

Gtf2a1 Cas9-KO Strategy

Designer:

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Project Overview

Project Name

Gtf2a1

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Gtf2a1* gene. The schematic diagram is as follows:



- The *Gtf2a1* gene has 3 transcripts. According to the structure of *Gtf2a1* gene, exon2-exon3 of *Gtf2a1-201* (ENSMUST00000021345.13) transcript is recommended as the knockout region. The region contains 310bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Gtf2a1* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Mice homozygous for a hypomorphic allele where D/G cleavage residues are replaced with noncleavable A/A show neonatal lethality, feeding defects, low testis weight, and male infertility associated with azoospermia, small seminiferous tubules, lack of elongating spermatids, and increased apoptosis.
- The *Gtf2a1* gene is located on the Chr12. 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)

Gtf2a1 general transcription factor II A, 1 [Mus musculus (house mouse)]

Gene ID: 83602, updated on 31-Jan-2019

Summary



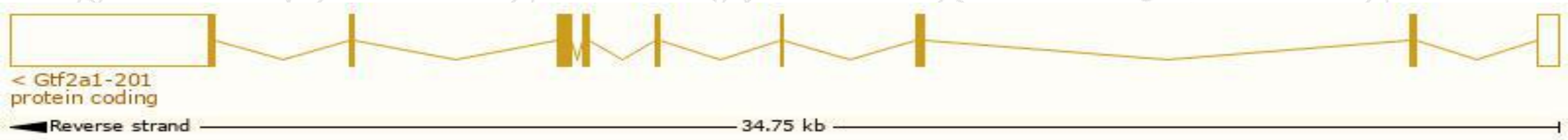
Official Symbol	Gtf2a1 provided by MGI
Official Full Name	general transcription factor II A, 1 provided by MGI
Primary source	MGI:MGI:1933277
See related	Ensembl:ENSMUSG00000020962
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	6330549H03Rik, AA536742, AA959775, AW060250, TfIIAa/b, TfIIa1
Expression	Ubiquitous expression in whole brain E14.5 (RPKM 9.2), CNS E11.5 (RPKM 8.9) and 28 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

