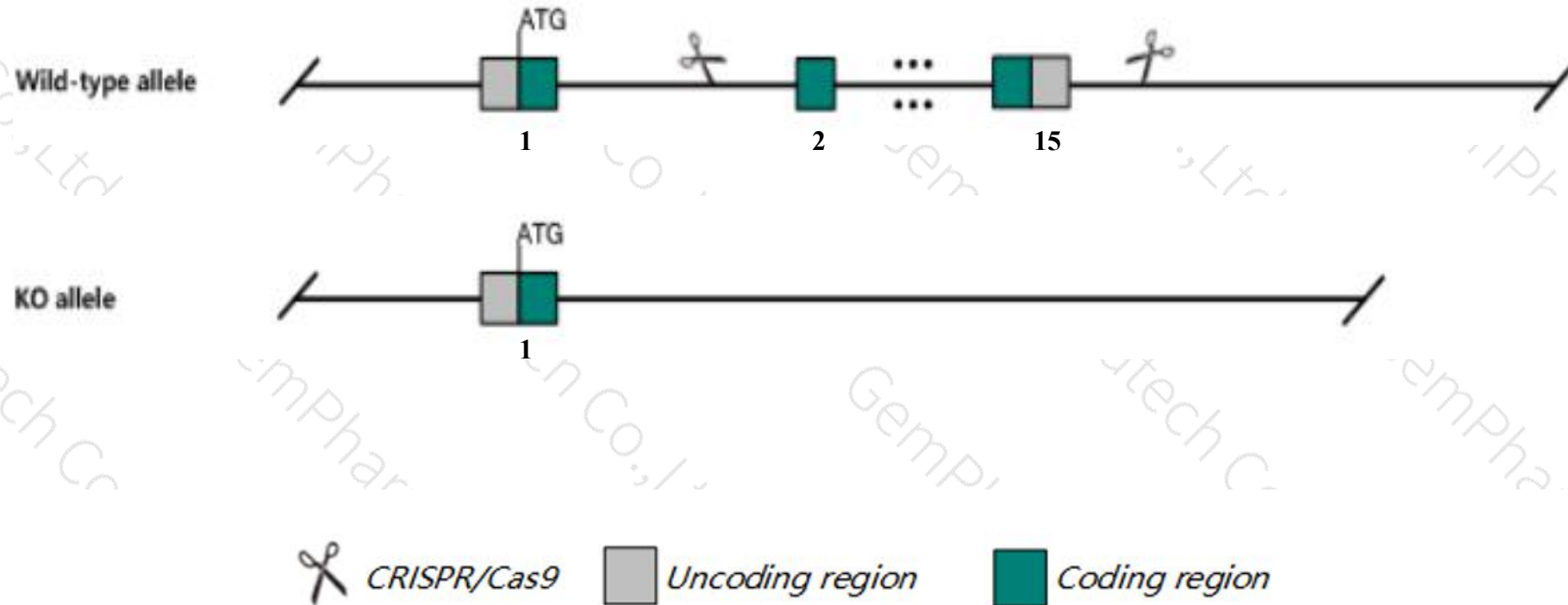
**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Arrb2* gene. The schematic diagram is as follows:



- The *Arrb2* gene has 13 transcripts. According to the structure of *Arrb2* gene, exon2-exon15 of *Arrb2*-205(ENSMUST00000108568.9) transcript is recommended as the knockout region. The region contains 1243bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Arrb2* gene. The brief process is as follows: CRISPR/Cas9 system 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, mice homozygous for a knock-out allele exhibit enhanced morphine analgesia, an enhanced inflammatory response and reduced threshold to lethal endotoxin challenge, and impaired T and B lymphocyte chemotaxis.
- The KO region contains functional region of the *Mir7115* gene. Knockout the region may affect the function of *Mir7115* gene.
- The *Arrb2* gene is located on the Chr11. 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)

