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Foxg1 Cas9-CKO Strategy

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Design Date: 2024-3-25

Overview

Target Gene Name

- Foxg1

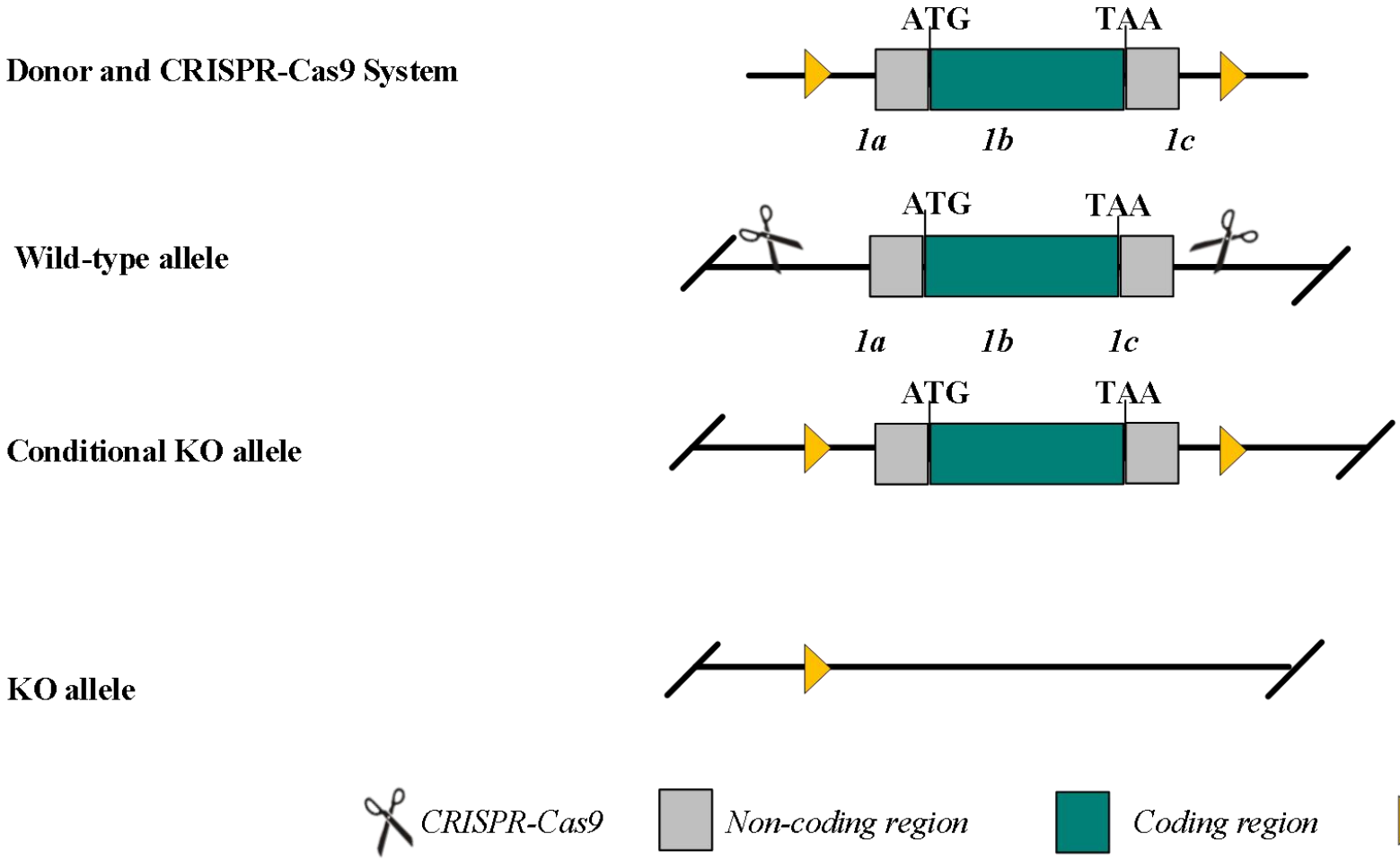
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy

