

Apex1 Cas9-KO Strategy

Designer: Daohua Xu

Reviewer: Huimin Su

Design Date: 2020-9-18

Project Overview

Project Name

Apex1

Project type

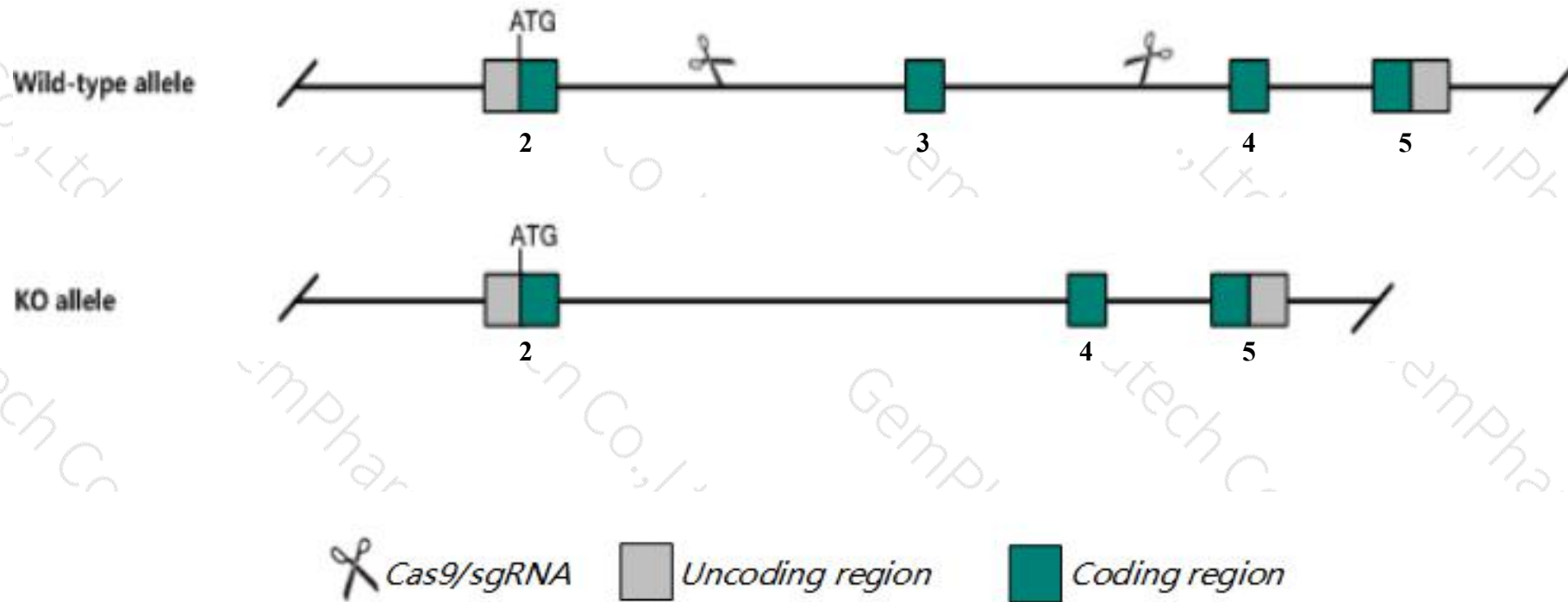
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Apex1* gene. The schematic diagram is as follows:



- The *Apex1* gene has 4 transcripts. According to the structure of *Apex1* gene, exon3 of *Apex1-201*(ENSMUST00000049411.11) transcript is recommended as the knockout region. The region contains 188bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Apex1* gene. The brief process is as follows: sgRNA was transcribed in vitro. Cas9 and 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.

