Emx2 Cas9-KO *Strategy*

Designer: **Daohua Xu**

Design Date: **2019-5-30**

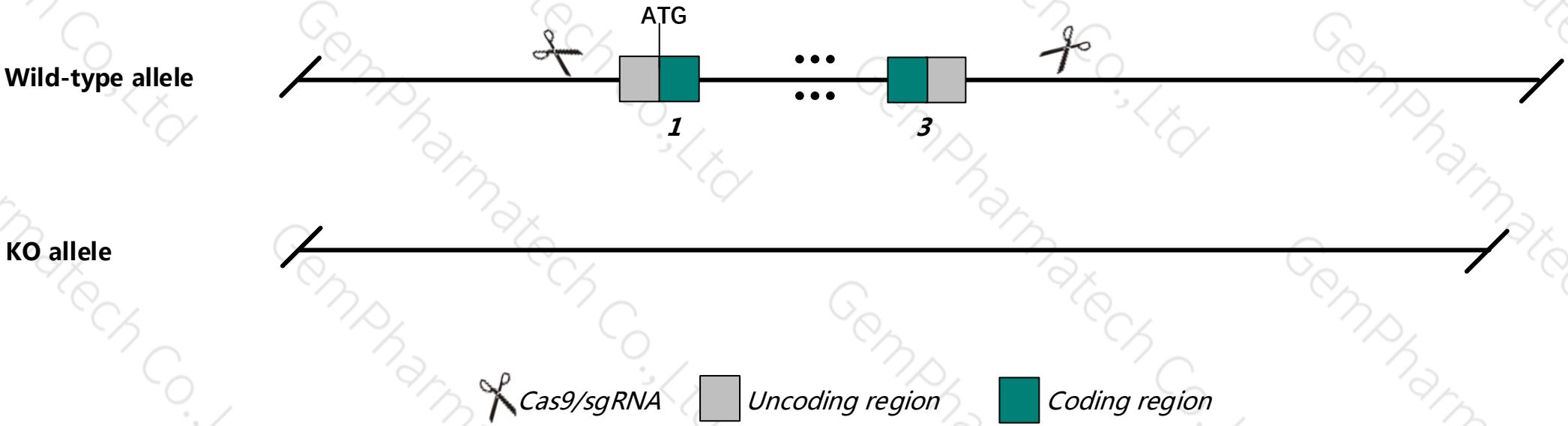
GemPharmatech Co.,Ltd

Project Overview

Project Name	***Emx2***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Emx2* gene. The schematic diagram is as follows:



Technical routes

- The *Emx2* gene has 3 transcripts.According to the structure of *Emx2* gene, exon1-exon3 of *Emx2*-201 (ENSMUST00000062216.3) 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 *Emx2* gene. The brief process is as follows: sgRNA was transcribed in vitro.Cas9, sgRNA 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.

Notice

- According to the existing MGI data，Homozygous disruption of this gene causes neonatal death, impaired urogenital development and malformation of several forebrain regions. Heterozygotes for a null allele show middle and inner ear defects. Homozygotes for an ENU-induced allele die neonatally with middle ear defects and small kidneys.
- The KO region contains functional region of the *Emx2os* gene.Knockout the region may affect the function of *Emx2os* gene.
- The *Emx2* gene is located on the Chr19. 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 knoukout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

Gene information （NCBI）

Emx2 empty spiracles homeobox 2 [*Mus musculus* (house mouse)]

Gene ID: 13797, updated on 12-Oct-2019

Summary

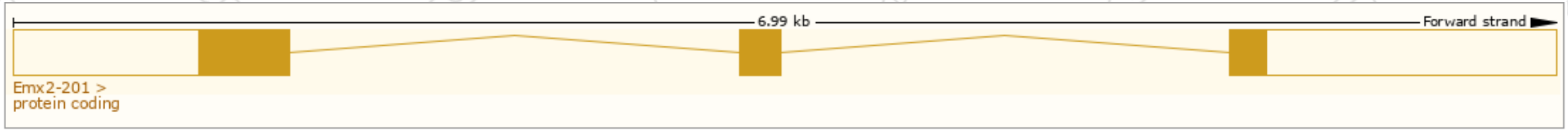
Official Symbol	Emx2 provided by MGI
Official Full Name	empty spiracles homeobox 2 provided by MGI
Primary source	MGI:MGI:95388
See related	Ensembl:ENSMUSG00000043969
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Pdo
Expression	Biased expression in ovary adult (RPKM 18.5), CNS E11.5 (RPKM 11.0) and 11 other tissues See more
Orthologs	human all