## Arrb2 arrestin, beta 2 [Mus musculus (house mouse)]

Gene ID: 216869, updated on 13-Mar-2020

### Summary



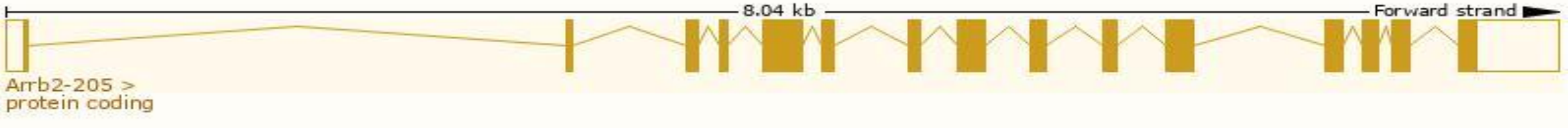
<b>Official Symbol</b>	Arrb2 provided by <a href="#">MGI</a>
<b>Official Full Name</b>	arrestin, beta 2 provided by <a href="#">MGI</a>
<b>Primary source</b>	<a href="#">MGI:MGI:99474</a>
<b>See related</b>	<a href="#">Ensembl:ENSMUSG00000060216</a>
<b>Gene type</b>	protein coding
<b>RefSeq status</b>	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>	AI326910, AW122872, Arr3
<b>Expression</b>	Ubiquitous expression in spleen adult (RPKM 25.2), thymus adult (RPKM 24.8) and 28 other tissues <a href="#">See more</a>
<b>Orthologs</b>	<a href="#">human</a> <a href="#">all</a>

# Transcript information (Ensembl)

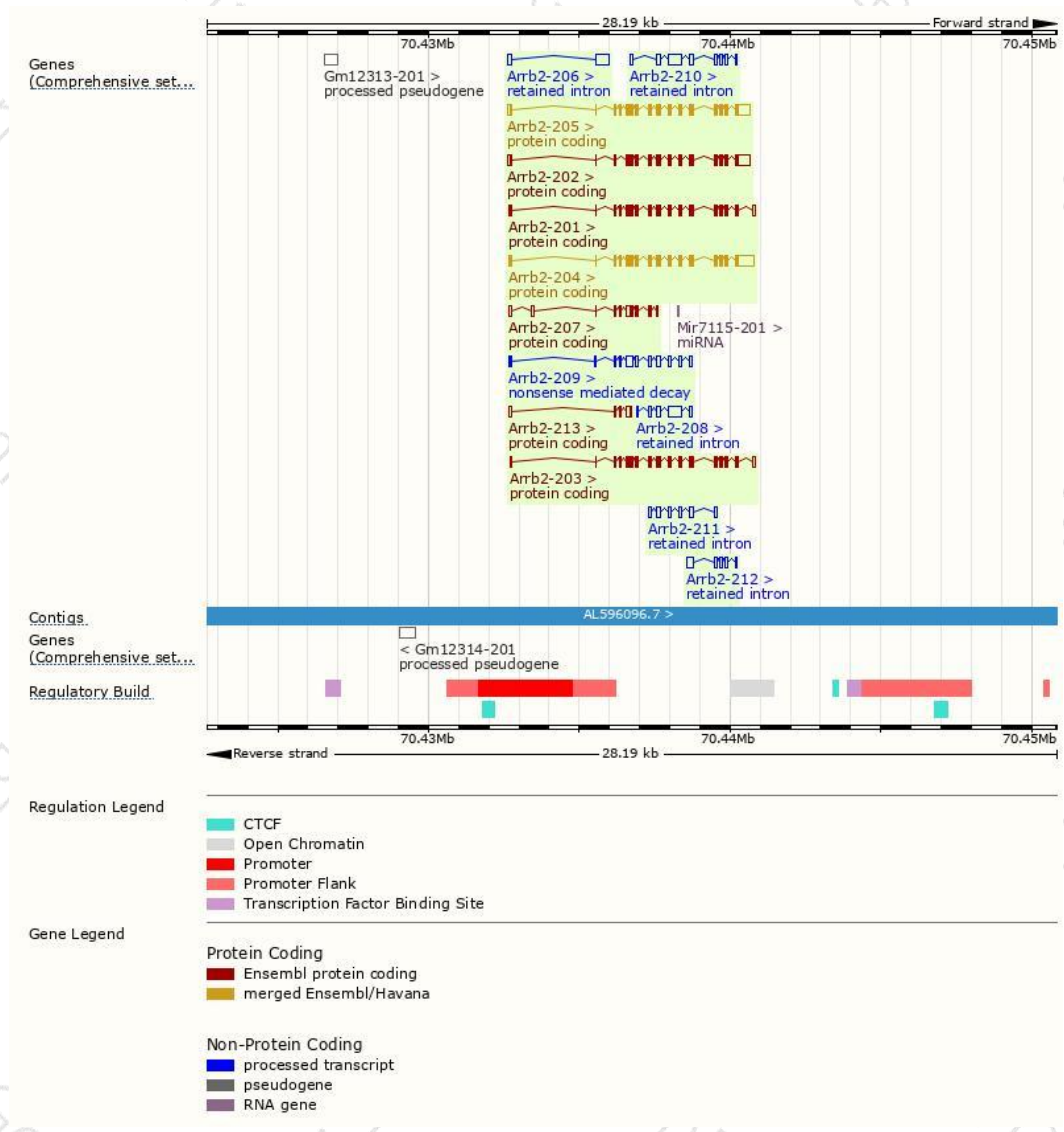
The gene has 13 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Arrb2-204	<a href="#">ENSMUST00000102564.10</a>	1848	<a href="#">410aa</a>	Protein coding	<a href="#">CCDS24946</a>	<a href="#">A0A158SIT9 Q91YI4</a>	TSL:1 GENCODE basic APPRIS P1
Arrb2-205	<a href="#">ENSMUST00000108568.9</a>	1777	<a href="#">421aa</a>	Protein coding	<a href="#">CCDS70226</a>	<a href="#">J3JS97 Q91YI4</a>	TSL:1 GENCODE basic