- According to the existing MGI data, mice homozygous for a knock-out allele exhibit embryonic lethality prior to E10 associated with abnormal embryogenesis.
- The KO region contains functional region of the *Osgep, Pip4p1* gene. Knockout the region may affect the function of *Osgep, Pip4p1* gene.
- The *Apex1* gene is located on the Chr14. 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)

Apex1 apurinic/apyrimidinic endonuclease 1 [Mus musculus (house mouse)]

Gene ID: 11792, updated on 13-Mar-2020

Summary



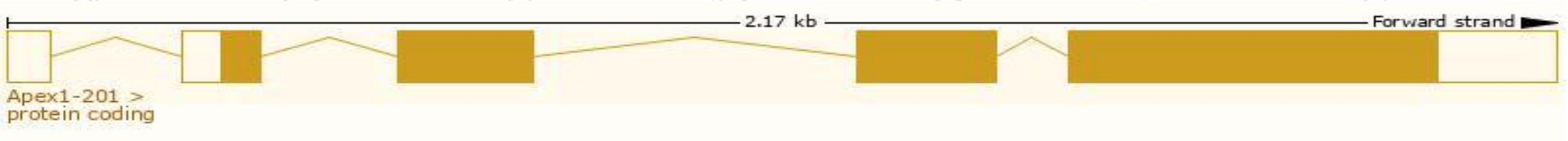
Official Symbol	Apex1 provided by MGI
Official Full Name	apurinic/apyrimidinic endonuclease 1 provided by MGI
Primary source	MGI:MGI:88042
See related	Ensembl:ENSMUSG00000035960
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	APE, Apex, HAP1, Ref-1
Expression	Ubiquitous expression in CNS E11.5 (RPKM 76.3), CNS E14 (RPKM 49.8) and 27 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

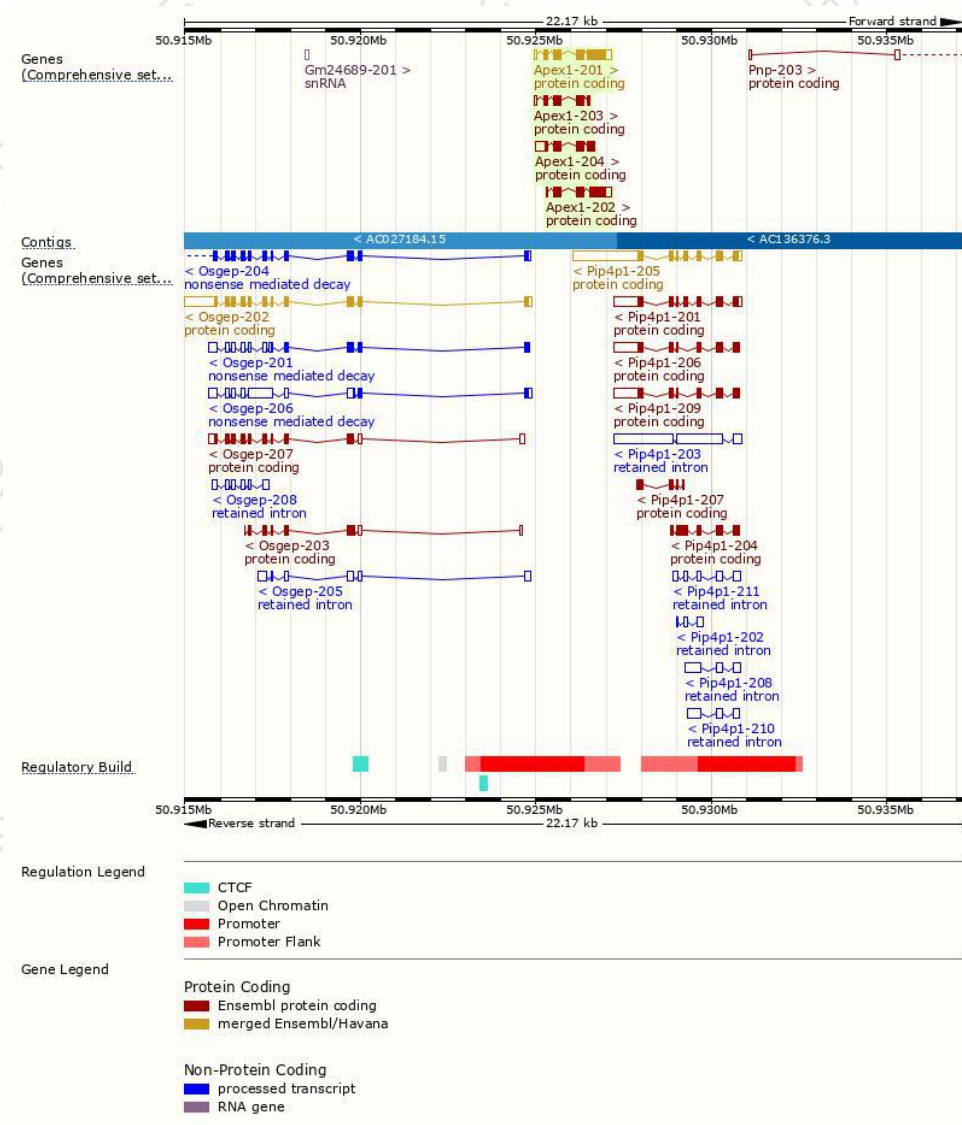
The gene has 4 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Apex1-201	ENSMUST00000049411.11	1239	317aa	Protein coding	CCDS27027	P28352 Q544Z7	TSL:1 GENCODE basic APPRIS P1
Apex1-202	ENSMUST00000128395.1	1036	289aa	Protein coding	-	F6QA74	CDS 5' incomplete TSL:5
Apex1-204	ENSMUST00000154288.2	935	214aa	Protein coding	-	D3Z6R9	CDS 3' incomplete TSL:2
Apex1-203	ENSMUST00000136753.7	655	177aa	Protein coding	-	D3Z124	CDS 3' incomplete TSL:2