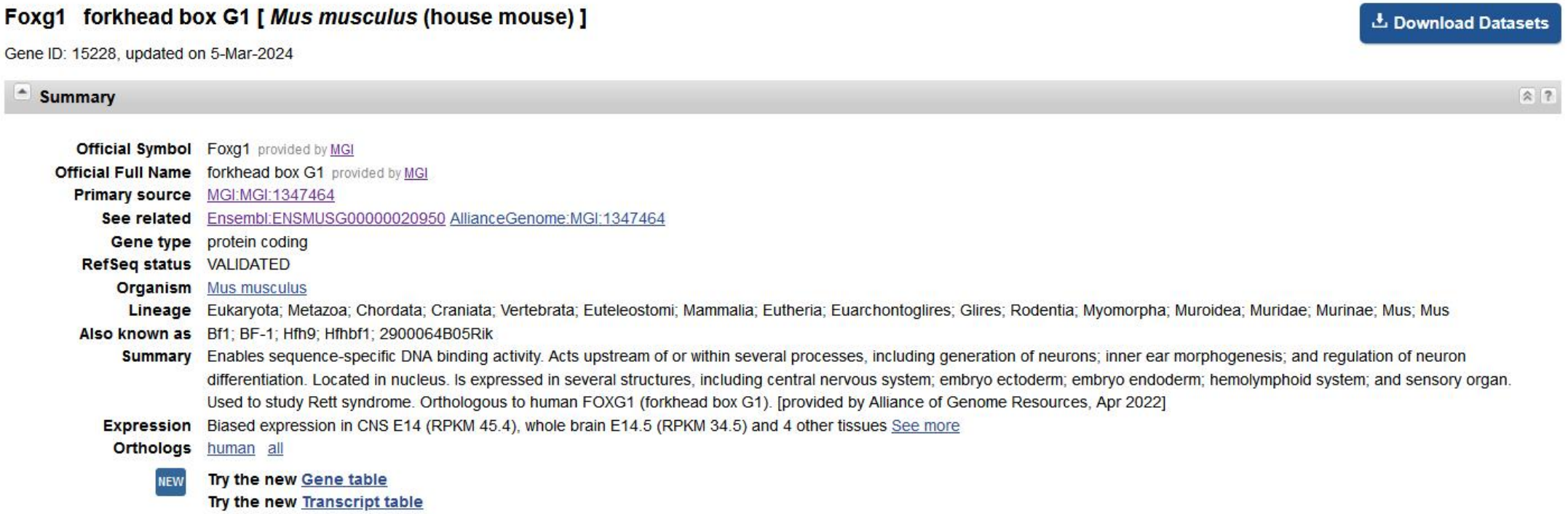


Schematic representation of CRISPR-Cas9 engineering used to edit the *Foxg1* gene.

Technical Information

- The *Foxg1* gene has 4 transcripts. According to the structure of *Foxg1* gene, exon 1 of *Foxg1*-204 (ENSMUST00000179669.3) transcript is recommended as the knockout region. The region contains all of the coding sequence. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Foxg1* 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 on-target amplicon sequencing. A stable F1-generation mouse strain was obtained by mating positive F0-generation mice with C57BL/6JGpt mice and confirmation of the desired mutant allele was carried out by PCR and on-target amplicon sequencing.
- 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.

Gene Information



Foxg1 forkhead box G1 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 15228, updated on 5-Mar-2024

Summary

Official Symbol	Foxg1 provided by MGI
Official Full Name	forkhead box G1 provided by MGI
Primary source	MGI:MGI:1347464
See related	Ensembl:ENSMUSG00000020950 AllianceGenome:MGI:1347464
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Bf1; BF-1; Hfh9; Hfhbf1; 2900064B05Rik
Summary	Enables sequence-specific DNA binding activity. Acts upstream of or within several processes, including generation of neurons; inner ear morphogenesis; and regulation of neuron differentiation. Located in nucleus. Is expressed in several structures, including central nervous system; embryo ectoderm; embryo endoderm; hemolymphoid system; and sensory organ. Used to study Rett syndrome. Orthologous to human FOXG1 (forkhead box G1). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Biased expression in CNS E14 (RPKM 45.4), whole brain E14.5 (RPKM 34.5) and 4 other tissues See more
Orthologs	human all

