

# *Ggt1* Cas9-KO Strategy

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# Project Overview



**Project Name**

***Ggt1***

**Project type**

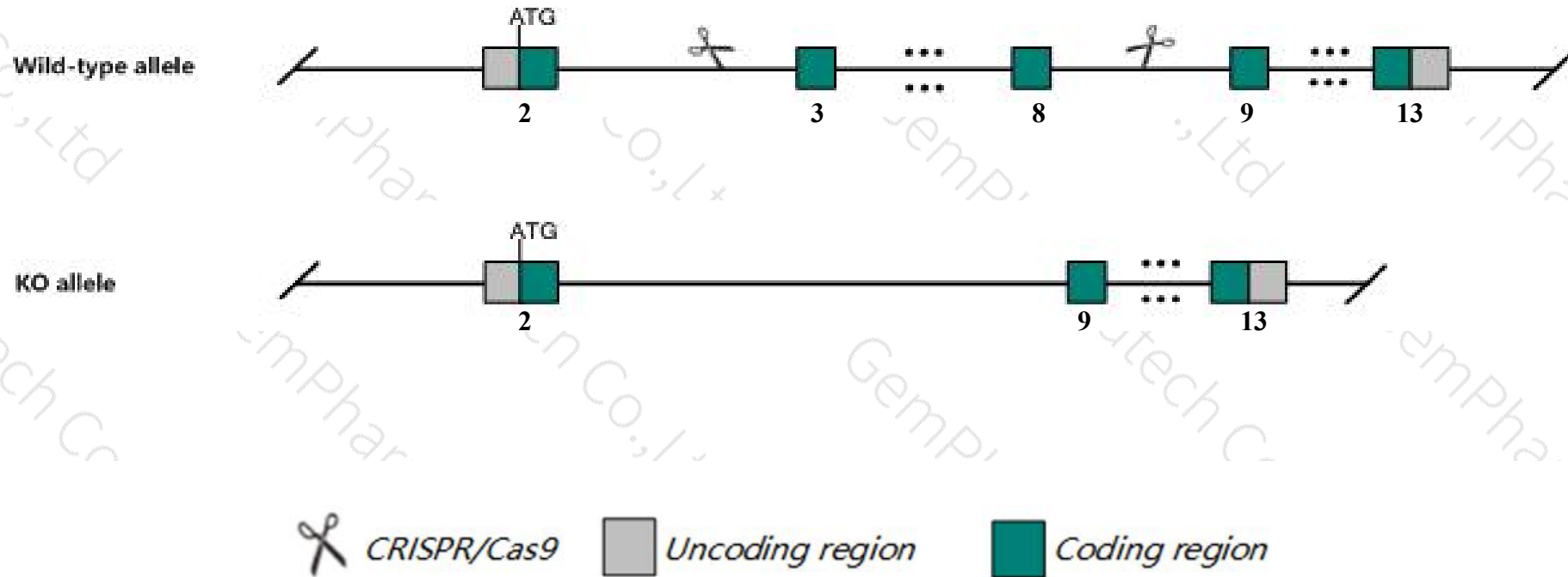
**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Ggt1* gene. The schematic diagram is as follows:



- The *Ggt1* gene has 20 transcripts. According to the structure of *Ggt1* gene, exon3-exon8 of *Ggt1-201* (ENSMUST00000006508.9) transcript is recommended as the knockout region. The region contains 856bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Ggt1* gene. The brief process is as follows: CRISPR/Cas9 system v

- According to the existing MGI data, Homozygous mutants may exhibit impaired growth, skeletal abnormalities, cataracts, lethargic behavior, premature greying, sterility, and shortened life span.
- Transcript 220 is unaffected.
- The effect on transcripts 205, 211 is unknown.
- The *Ggt1* gene is located on the Chr10. 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)

