

# Zic1 Cas9-KO Strategy

Designer: Yang Yang

Reviewer: Yanhua Shen

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# Overview

## Target Gene Name

- Zic1

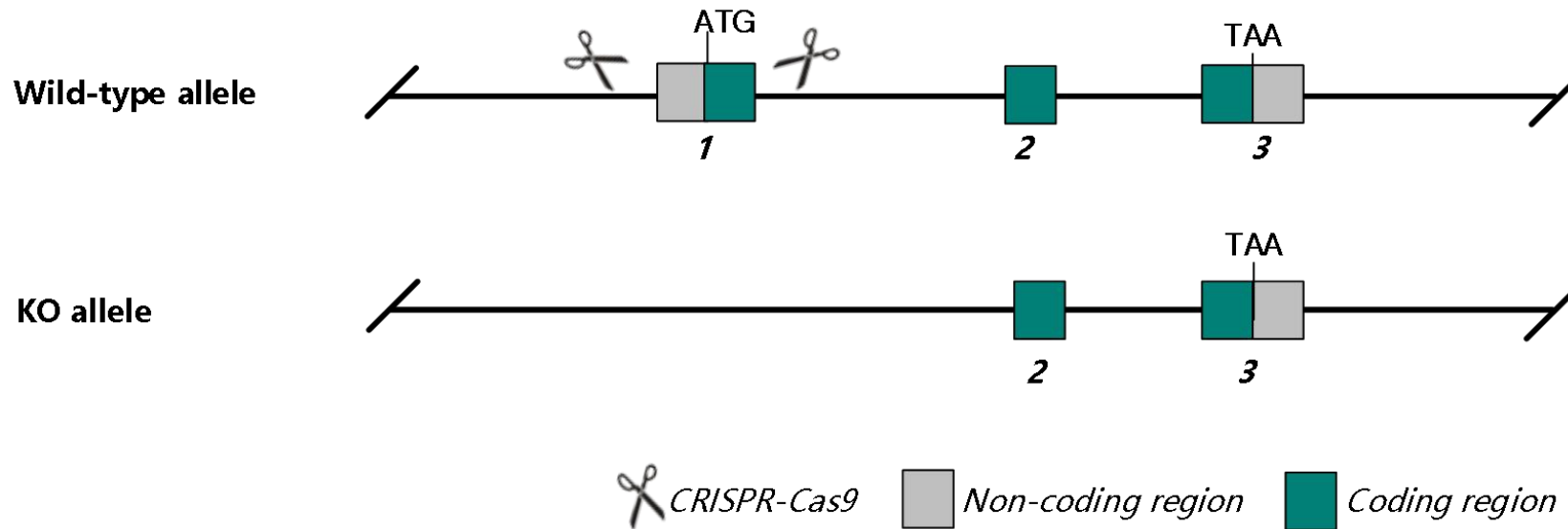
## Project Type

- Cas9-KO

## Genetic Background

- C57BL/6JGpt

# Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Zic1* gene.

# Technical Information

- The *Zic1* gene has 3 transcripts. According to the structure of *Zic1* gene, exon 1 of *Zic1*-201 (ENSMUST00000034927.13) transcript is recommended as the knockout region. The region contains 982 bp of coding sequences. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Zic1* gene. The brief process is as follows: gRNAs were transcribed in vitro. Cas9 and gRNAs 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.

# Gene Information

**Zic1** zinc finger protein of the cerebellum 1 [ *Mus musculus* (house mouse) ]

Gene ID: 22771, updated on 17-Jan-2023

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## Summary

**Official Symbol** **Zic1** provided by [MGI](#)

**Official Full Name** zinc finger protein of the cerebellum 1 provided by MGI

Primary source [MGI:MGI:106683](#)