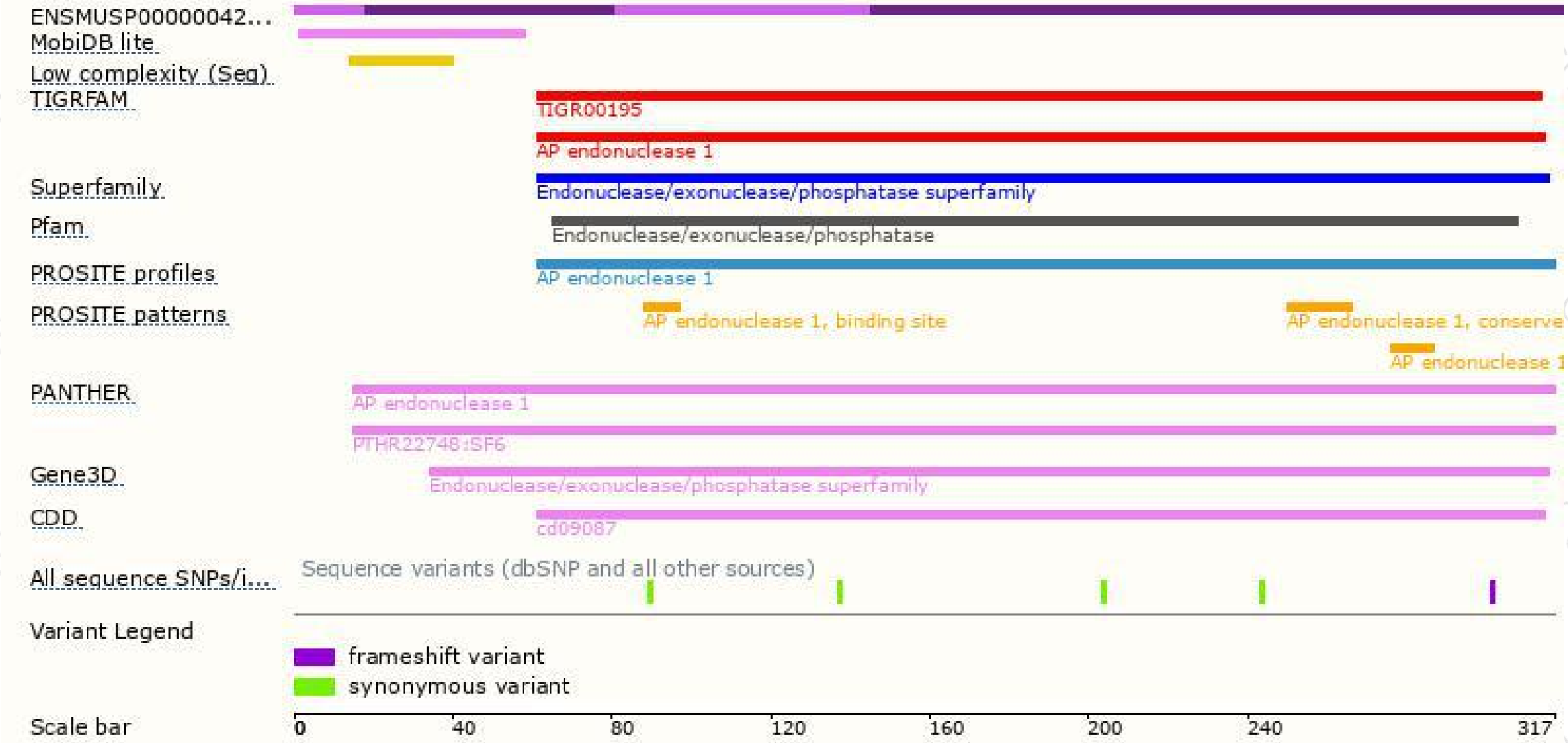
The strategy is based on the design of *Apex1-201* transcript,the transcription is shown below:



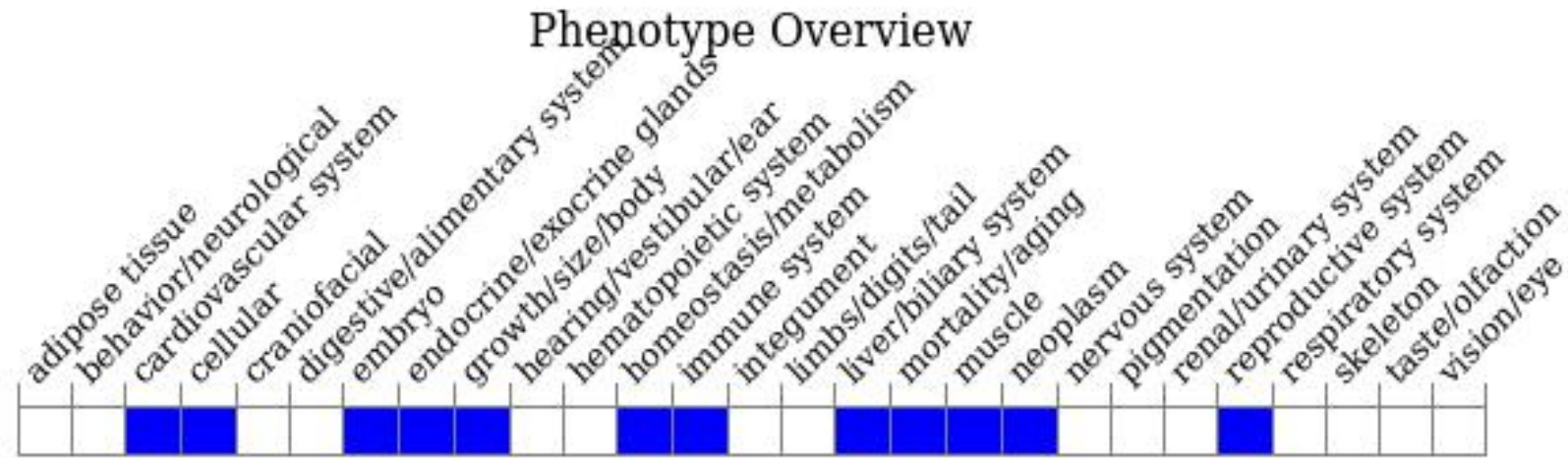
Genomic location distribution



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 knock-out allele exhibit embryonic lethality prior to E10 associated with abnormal embryogenesis.

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

Tel: 025-5864 1534