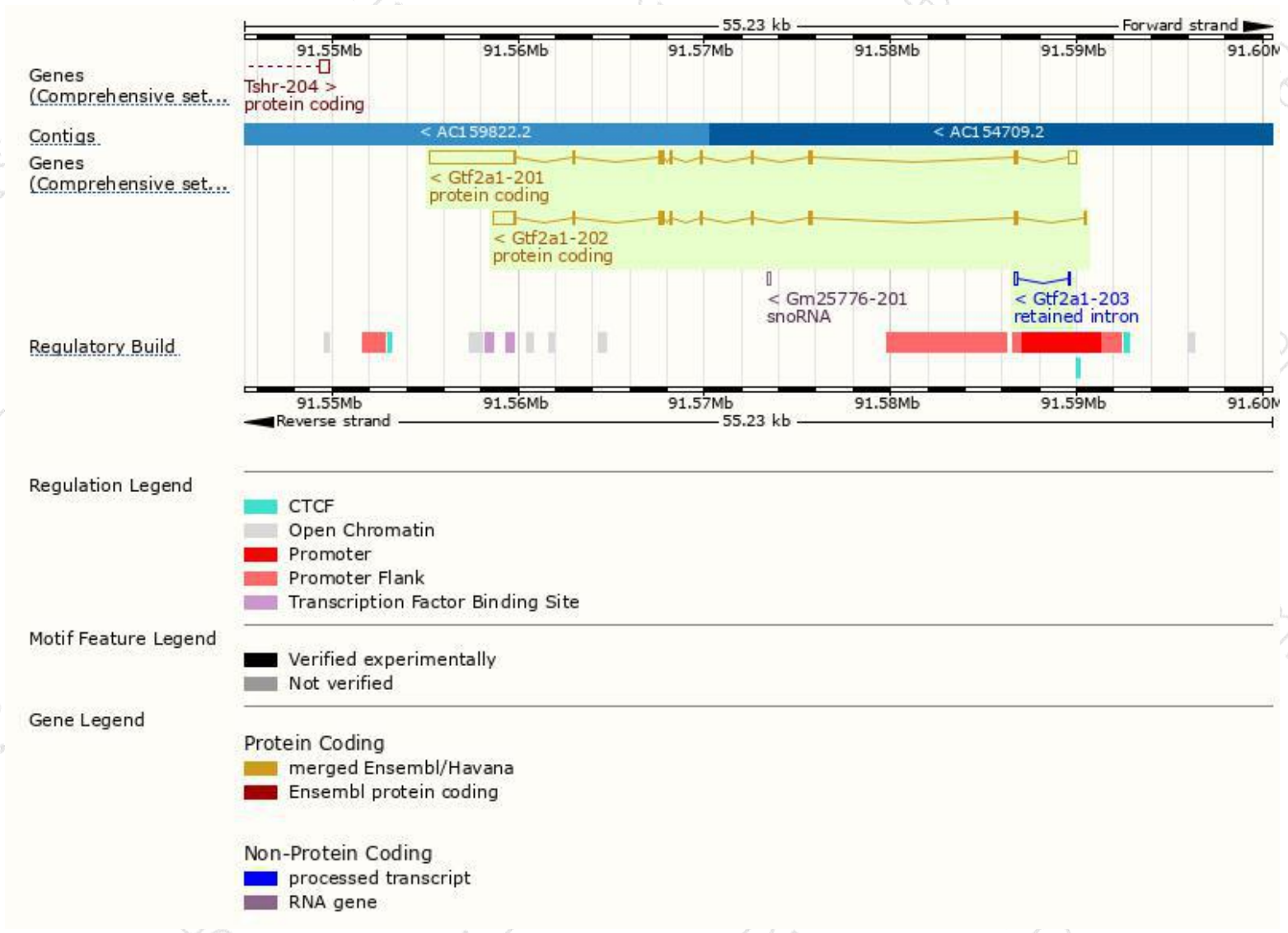
The gene has 3 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Gtf2a1-201	ENSMUST00000021345.13	6064	378aa	Protein coding	CCDS26089	Q99PM3	TSL:1 GENCODE basic APPRIS P1
Gtf2a1-202	ENSMUST00000063314.6	2265	339aa	Protein coding	CCDS49136	Q149E9	TSL:1 GENCODE basic
Gtf2a1-203	ENSMUST00000163693.1	282	No protein	Retained intron	-	-	TSL:3

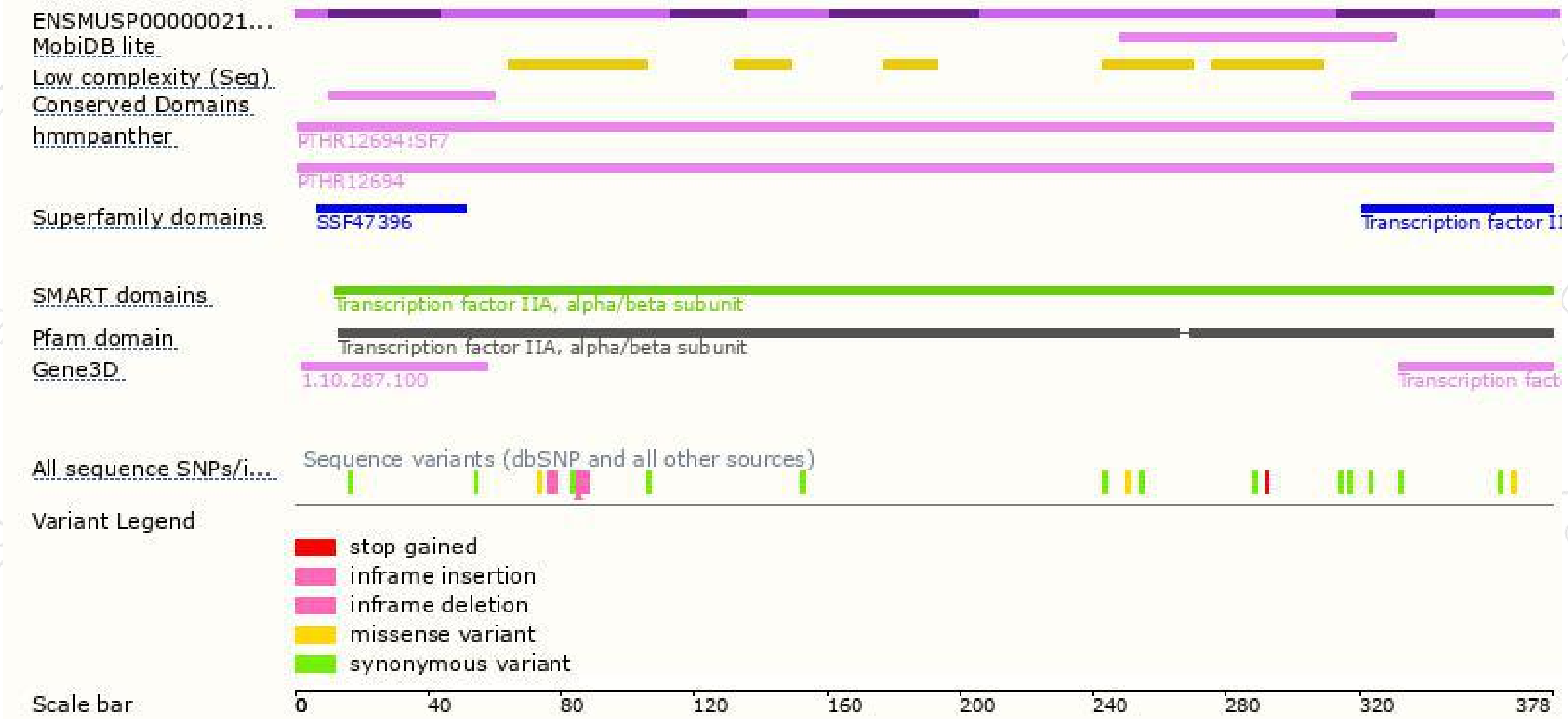
The strategy is based on the design of *Gtf2a1-201* transcript,The transcription is shown below