**See related** [Ensembl:ENSMUSG00000032368](#) [AllianceGenome:MGI:106683](#)

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 **ZIC; ZNF201**

**Summary** Enables DNA-binding transcription activator activity, RNA polymerase II-specific and RNA polymerase II cis-regulatory region sequence-specific DNA binding activity. Involved in several processes, including central nervous system development; positive regulation of protein import into nucleus; and regulation of smoothened signaling pathway. Acts upstream of or within adult walking behavior and central nervous system development. Located in cytoplasm and nucleus. Is expressed in several structures, including central nervous system; embryo mesenchyme; future brain; metanephros; and visual system. Used to study Dandy-Walker syndrome and Joubert syndrome. Human ortholog(s) of this gene implicated in Dandy-Walker syndrome and craniosynostosis. Orthologous to human ZIC1 (Zic family member 1). [provided by Alliance of Genome Resources, Apr 2022]

**Expression** Biased expression in cerebellum adult (RPKM 92.7), whole brain E14.5 (RPKM 45.5) and 4 other tissues [See more](#)

Orthologs [human](#) [all](#)

NEW

Try the new [Gene table](#)

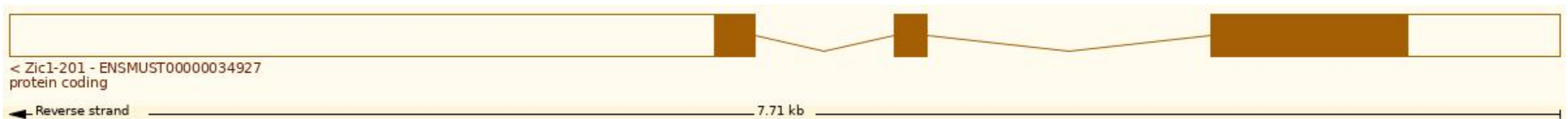
Try the new [Transcript table](#)

# Transcript Information

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

Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
<a href="#">ENSMUST00000034927.13</a>	Zic1-201	5606	<a href="#">447aa</a>	Protein coding	<a href="#">CCDS23403</a>	<a href="#">P46684</a>	Ensembl Canonical Gencode basic APPRIS P1 TSL:1
<a href="#">ENSMUST00000065360.5</a>	Zic1-202	2811	<a href="#">447aa</a>	Protein coding	<a href="#">CCDS23403</a>	<a href="#">P46684</a>	Gencode basic APPRIS P1 TSL:1
<a href="#">ENSMUST00000173121.2</a>	Zic1-203	395	No protein	Protein coding CDS not defined		-	TSL:5