Transcript information（Ensembl）

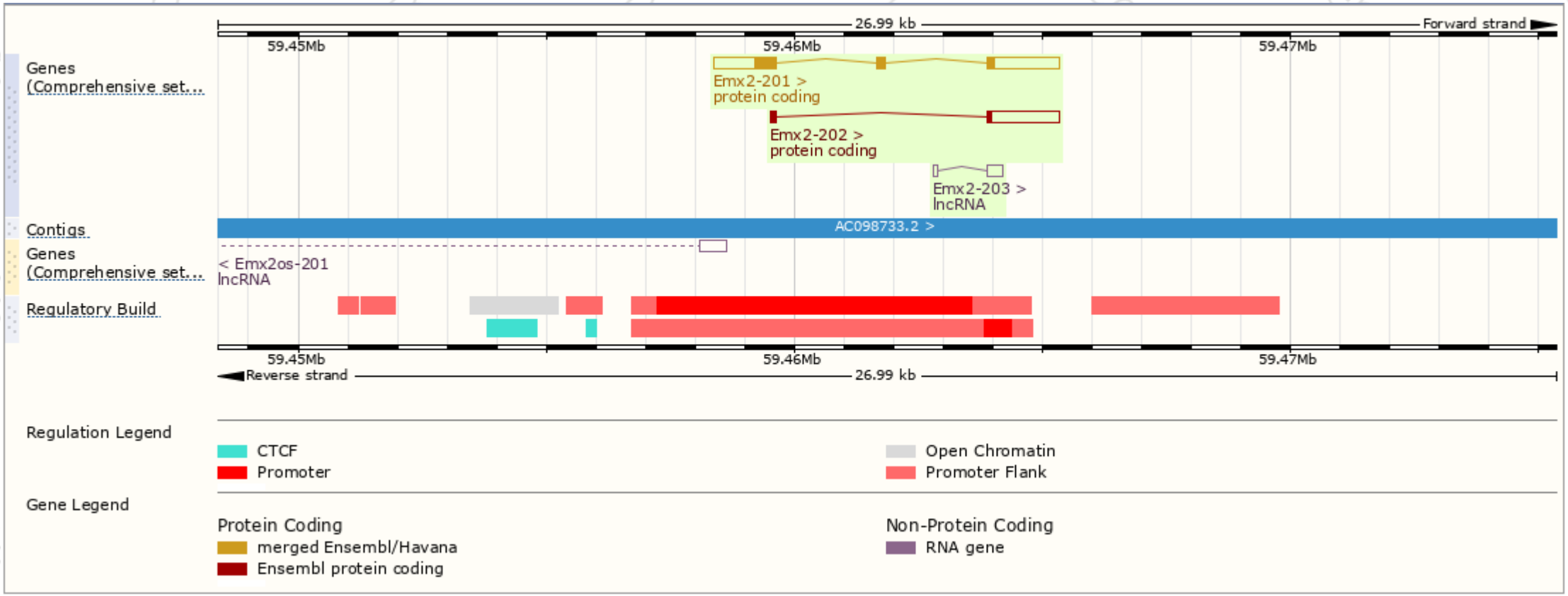
The gene has 3 transcripts, and all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Emx2-201	ENSMUST00000062216.3	2916	253aa	Protein coding	CCDS29937	Q04744	TSL:1 GENCODE basic APPRIS P1
Emx2-202	ENSMUST00000174353.1	1580	69aa	Protein coding	-	A0A087WQN3	CDS 5' incomplete TSL:5
Emx2-203	ENSMUST00000174573.1	422	No protein	lncRNA	-	-	TSL:2

