

# ***Gbe1 Cas9-KO Strategy***

**Designer:**

**Yupeng Yang**

**Design Date:**

**2019-9-30**

# Project Overview

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**Project Name**

***Gbel***

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**Project type**

**Cas9-KO**

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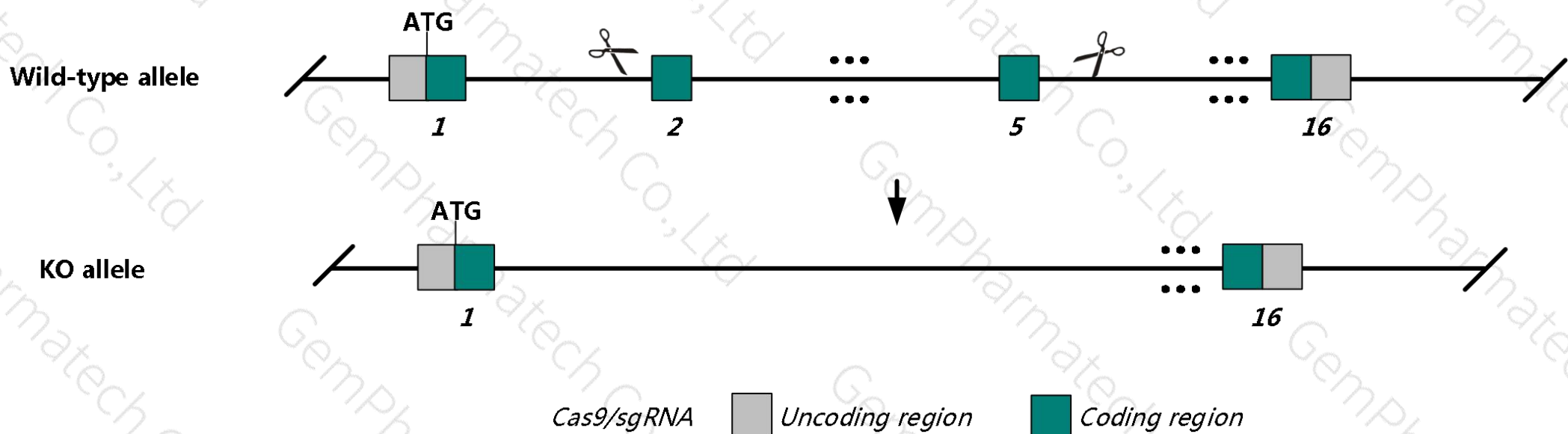
**Strain background**

**C57BL/6JGpt**

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# Knockout strategy

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



# Technical routes

- The *Gbe1* gene has 7 transcripts. According to the structure of *Gbe1* gene, exon2-5 of *Gbe1*-203 (ENSMUST00000163832.7) transcript is recommended as the knockout region. The region contains 548bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Gbe1* 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.

- According to the existing MGI data , Mice homozygous for an ENU-induced allele exhibit mid-to-late gestation lethality, decreased heart rate, glycogen storage defects, and ventricles that were small, hypertrabeculated, and noncompacted.
- The *Gbe1* gene is located on the Chr16. 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 )

## Gbe1 glucan (1,4-alpha-), branching enzyme 1 [ *Mus musculus* (house mouse) ]

Gene ID: 74185, updated on 12-Aug-2019

### Summary

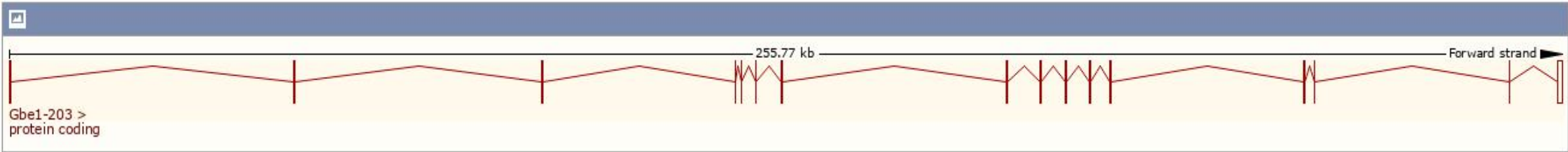
Official Symbol	Gbe1 provided by <a href="#">MGI</a>
Official Full Name	glucan (1,4-alpha-), branching enzyme 1 provided by <a href="#">MGI</a>
Primary source	<a href="#">MGI:MGI:1921435</a>
See related	<a href="#">Ensembl:ENSMUSG00000022707</a>
Gene type	protein coding
RefSeq status	VALIDATED
Organism	<a href="#">Mus musculus</a>
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	D16Ert536e; 2310045H19Rik; 2810426P10Rik
Expression	Broad expression in liver E18 (RPKM 14.7), adrenal adult (RPKM 14.5) and 27 other tissues <a href="#">See more</a>
Orthologs	<a href="#">human</a> <a href="#">all</a>

