Hes1 Cas9-CKO Strategy

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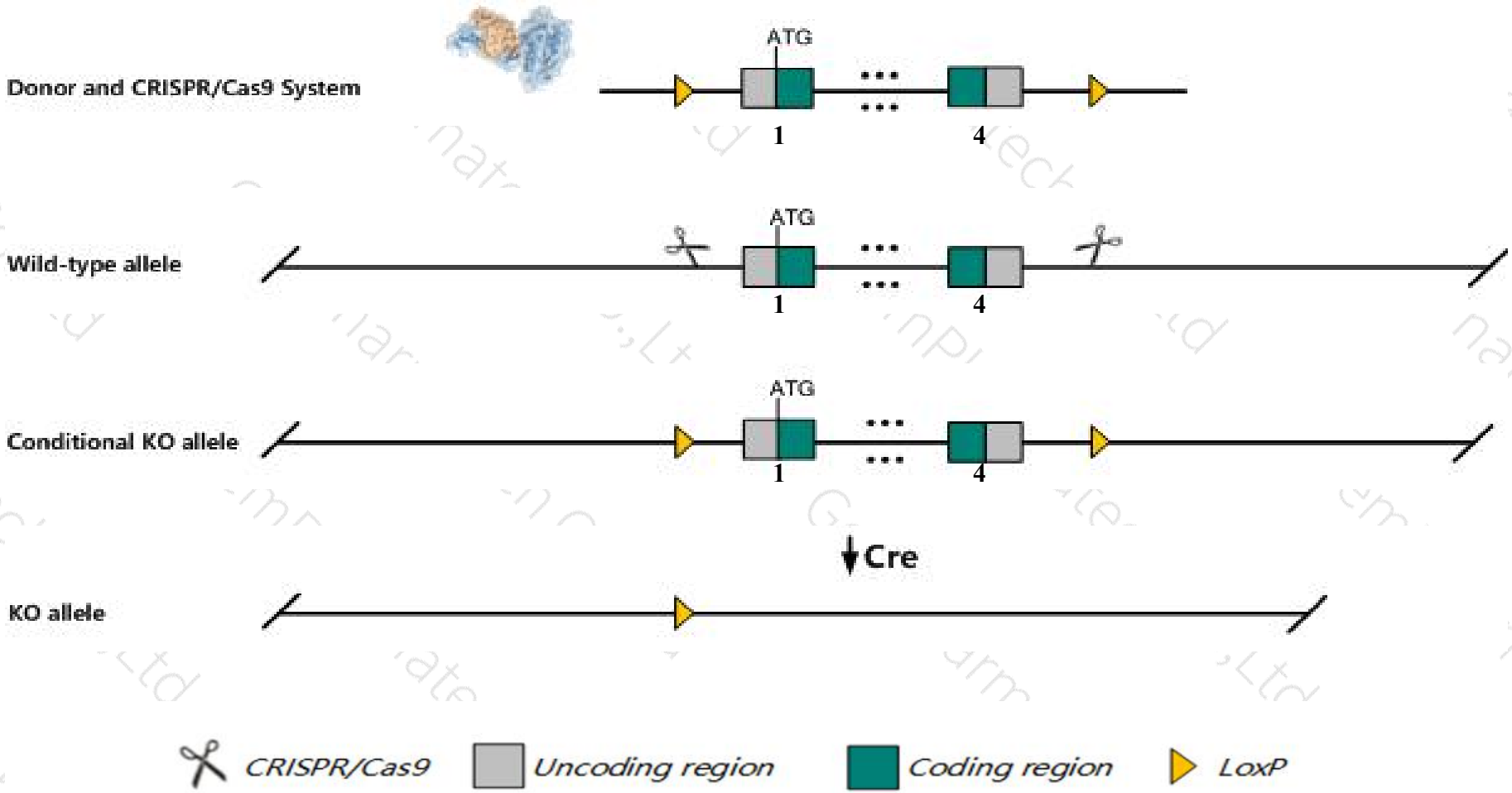
Project Overview

Project Name	***Hes1***
Project type	**Cas9-CKO**
Strain background	**C57BL/6JGpt**

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Hes1* gene. The schematic diagram is as follows:



Technical routes

- The *Hes1* gene has 4 transcripts. According to the structure of *Hes1* gene, exon1-exon4 of *Hes1-201* (ENSMUST00000023171.7) transcript is recommended as the knockout region.The region contains all 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 *Hes1* gene. The brief process is as follows:CRISPR/Cas9 system 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 will be 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.