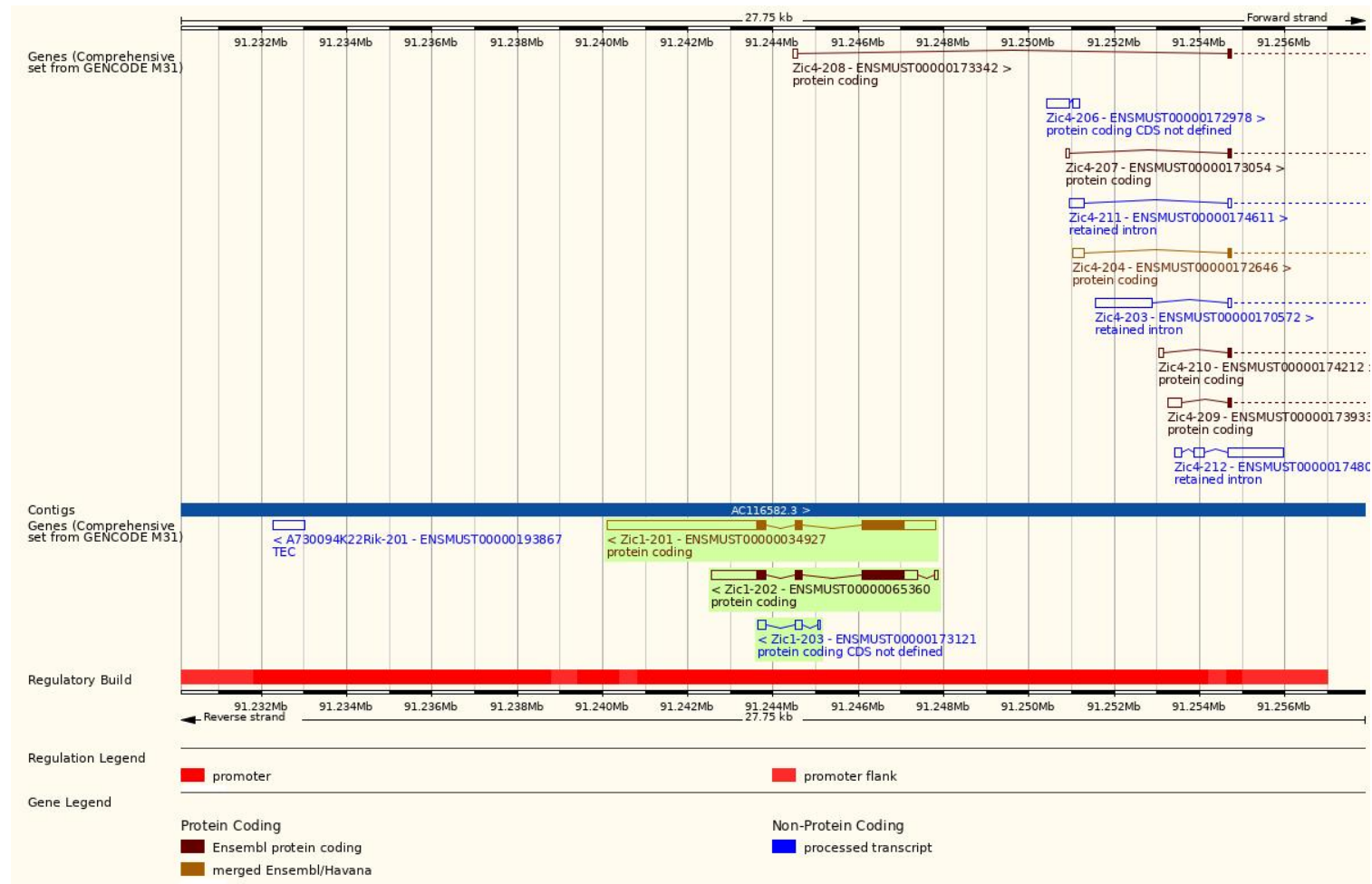
The strategy is based on the design of *Zic1*-201 transcript, the transcription is shown below:



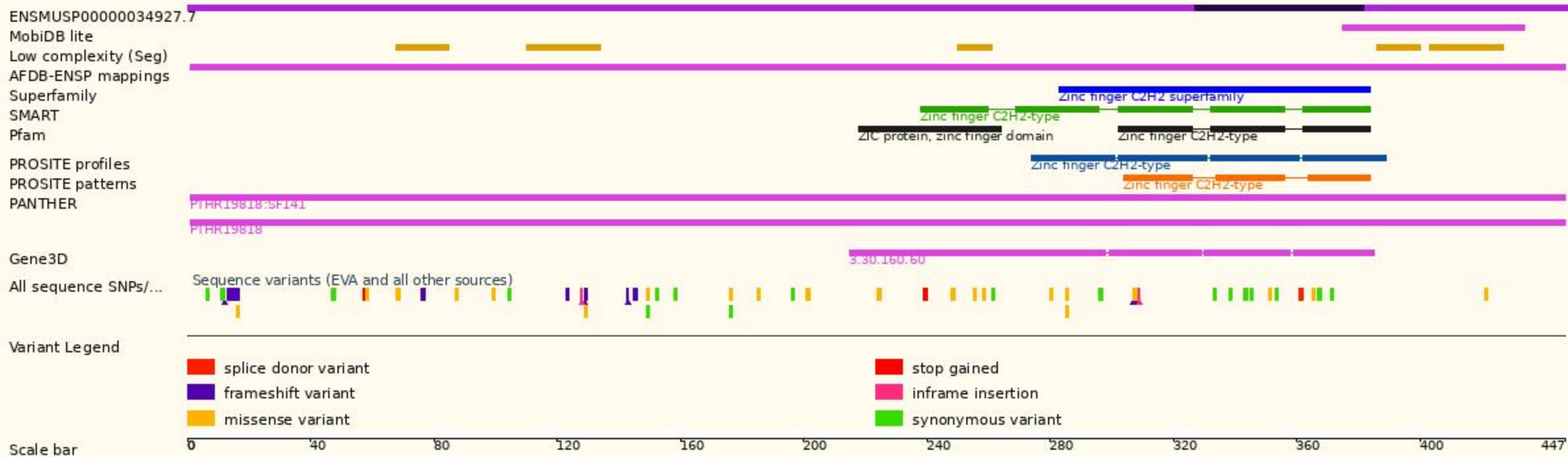
Source: <https://www.ensembl.org>



# Genomic Information

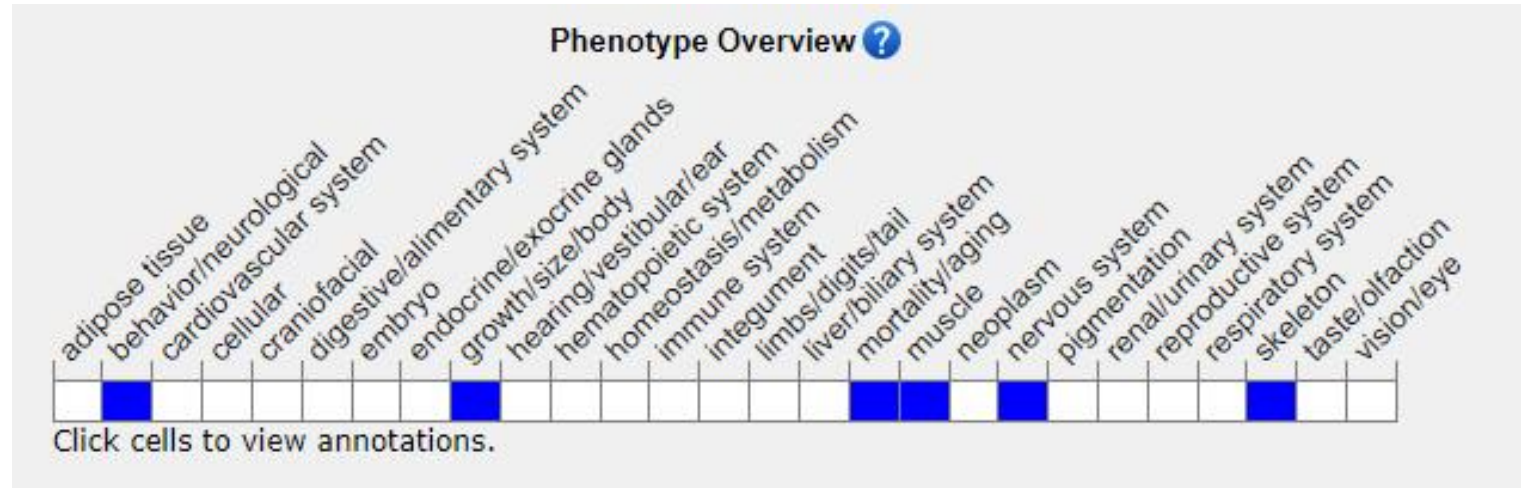


# Protein Information





# Mouse Phenotype Information (MGI)



- Homozygous mutants show cerebellar hypoplasia with a missing lobule of the anterior lobe. Newborn pups suckle poorly. 50% die within one day of birth and almost all die within 3 weeks; longer survivors show marked ataxia and exhibit tonic convulsions.

# Important Information

- This strategy may affect the regulatory expression of the side gene *Zic4*.
- *Zic1* is located on Chr 9. 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 risks of the mutation on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.