## Ggt1 gamma-glutamyltransferase 1 [ *Mus musculus* (house mouse) ]

Gene ID: 14598, updated on 12-Aug-2019

### Summary

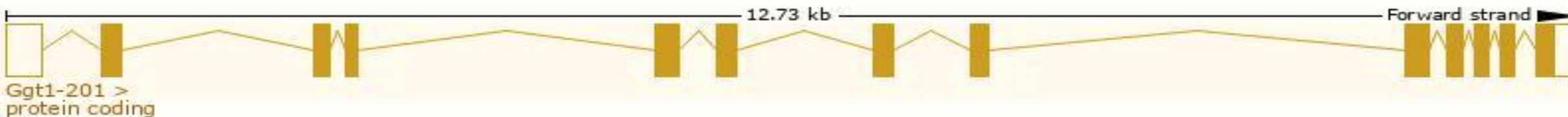
<b>Official Symbol</b>	Ggt1 provided by MGI
<b>Official Full Name</b>	gamma-glutamyltransferase 1 provided by MGI
<b>Primary source</b>	<a href="#">MGI:MGI:95706</a>
<b>See related</b>	<a href="#">Ensembl:ENSMUSG00000006345</a>
<b>Gene type</b>	protein coding
<b>RefSeq status</b>	REVIEWED
<b>Organism</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>	GGT; dwg; Ggtp; CD224; GGT 1; GGT-1
<b>Summary</b>	This gene encodes gamma-glutamyl transpeptidase, a plasmamembrane-associated enzyme that cleaves the peptide bond between gamma-glutamyl and cysteinyl glycine moieties of glutathione. The encoded protein is autocatalytically processed to generate an enzymatically active heterodimer comprised of heavy and light chains. Mice lacking the encoded protein grow slowly, develop cataracts and have elevated levels of glutathione in plasma and urine. Transgenic overexpression of the encoded protein in mice enhances osteoclastic bone resorption. The mutant alleles termed 'Dwarf grey' and 'Dwarf grey Bayer' in mice are associated with deletions in this gene. A gamma-glutamyl transpeptidase paralog is located adjacent to this gene. Alternative splicing results in multiple transcript variants. Additional transcripts using alternate promoters and differing in 5' UTRs have been described. [provided by RefSeq, Apr 2015]
<b>Expression</b>	Biased expression in kidney adult (RPKM 265.8), duodenum adult (RPKM 234.7) and 4 other tissues <a href="#">See more</a>
<b>Orthologs</b>	<a href="#">human</a> <a href="#">all</a>