# Transcript information ( Ensembl )

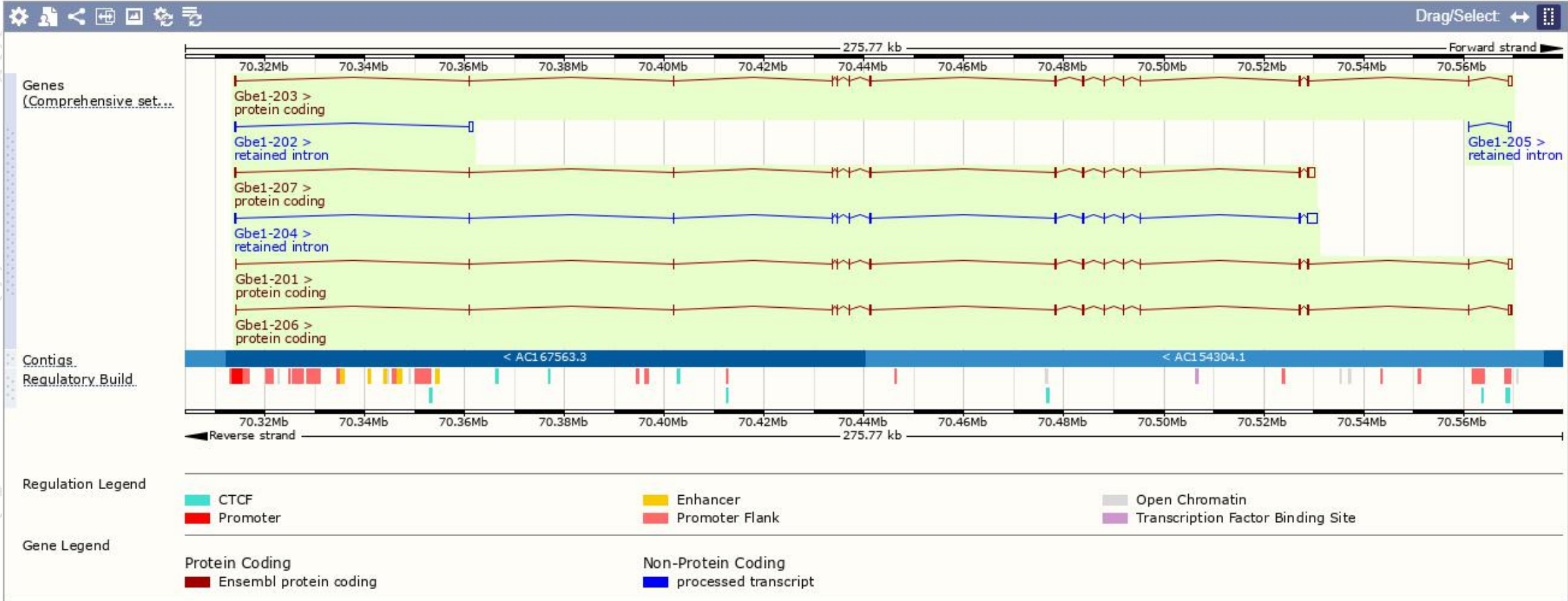
The gene has 7 transcripts, and all transcripts are shown below:

Show/hide columns (1 hidden)							Filter	
Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags	
Gbe1-207	<a href="#">ENSMUST00000171132.7</a>	3303	<a href="#">660aa</a>	Protein coding	-	<a href="#">G3UW30</a>	TSL:1	GENCODE basic
Gbe1-203	<a href="#">ENSMUST00000163832.7</a>	2984	<a href="#">702aa</a>	Protein coding	-	<a href="#">Q9D6Y9</a>	TSL:5	GENCODE basic APPRIS ALT2
Gbe1-201	<a href="#">ENSMUST00000023393.14</a>	2846	<a href="#">702aa</a>	Protein coding	-	<a href="#">F6ZHD8</a>	TSL:5	GENCODE basic APPRIS P5
Gbe1-206	<a href="#">ENSMUST00000170464.2</a>	2736	<a href="#">702aa</a>	Protein coding	-	<a href="#">F6ZHD8</a>	TSL:5	GENCODE basic APPRIS ALT2
Gbe1-204	<a href="#">ENSMUST00000164300.1</a>	3734	No protein	Retained intron	-	-	TSL:5	
Gbe1-202	<a href="#">ENSMUST00000099628.4</a>	1026	No protein	Retained intron	-	-	TSL:1	
Gbe1-205	<a href="#">ENSMUST00000169432.1</a>	658	No protein	Retained intron	-	-	TSL:1	

The strategy is based on the design of *Gbe1-203* transcript, The transcription is shown below