Notice

- According to the existing MGI data,Mutants show anomalous timing in neurogenesis. Homozygotes for a null allele exhibit premature neurogenesis, severe neural tube defects, supernumerary hair cells in the inner ear, increased numbers of pulmonary neuroendocrine cells, and pancreatic hypoplasia. Death occurs in utero or neonatally.

- The *Hes1* 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information （NCBI）

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Hes1 hes family bHLH transcription factor 1 [Mus musculus (house mouse)]

Gene ID: 15205, updated on 9-Apr-2019

Summary

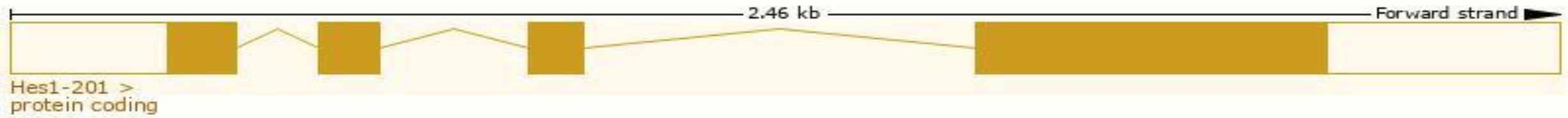
Official Symbol	Hes1 provided by MGI
Official Full Name	hes family bHLH transcription factor 1 provided byMGI
Primary source	MGI:MGI:104853
See related	Ensembl:ENSMUSG00000022528
Gene type	protein coding
RefSeq status	PROVISIONAL
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Hry, bHLHb39
Expression	Broad expression in stomach adult (RPKM 82.2), colon adult (RPKM 65.6) and 21 other tissuesSee more
Orthologs	human all

Transcript information（Ensembl）

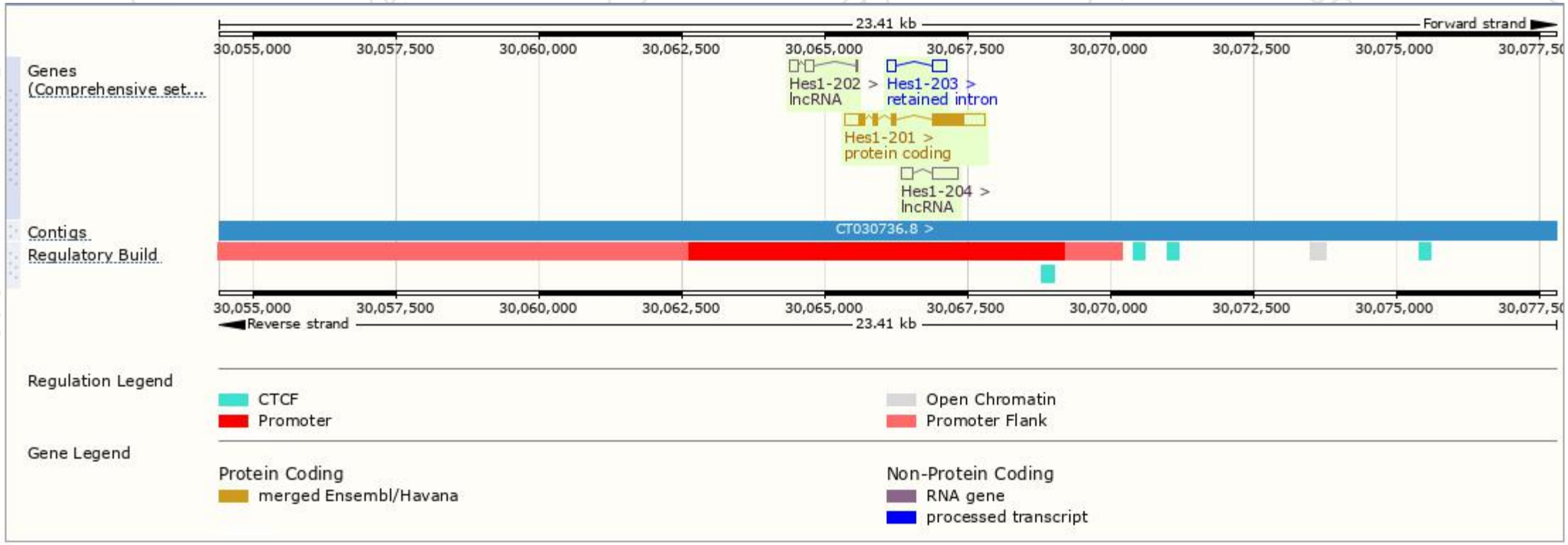
The gene has 4 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Hes1-201	ENSMUST00000023171.7	1468	282aa	Protein coding	CCDS28098	P35428 Q3UZZ2	TSL:1 GENCODE basic APPRIS P1
Hes1-203	ENSMUST00000161676.1	406	No protein	Retained intron	-	-	TSL:2
Hes1-204	ENSMUST00000161839.1	653	No protein	lncRNA	-	-	TSL:3
Hes1-202	ENSMUST00000160592.2	344	No protein	lncRNA	-	-	TSL:2