# Transcript information (Ensembl)

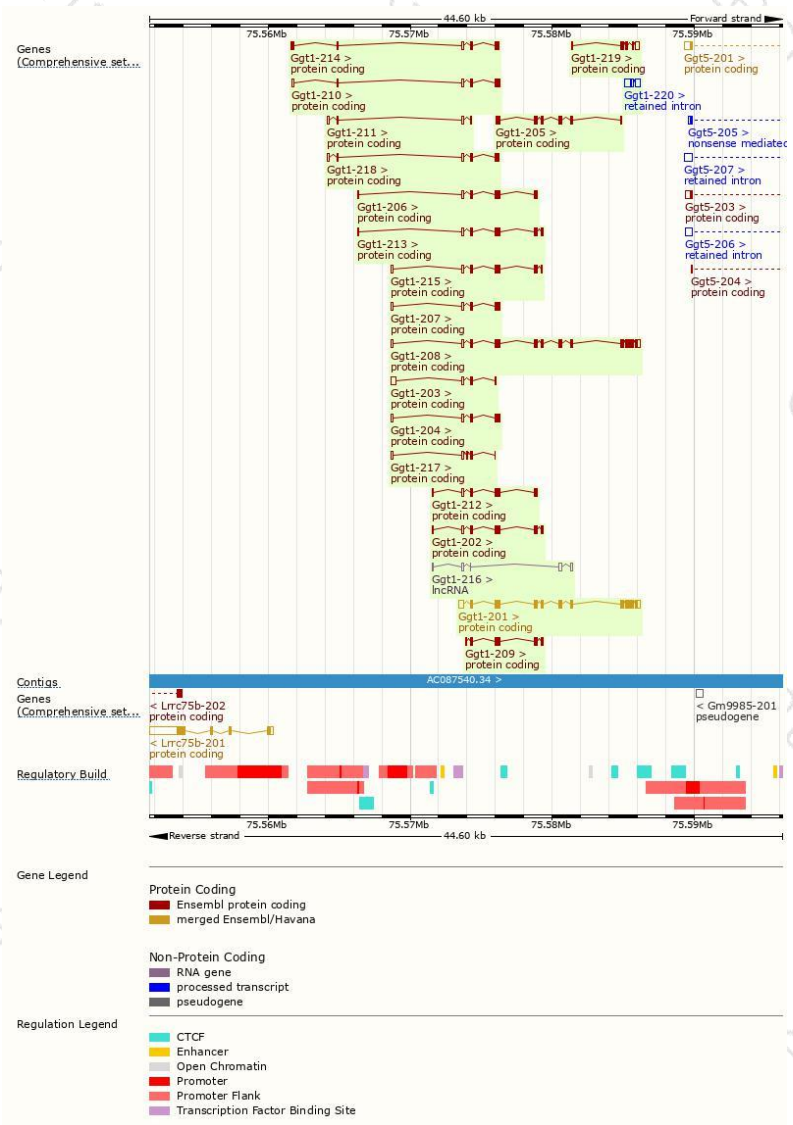
The gene has 20 transcripts, all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Ggt1-201	<a href="#">ENSMUST0000006508.9</a>	2167	<a href="#">568aa</a>	Protein coding	<a href="#">CCDS23927</a>	<a href="#">Q4FK56</a> <a href="#">Q60928</a>	TSL:1 GENCODE basic APPRIS P1
Ggt1-208	<a href="#">ENSMUST00000134503.7</a>	2140	<a href="#">568aa</a>	Protein coding	<a href="#">CCDS23927</a>	<a href="#">Q4FK56</a> <a href="#">Q60928</a>	TSL:1 GENCODE basic APPRIS P1
Ggt1-202	<a href="#">ENSMUST00000124259.7</a>	962	<a href="#">235aa</a>	Protein coding	-	<a href="#">D3Z4Q6</a>	CDS 3' incomplete TSL:5
Ggt1-213	<a href="#">ENSMUST00000143792.7</a>	909	<a href="#">237aa</a>	Protein coding	-	<a href="#">D3YVY4</a>	CDS 3' incomplete TSL:5
Ggt1-215	<a href="#">ENSMUST00000145928.7</a>	907	<a href="#">209aa</a>	Protein coding	-	<a href="#">D3YY79</a>	CDS 3' incomplete TSL:5
Ggt1-212	<a href="#">ENSMUST00000143226.7</a>	834	<a href="#">190aa</a>	Protein coding	-	<a href="#">D3YWW4</a>	CDS 3' incomplete TSL:2
Ggt1-209	<a href="#">ENSMUST00000139459.7</a>	792	<a href="#">243aa</a>	Protein coding	-	<a href="#">D3Z266</a>	CDS 3' incomplete TSL:5
Ggt1-205	<a href="#">ENSMUST00000129020.2</a>	787	<a href="#">263aa</a>	Protein coding	-	<a href="#">F6WUX1</a>	5' and 3' truncations in transcript evidence prevent annotation of the start and the end of the CDS. CDS 5' and 3' incomplete TSL:5
Ggt1-206	<a href="#">ENSMUST00000129232.7</a>	767	<a href="#">189aa</a>	Protein coding	-	<a href="#">D3YWW2</a>	CDS 3' incomplete TSL:3
Ggt1-210	<a href="#">ENSMUST00000140219.7</a>	758	<a href="#">126aa</a>	Protein coding	-	<a href="#">D3YXV6</a>	CDS 3' incomplete TSL:5
Ggt1-203	<a href="#">ENSMUST00000125770.7</a>	724	<a href="#">88aa</a>	Protein coding	-	<a href="#">D3YVX1</a>	CDS 3' incomplete TSL:2
Ggt1-219	<a href="#">ENSMUST00000155186.1</a>	700	<a href="#">130aa</a>	Protein coding	-	<a href="#">F6V328</a>	CDS 5' incomplete TSL:5
Ggt1-214	<a href="#">ENSMUST00000145079.7</a>	676	<a href="#">110aa</a>	Protein coding	-	<a href="#">D3YYH6</a>	CDS 3' incomplete TSL:5
Ggt1-218	<a href="#">ENSMUST00000152657.7</a>	666	<a href="#">110aa</a>	Protein coding	-	<a href="#">D3YYH6</a>	CDS 3' incomplete TSL:5
Ggt1-207	<a href="#">ENSMUST00000131565.7</a>	647	<a href="#">126aa</a>	Protein coding	-	<a href="#">D3YXV6</a>	CDS 3' incomplete TSL:5
Ggt1-204	<a href="#">ENSMUST00000128886.7</a>	630	<a href="#">126aa</a>	Protein coding	-	<a href="#">D3YXV6</a>	CDS 3' incomplete TSL:5
Ggt1-217	<a href="#">ENSMUST00000151212.7</a>	531	<a href="#">60aa</a>	Protein coding	-	<a href="#">D3Z2C6</a>	CDS 3' incomplete TSL:5
Ggt1-211	<a href="#">ENSMUST00000141062.7</a>	429	<a href="#">30aa</a>	Protein coding	-	<a href="#">D3YWZ7</a>	CDS 3' incomplete TSL:3
Ggt1-220	<a href="#">ENSMUST00000156487.1</a>	820	No protein	Retained intron	-	-	TSL:2
Ggt1-216	<a href="#">ENSMUST00000148447.1</a>	551	No protein	lncRNA	-	-	TSL:3