NEW **Try the new Gene table**
Try the new Transcript table

Source: https://www.ncbi.nlm.nih.gov/

Transcript Information

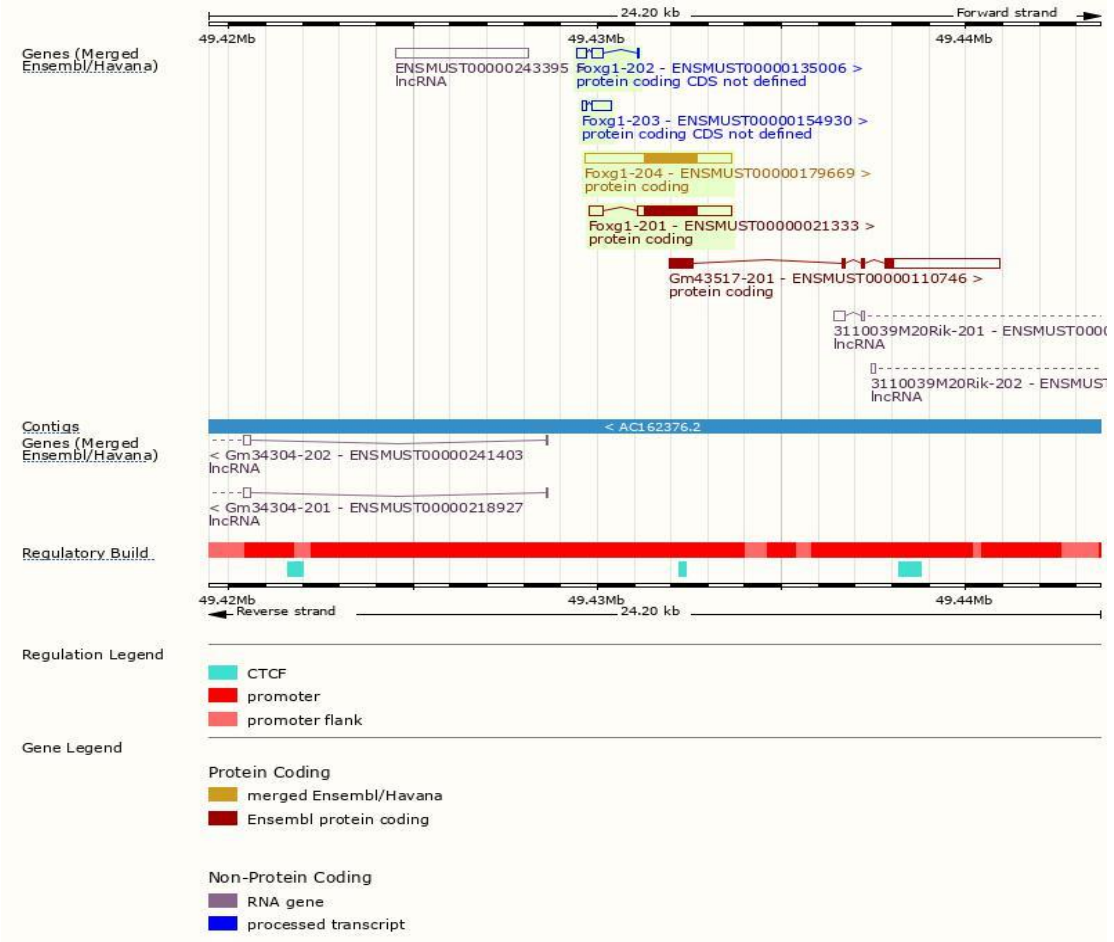
The gene has 4 transcripts,all transcripts are shown below:

Transcript ID	Name	bp ▼	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000179669.3	Foxg1-204	3973	481aa	Protein coding	CCDS25899	Q3V1Q8 Q60987	Ensembl Canonical GENCODE basic APPRIS P1 TSL:NA
ENSMUST00000021333.5	Foxg1-201	2941	481aa	Protein coding	CCDS25899	Q3V1Q8 Q60987	GENCODE basic APPRIS P1 TSL:1
ENSMUST00000154930.2	Foxg1-203	633	No protein	Protein coding CDS not defined		-	TSL:2
ENSMUST00000135006.3	Foxg1-202	623	No protein	Protein coding CDS not defined		-	TSL:3

The strategy is based on the design of *Foxg1*-204 transcript, the transcription is shown below:

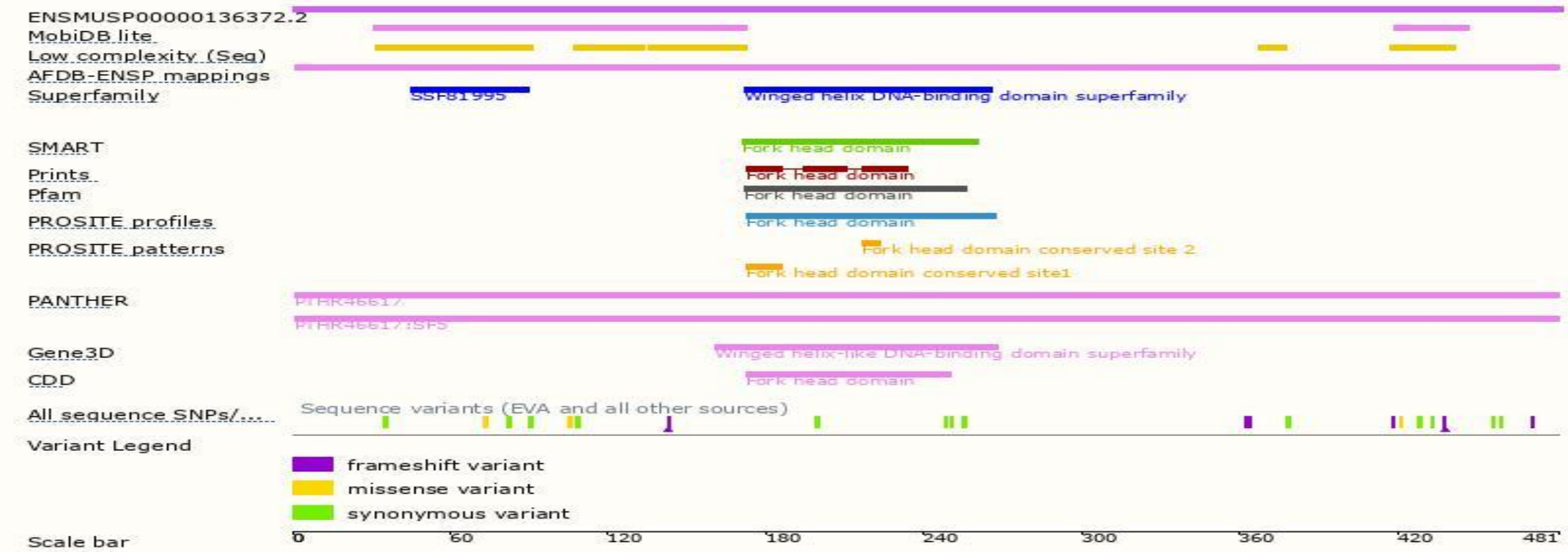
Source: https://www.ensembl.org

Genomic Information



Source: : https://www.ensembl.org

Protein Information



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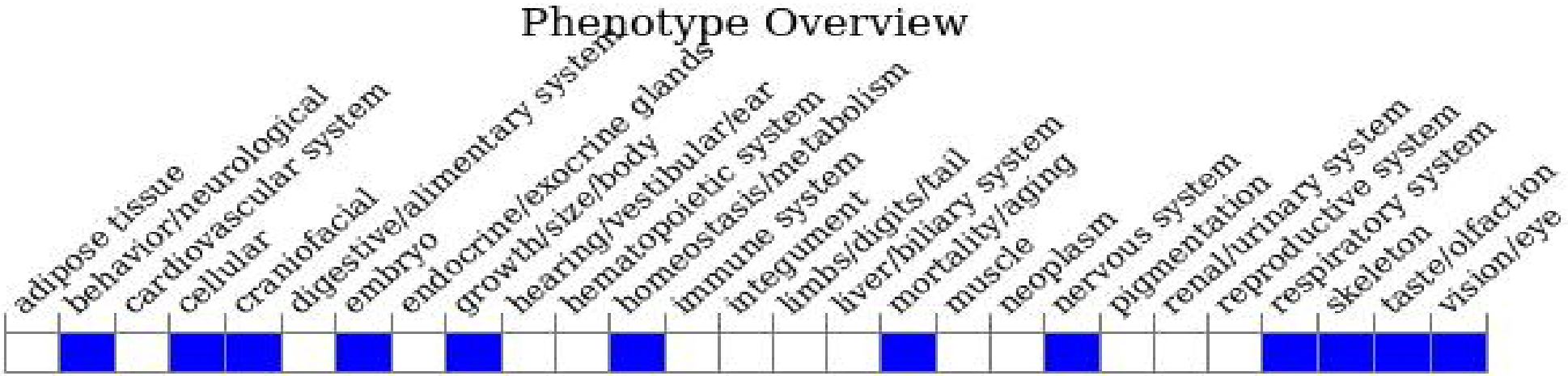
Source: : https://www.ensembl.org

Mouse Phenotype Information (MGI)



- Homozygous mutants exhibit dramatically reduced cerebral hemispheres, missing ventral telencephalic structures, impaired migration of efferent thalamocortical axons, and multiple eye defects. Mutants die at birth from respiratory failure.

Source: https://www.informatics.jax.org

Important Information

- According to the existing MGI data, homozygous mutants exhibit dramatically reduced cerebral hemispheres, missing ventral telencephalic structures, impaired migration of efferent thalamocortical axons, and multiple eye defects. Mutants die at birth from respiratory failure.
- This strategy may affect the 5-terminal regulatory function of *Gm34304* and *3110039M20Rik.*
- This strategy may affect the 3-terminal regulatory function of *Gm56158.*
- The insertion of loxp may affect *Foxg1* expression.
- In this strategy, *Gm43517* will be deleted while *Foxg1* is knocked out, which will affect the normal expression of overlapping genes.
- *Foxg1* is located on Chr12. If the knockout mice are crossed with other mouse strains to obtain double homozygous mutant offspring, please avoid the situation that the second gene is 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 the existing technology level.