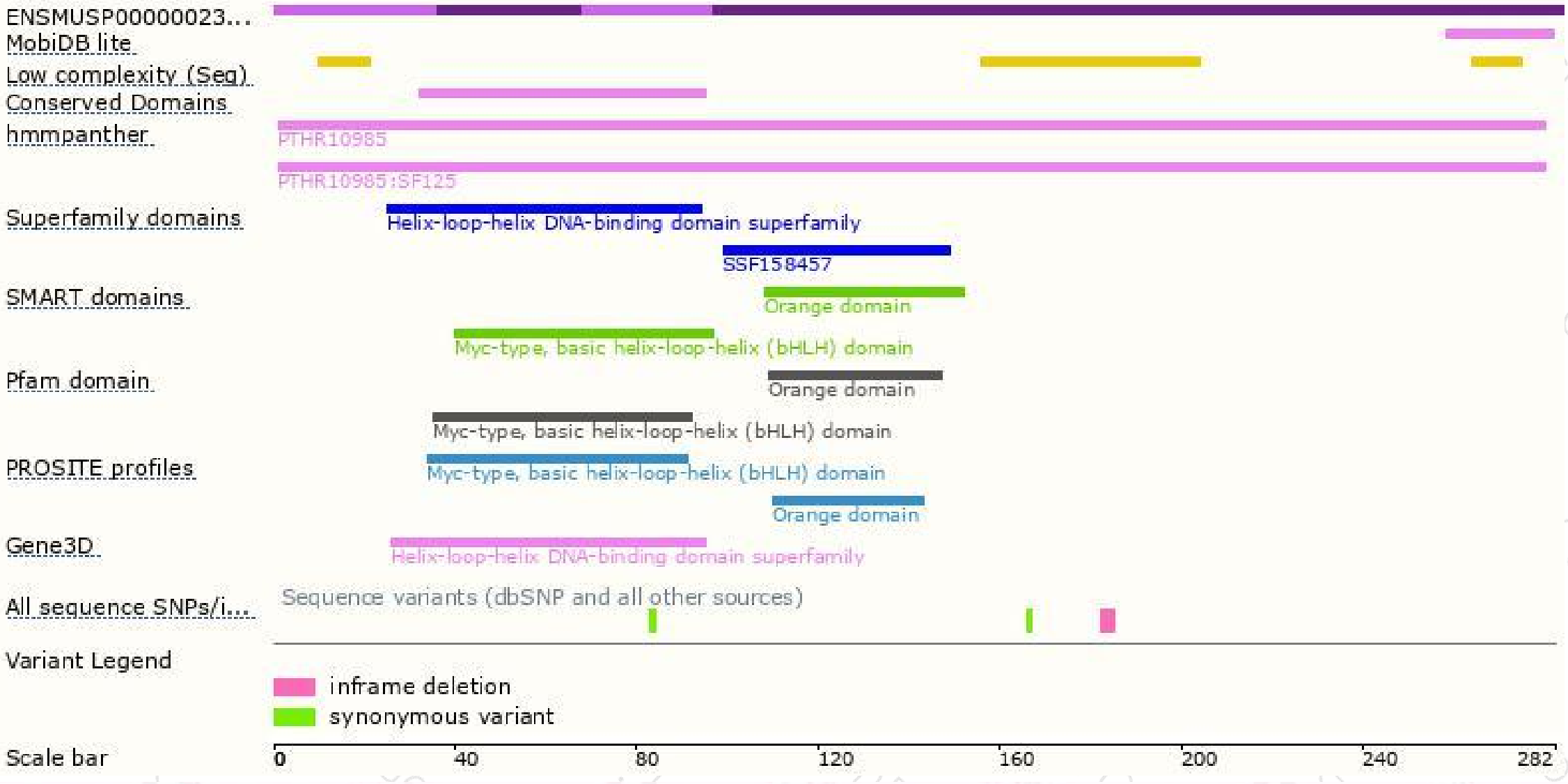
The strategy is based on the design of *Hes1-201* transcript,The transcription is shown below