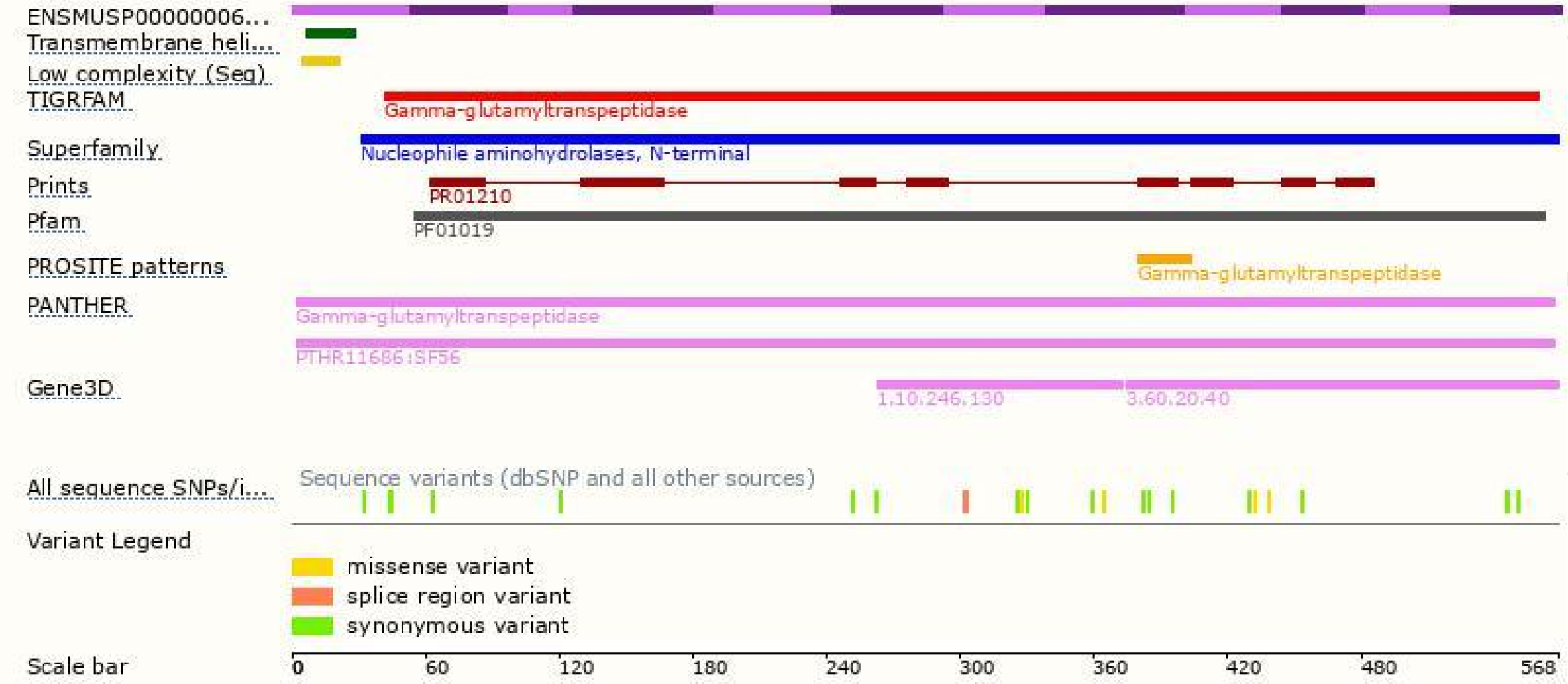
The strategy is based on the design of *Ggt1-201* transcript, The transcription is shown below