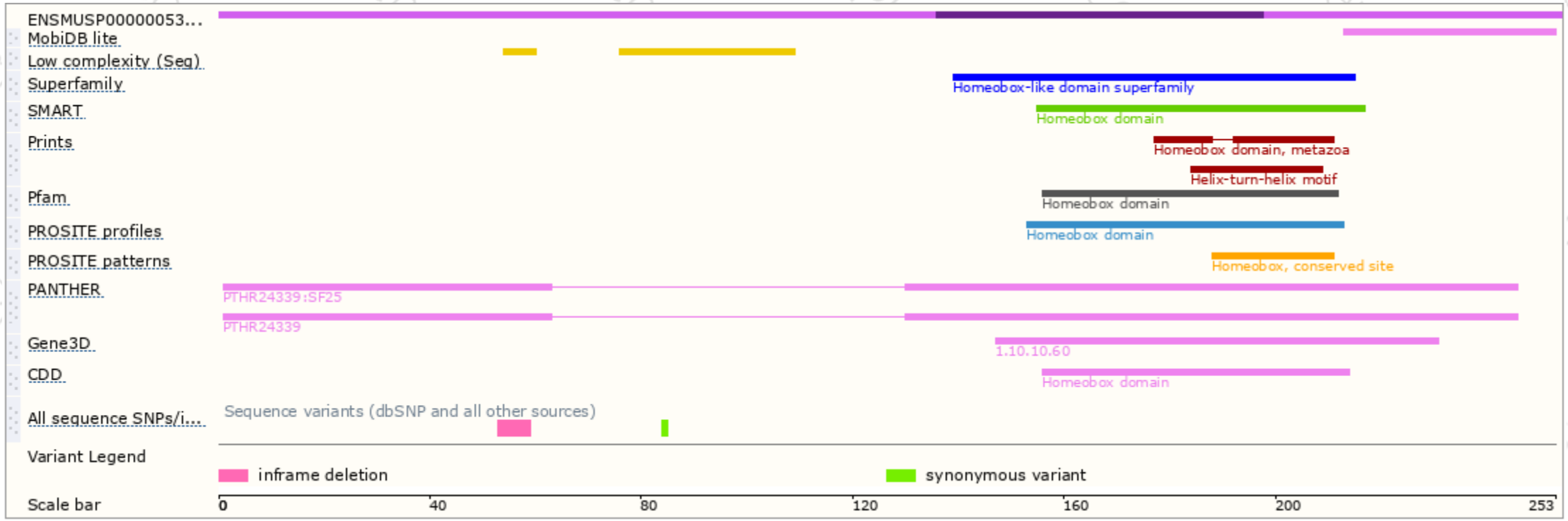
The strategy is based on the design of *Emx2*-201 transcript,The transcription is shown below



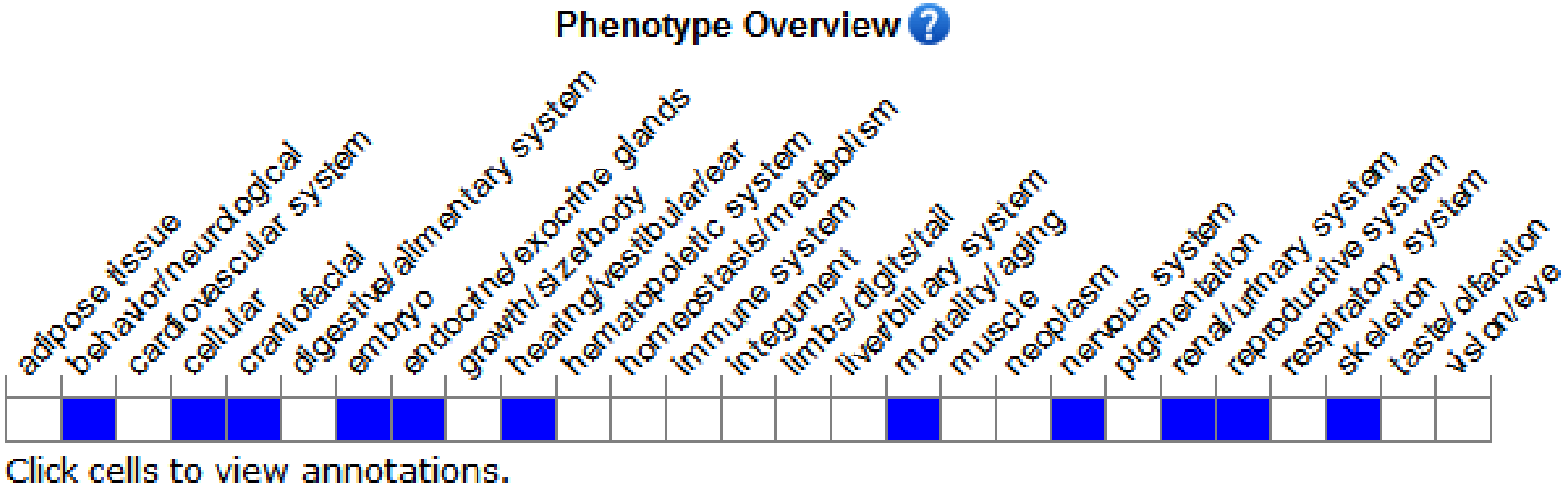
Genomic location distribution



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 disruption of this gene causes neonatal death, impaired urogenital development and malformation of several forebrain regions. Heterozygotes for a null allele show middle and inner ear defects. Homozygotes for an ENU-induced allele die neonatally with middle ear defects and small kidneys.

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

Tel: 025-5864 1534

集萃药康生物科技

GemPharmatech Co.,Ltd

GemPharmatech Co.,Ltd