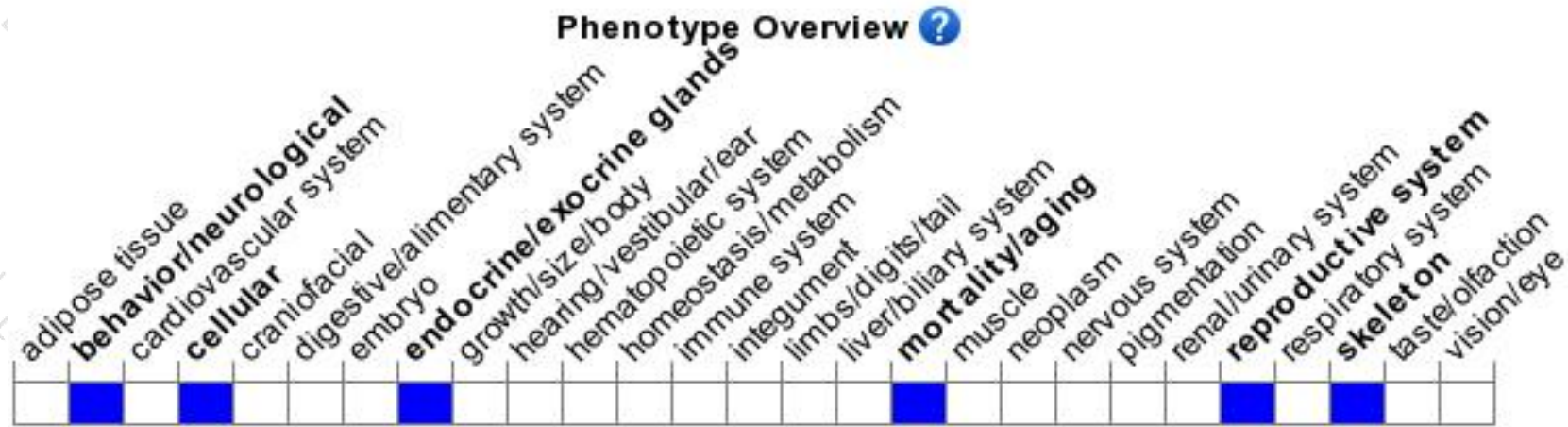
Genomic location distribution



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, Mice homozygous for a hypomorphic allele where D/G cleavage residues are replaced with noncleavable A/A show neonatal lethality, feeding defects, low testis weight, and male infertility associated with azoospermia, small seminiferous tubules, lack of elongating spermatids, and increased apoptosis.

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

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