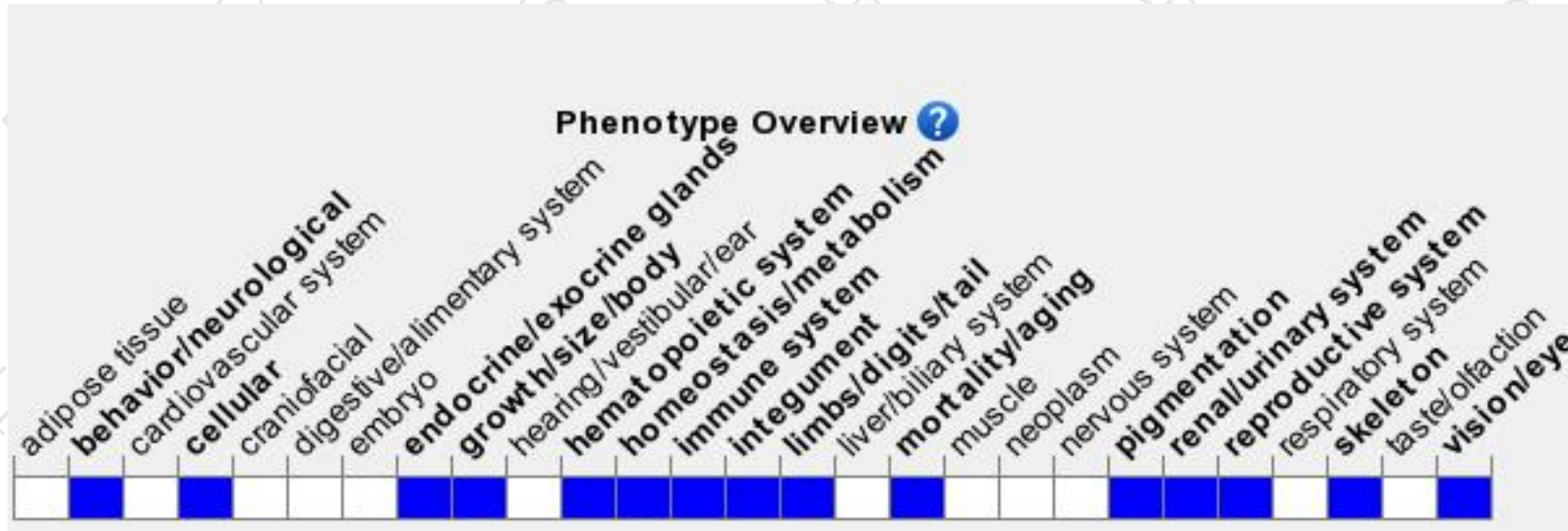
# Genomic location distribution



# 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 mutants may exhibit impaired growth, skeletal abnormalities, cataracts, lethargic behavior, premature greying, sterility, and shortened life span.

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

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