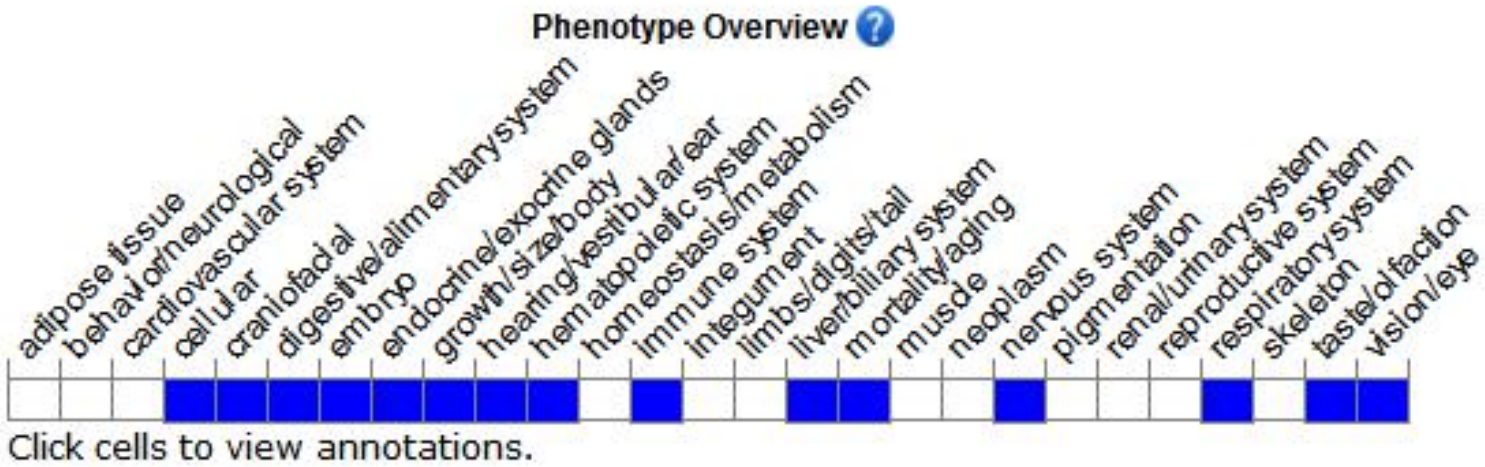
Genomic location distribution



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/).

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

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