

# *Aldh5a1* Cas9-KO Strategy

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# Overview

## Target Gene Name

- *Aldh5a1*

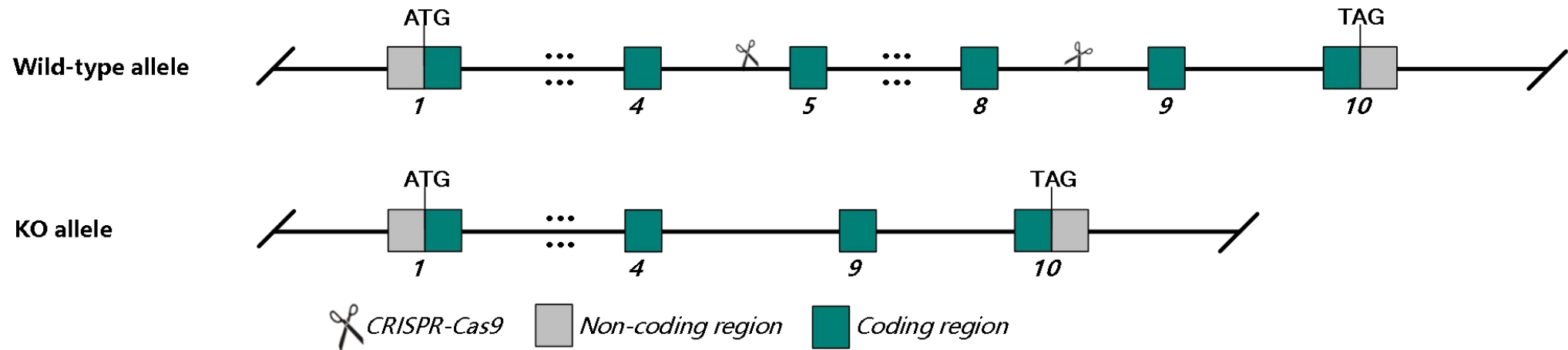
## Project Type

- Cas9-KO

## Genetic Background

- C57BL/6JGpt

# Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Aldh5a1* gene.

# Technical Information

- The *Aldh5a1* gene has 1 transcript. According to the structure of *Aldh5a1* gene, exon 5-8 of *Aldh5a1*-201 (ENSMUST00000037615.7) is recommended as the knockout region. The region contains 617 bp of coding sequence. Knocking out the region will result in disruption of gene function.
- In this project we use CRISPR-Cas9 technology to modify *Aldh5a1* gene. The brief process is as follows: CRISPR-Cas9 system 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

**Aldh5a1** aldehyde dehydrogenase family 5, subfamily A1 [ *Mus musculus* (house mouse) ]

[Download Datasets](#)

Gene ID: 214579, updated on 8-Feb-2024

## Summary

<b>Official Symbol</b>	Aldh5a1 provided by <a href="#">MGI</a>
<b>Official Full Name</b>	aldehyde dehydrogenase family 5, subfamily A1 provided by <a href="#">MGI</a>
<b>Primary source</b>	<a href="#">MGI:MGI:2441982</a>
<b>See related</b>	<a href="#">Ensembl:ENSMUSG00000035936</a> <a href="#">AllianceGenome:MGI:2441982</a>
<b>Gene type</b>	protein coding
<b>RefSeq status</b>	VALIDATED
<b>Organism</b>	<a href="#">Mus musculus</a>
<b>Lineage</b>	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
<b>Also known as</b>	Ahd1; Ahd-1; SSADH; Ssdh1; 6330403E24Rik; D630032B01Rik
<b>Summary</b>	Predicted to enable several functions, including NAD binding activity; identical protein binding activity; and succinate-semialdehyde dehydrogenase (NAD+) activity. Acts upstream of or within carboxylic acid metabolic process; neurotransmitter catabolic process; and post-embryonic development. Located in mitochondrion. Used to study epilepsy. Human ortholog(s) of this gene implicated in succinic semialdehyde dehydrogenase deficiency. Orthologous to human ALDH5A1 (aldehyde dehydrogenase 5 family member A1). [provided by Alliance of Genome Resources, Apr 2022]
<b>Expression</b>	Ubiquitous expression in cerebellum adult (RPKM 11.4), frontal lobe adult (RPKM 11.3) and 26 other tissues <a href="#">See more</a>
<b>Orthologs</b>	<a href="#">human</a> <a href="#">all</a>
<b>NEW</b>	Try the new <a href="#">Gene table</a> Try the new <a href="#">Transcript table</a>

## Genomic context

**Location:** 13 A3.1; 13 10.77 cM

See Aldh5a1 in [Genome Data Viewer](#)