Arrb2-201	<a href="#">ENSMUST00000079056.8</a>	1443	<a href="#">421aa</a>	Protein coding	<a href="#">CCDS70226</a>	<a href="#">J3JS97 Q91YI4</a>	TSL:1 GENCODE basic
Arrb2-203	<a href="#">ENSMUST00000102563.1</a>	1352	<a href="#">410aa</a>	Protein coding	<a href="#">CCDS24946</a>	<a href="#">A0A158SIT9 Q91YI4</a>	TSL:1 GENCODE basic APPRIS P1
Arrb2-202	<a href="#">ENSMUST00000084954.12</a>	1732	<a href="#">406aa</a>	Protein coding	-	<a href="#">Q5F2D9</a>	TSL:5 GENCODE basic
Arrb2-207	<a href="#">ENSMUST00000124943.7</a>	662	<a href="#">83aa</a>	Protein coding	-	<a href="#">J3QNV6</a>	CDS 3' incomplete TSL:3
Arrb2-213	<a href="#">ENSMUST00000150076.7</a>	370	<a href="#">27aa</a>	Protein coding	-	<a href="#">J3QN53</a>	CDS 3' incomplete TSL:3
Arrb2-209	<a href="#">ENSMUST00000128748.7</a>	957	<a href="#">37aa</a>	Nonsense mediated decay	-	<a href="#">G3UZ54</a>	TSL:5
Arrb2-210	<a href="#">ENSMUST00000138006.7</a>	1073	No protein	Retained intron	-	-	TSL:5
Arrb2-208	<a href="#">ENSMUST00000125441.7</a>	756	No protein	Retained intron	-	-	TSL:3
Arrb2-211	<a href="#">ENSMUST00000143232.1</a>	603	No protein	Retained intron	-	-	TSL:5
Arrb2-206	<a href="#">ENSMUST00000124112.1</a>	574	No protein	Retained intron	-	-	TSL:5
Arrb2-212	<a href="#">ENSMUST00000144454.1</a>	488	No protein	Retained intron	-	-	TSL:2