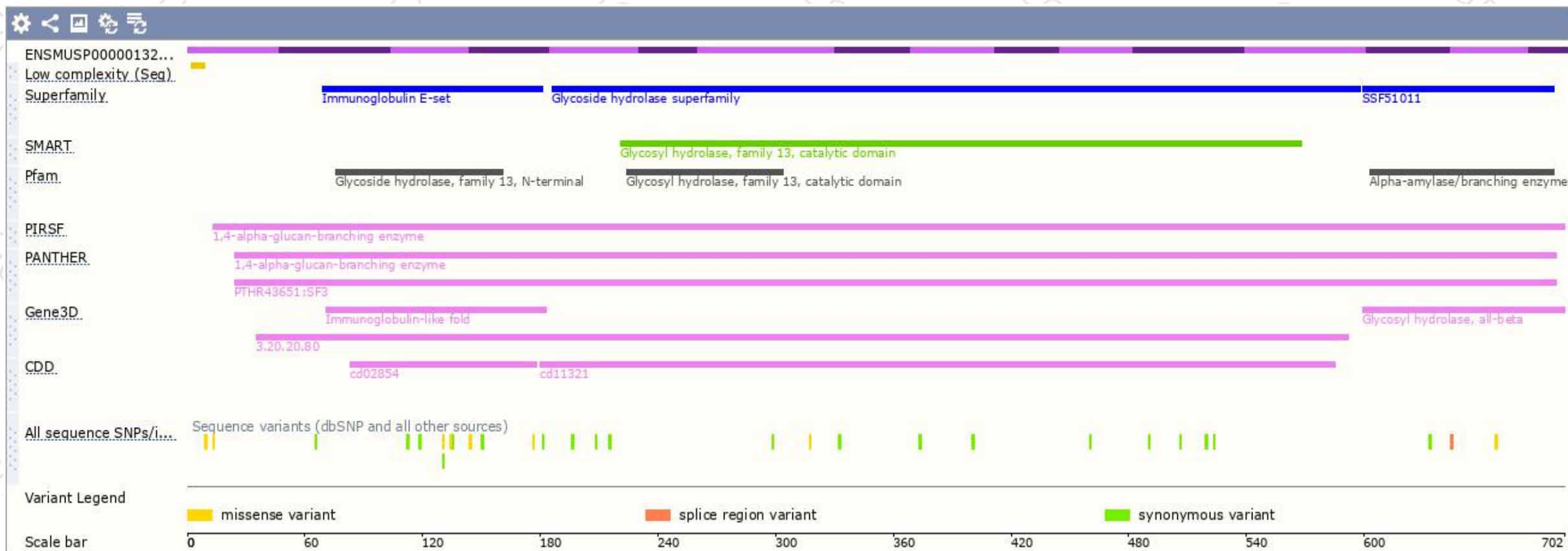


# Genomic location ( Ensembl )

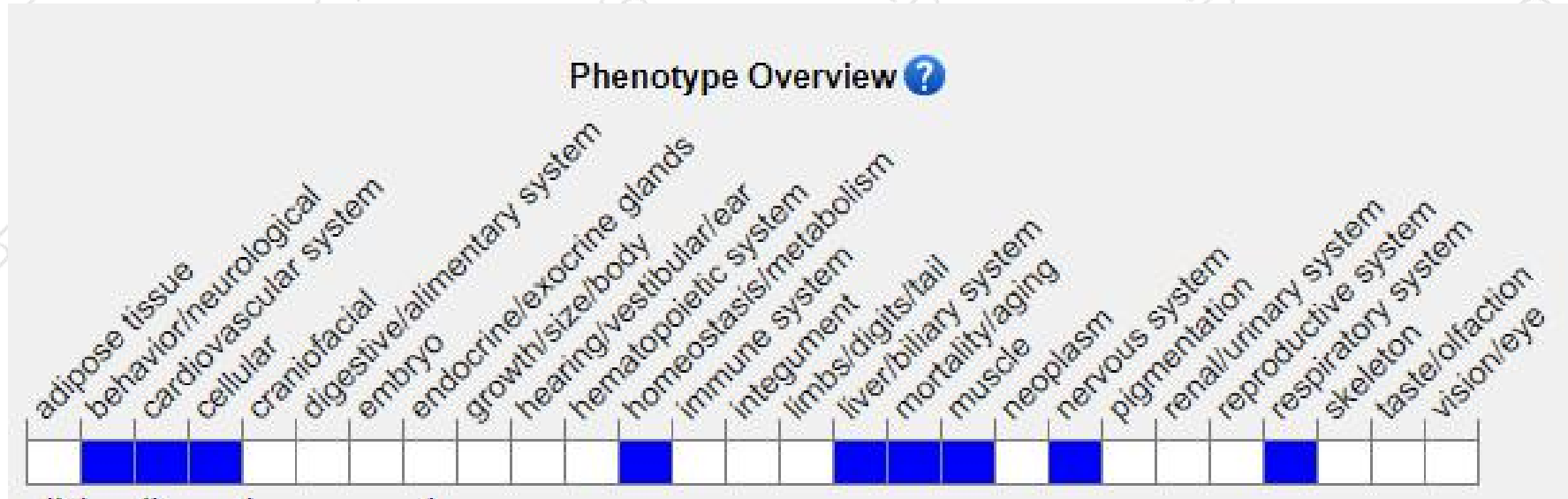




# Protein domain ( Ensembl )



# 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 an ENU-induced allele exhibit mid-to-late gestation lethality, decreased heart rate, glycogen storage defects, and ventricles that were small, hypertrabeculated, and noncompacted.

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

Tel: 400-9660890



集萃药康生物科技  
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