**Exon count:** 11

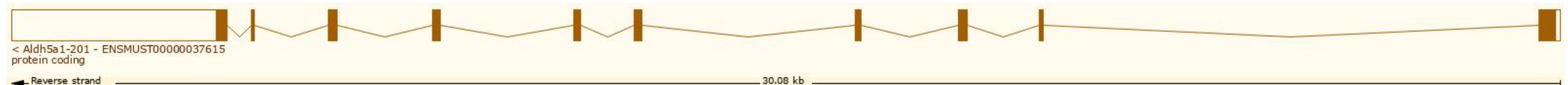
<https://www.ncbi.nlm.nih.gov/gene/214579>

# Transcript Information

The gene has 1 transcript, the transcript is shown below:

Show/hide columns (1 hidden)							Filter	
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags	
<a href="#">ENSMUST00000037615.7</a>	Aldh5a1-201	5647	<a href="#">523aa</a>	Protein coding	<a href="#">CCDS26383</a>	<a href="#">B2RS41</a> <a href="#">Q8BWF0</a>	Ensembl Canonical	GENCODE basic APPRIS P1 TSL:1

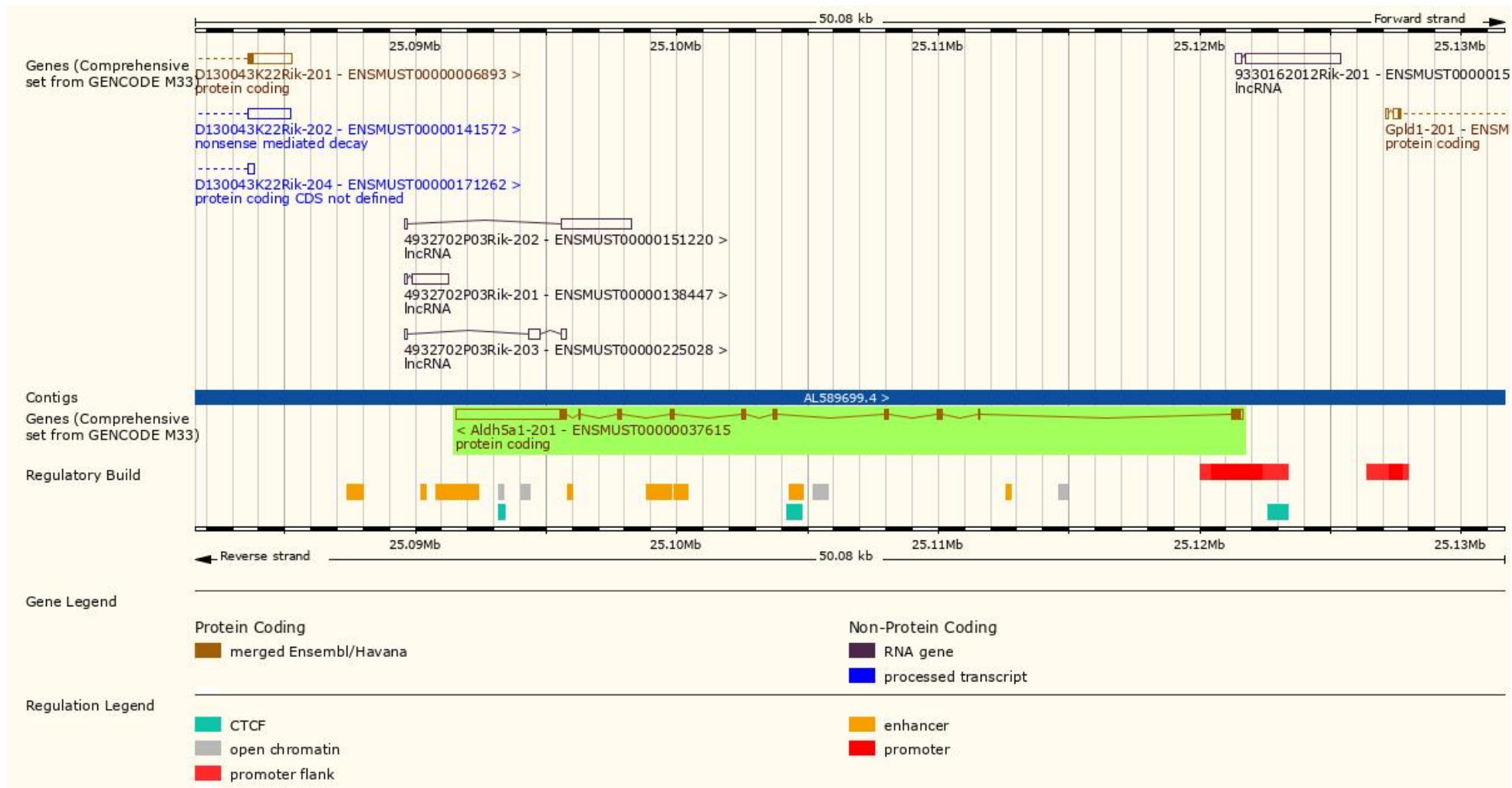
The strategy is based on the design of *Aldh5a1*-201 transcript, the transcription is shown below:



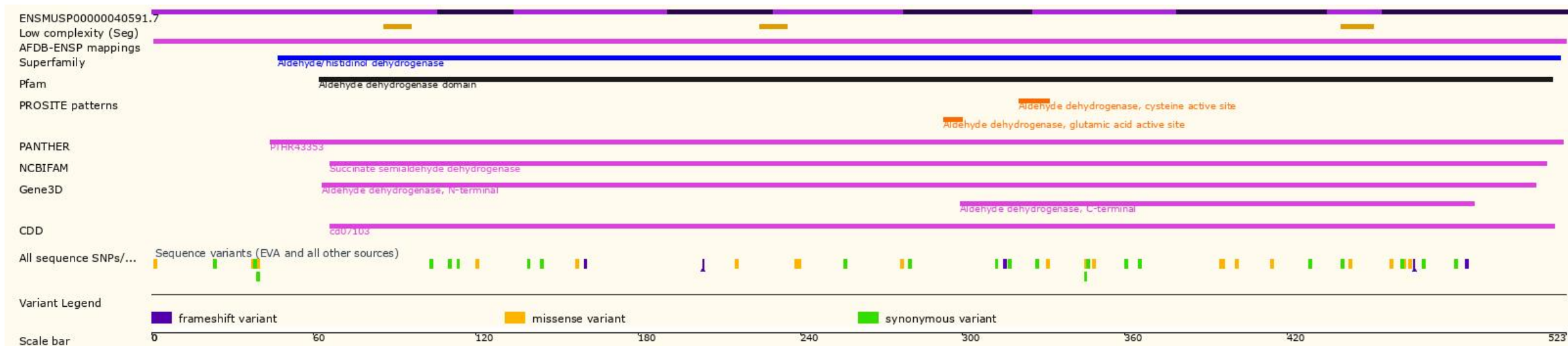
Source: <http://asia.ensembl.org/>



# Genomic Information

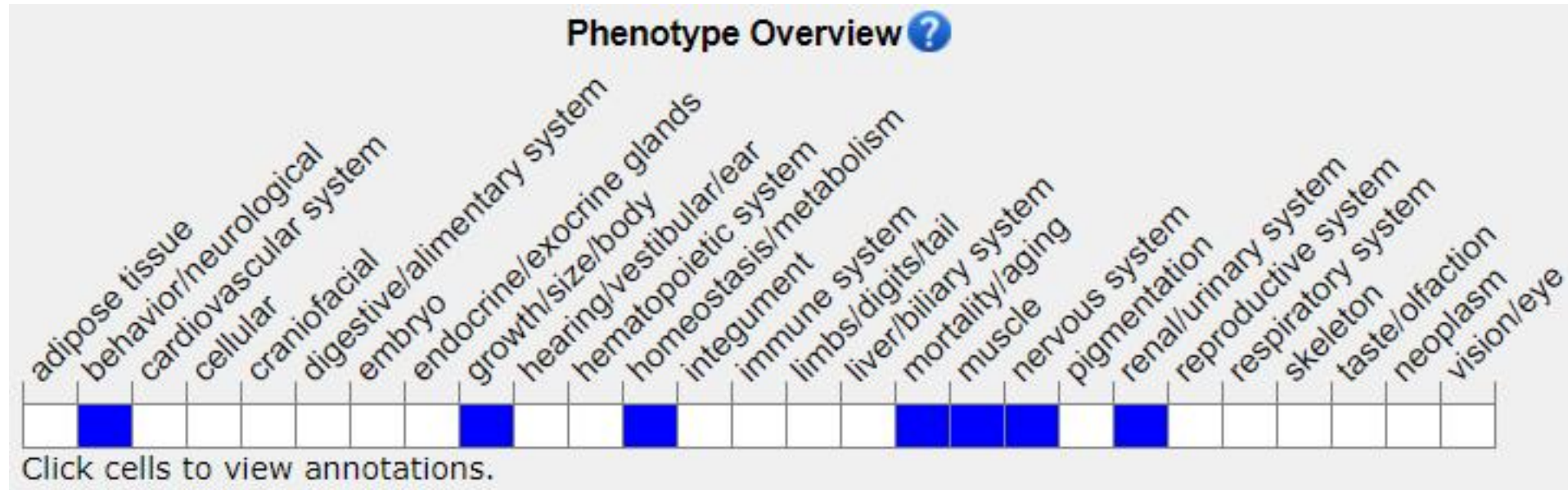


# Protein Information





# MGI Information



Homozygous mutation of this gene results in reduced body weight, ataxia, seizures, gliosis of the hippocampus, and early death.

# Important Information

- A part of amino acid sequence (230 aa) will still remain at the N-terminal of *Aldh5a1*-201 transcript.
- The knockout region overlaps with *4932702P03Rik* lncRNA, which may affect the regulation of this lncRNA.
- *Aldh5a1* is located on Chr 13. 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 on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.