The strategy is based on the design of *Arrb2-205* transcript,the transcription is shown below:

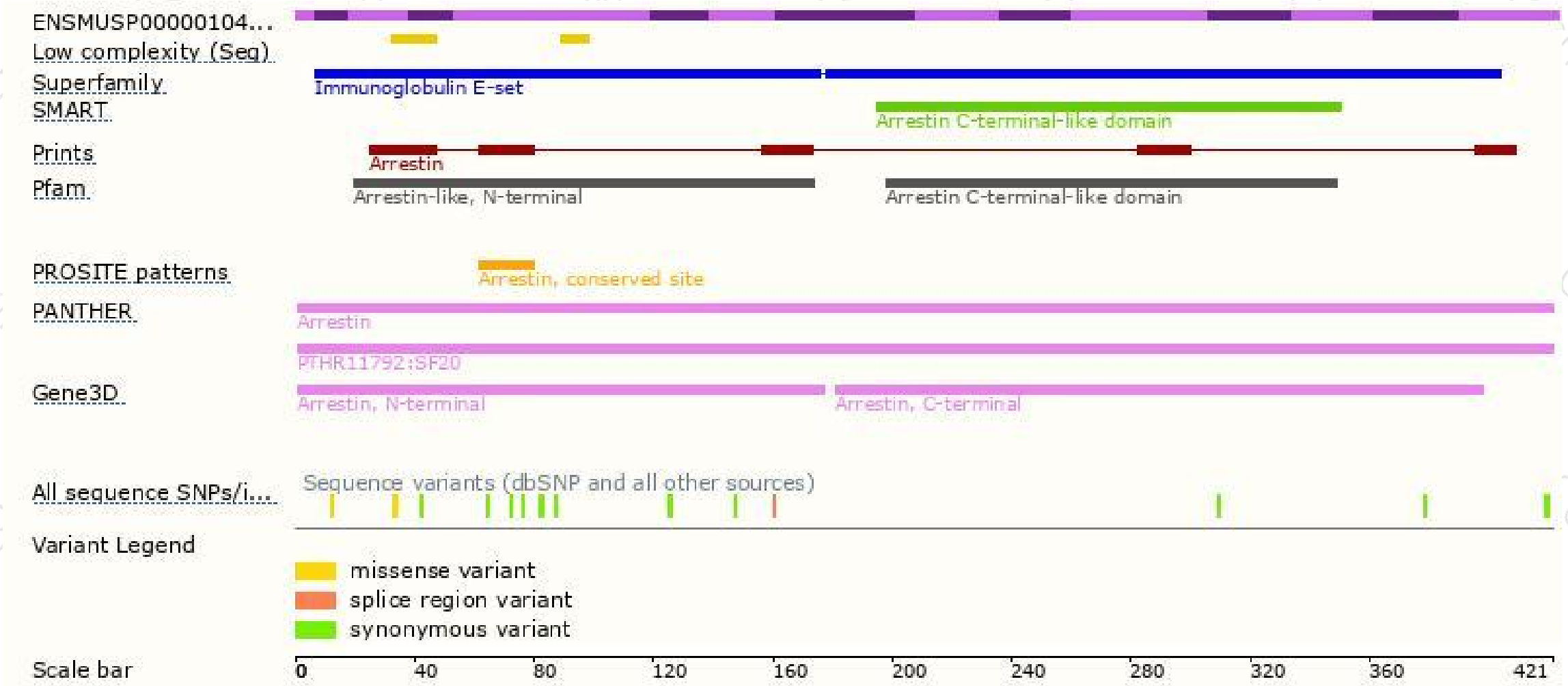


# Genomic location distribution

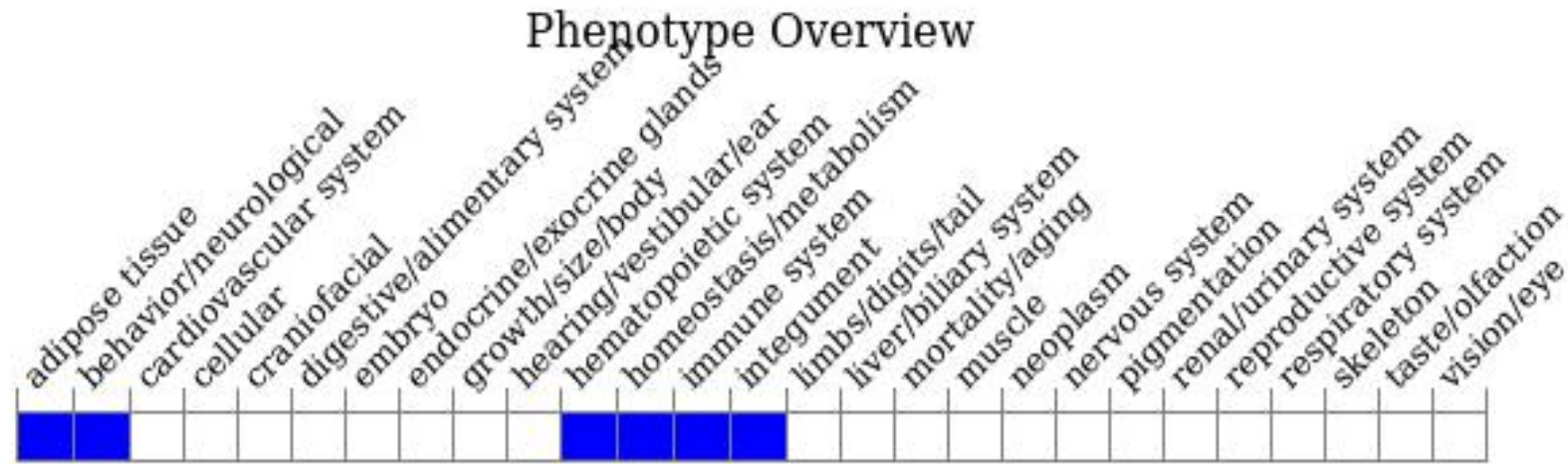




# Protein domain



# 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, mice homozygous for a knock-out allele exhibit enhanced morphine analgesia, an enhanced inflammatory response and reduced threshold to lethal endotoxin challenge, and impaired T and B lymphocyte chemotaxis.

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

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